Royal Mail Group Limited

Royal Mail Mount Pleasant Sorting Office – Calthorpe Site

Interpretative Geotechnical Report

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Author	Svetislav Trajkovski	**Technical reviewer**	Jonathan Bailey
Signature		Signature	
Date:	1st February 2017	Date:	1st February 2017
Project manager	Svetislav Trajkovski	**Quality reviewer**	Carys Baker
Signature		Signature	
Date:	1st February 2017	Date:	1st February 2017

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1 INTRODUCTION

RSK Environment Limited (RSK) was commissioned by The Livemore Partnership LLP, on behalf of Royal Mail Group Limited (the 'Client') to carry out a geotechnical assessment of the land at Mount Pleasant Sorting Office (Clathorpe Street Site), London. It is understood the site is being considered for mixed-use redevelopment with the construction of high-rise residential tower blocks and commercial properties, and structural refurbishment of the existing Royal Mail main sorting office building.

This report is subject to the RSK service constraints given in Appendix A.

1.1 Objective

The objective of the work is to provide information on ground conditions beneath the site to assist the geotechnical design of the proposed development.

1.2 Scope

The project was carried out to an agreed brief as set out in RSK's proposal (ref: BoQ Clathorpe Site - 28549 07, dated 16th September 2016). The scope of works for the assessment included:

i. Intrusive investigation, including:
   - deep boreholes by rotary and cable percussive methods, with the installation of shallow and deep groundwater monitoring wells;
   - shallow drive-in sampling boreholes, with the installation of shallow groundwater monitoring wells;
   - machine excavated trial pits;
   - hand excavated trial pits
   - self-boring pressuremeter testing within three cable percussive borehole locations;
   - an UXO watching brief and down-hole magnetometer survey;
   - an archaeological watching brief (carried out by others and reported directly to the client);

ii. off site analysis for geotechnical purposes;

iii. a ground investigation report (GIR) including:
   - a description of the site and the works carried out, the exploratory hole logs, in-situ and laboratory testing results;
   - a presentation of all appropriate geotechnical information including geological features and relevant data;
   - a geotechnical evaluation of the information;

iv. interpretive geotechnical report including:

- a review of geotechnical data and recommendations on characteristic soil parameters for geotechnical design in relation to the proposed development;
- results of a preliminary numerical analysis on piled foundations;
- a discussion and recommendations on relevant geotechnical matters in relation to the proposed development, including ground and basement floors, retaining wall design parameters, and chemical attack on buried concrete.

Other than an inspection of geological maps, no comprehensive desk study has been undertaken as part of this investigation. A Preliminary Risk Assessment been completed by Waterman Infrastructure & Environment and their report was made available prior these works.

The chemical testing of samples of soil and water for contamination including testing to detect the presence of gas in the ground has not formed part of this investigation, and was carried out by Waterman Infrastructure & Environment.

The factual element of the investigation (items i to iii) has been covered by RSK's "Royal Mail Mount Pleasant Sorting Office – Calthorpe Site Ground Investigation Report (GIR)", ref: 28549-GIR01(00). Section 2 provides an overview of the findings contained within this report.

1.3 Limitations

The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows may vary from those reported due to seasonal, or other, effects.

2 SUMMARY OF THE GROUND IINVESTIGATION (GIR) REPORT

2.1 Site location and description

The Clathorpe Site is located at National Grid reference 531250^{E}, 181850^{N}, as shown on Figure 1. Farringdon Road bounds the site to the east and north east, the southern boundary is formed by Rosebery Avenue and Mount Pleasant, while Phoenix Place (Street) and Clathorpe Street bound the site to the west and south west, and north, respectively.

The site covers an area of approximately 4.8 hectares, and comprises the main sorting office building to the south, and an external area in the central and northern portions of the site (known as the 'Bathtub'). The latter is used as loading bays and a car-park for Royal Mail vehicles, with access roads at the northern, eastern and western perimeters of the site (Figure 2 and Figure 4). The 'Bathtub' lies at around 14.5mAOD, surrounded by up to 5m high concrete retaining structures at its northern, eastern and western boundaries, with the remainder of the site and surrounding perimeter roads at 19mAOD.

The majority of the site is covered with buildings and bituminous/concrete hardstanding, with small soft landscaping areas only present along the northern boundary. A fuel filling station and a vehicle washing area are present in the northern part of the 'Bathtub', with the fuel storage tanks located on plinths beneath the northern concrete ramp.

Post Office Railway ('Mail Rail') tunnels running in the north-south direction and station are located beneath the centre of the site, with the rail maintenance depot close to the south western boundary. A combined sewer, (River Fleet Sewer branch) runs east to west beneath the northern part of the site, connecting with the culverted River Fleet, which runs north to south, beneath Phoenix Place. The LUL Metropolitan Lane tunnels run beneath Farringdon Road to the east.

The site surroundings comprise mixed residential / commercial properties, typical for the urban area of central London.

2.2 Proposed development

The proposed development of the site will comprise the demolition of existing buildings and structures in the central and northern part of the site to make way for six new buildings ranging from three to twelve storeys providing residential, office and retail space, with associated energy centre, waste and storage areas, and vehicle and cycle parking. Areas of hard and soft landscaping are also proposed to provide public and private areas of open space.

The main sorting office building will be retained and refurbished with construction of an acoustic roof deck over the existing servicing yard to the south. In addition, the proposals include alterations to the public highway and the construction of a new dedicated vehicle ramp to basement level in order to service Royal Mail operations.

The planned layout of the site is shown on Figure 3.

2.3 Preliminary Geotechnical Category

Based on the available information on the existing site conditions and the proposed development, a Geotechnical Category 2 has been assumed for structures outside zones of the Mail Rail tunnels and River Fleet sewer branch. An increased (Geotechnical Category 3) was assumed for structures proposed within these areas.

2.4 Anticipated Geology, hydrogeology and hydrology

Published records (British Geological Survey) for the area indicate that the superficial geology of the site is characterised by the Hackney Gravel Member of the River Terrace Deposits, with alluvial deposits associated with the historical course of the River Fleet also shown to the west and south west of the site. The underlying solid geology comprises a sequence of the London Clay Formation, the Lambeth Group and the Thanet Sand Formation, with the White Chalk Subgroup at depth.

Information available from the previous investigation confirms the predicted succession, revealing that the site is underlain by up to 9.2m of made ground, over between 0.8m to 2.2m of soft to firm alluvial clays and silts found in the southern part of the site. The Hackney Gravel Member beneath was encountered as loose to medium dense clayey, gravelly sand with thickness of between 0.2m to 3.1m. Towards the north western portion of the site, sandy gravel, sandy clay with occasional sand lenses, and clayey gravelly sand soils extended to a depth of 22.0m, indicating the potential presence of a drift filled hollow feature in this area of the site. Apart from the location of the drift filled hollow feature, the London Clay was present at all other locations, at depths of between 3.0m to 11.1m, comprising firm to stiff and very stiff, silty clay with sand lenses. The Lambeth Group soils comprised stiff to very stiff mottled clays with silt and sand lenses, and medium dense to dense (locally very dense) sandy gravels and silty sands encountered to depths of between 28.0m to 35.0m. This was followed by very dense grey sand of the Thanet Sand Formation to depths of 35.5m and 41.2m, with the White Chalk Sub-group at depth.

In addition, it is considered likely that the foundations of the Coldbath Field Prison and the former Royal Mail building previously occupying the site may not have not been removed prior to the construction of the current structures, and may still be encountered.

Based on the published geological information and Waterman's Preliminary Environmental Risk Assessment, the hydrogeology of the site is likely to be characterised by the presence of an unconfined shallow Secondary A Aquifer comprising the Alluvium and the Hackney Gravel Member, overlying the London Clay Formation, which is classified as an Unproductive Strata.

Confined by the London Clay Formation, are deep Secondary A Aquifers comprising the Lambeth Group and the Thanet Sand Formation, with the White Chalk Sub-group (Principal Aquifer), at depth. These units are expected to be in hydraulic continuity.

It is also possible that localised perched water may also be present in the made ground.

As defined within CIRIA Special Publication 69 (Simpson et al., 1989), the site lies within the 'Critical Area' of the London Basin in which deep structures are potentially at risk

from the rising groundwater levels in the deep aquifer. Deep structures include basements deeper than about 20m and other structures whose foundations extend to between 30m and 50m below ground level.

The Environment Agency (EA) status report issued in 2016 'Management of the London Basin Chalk Aquifer' indicates that the piezometric surface of the groundwater in the deep aquifer in the site area in January 2016 was at approximately -35mAOD, i.e. approximately between 49m and 54m below existing ground levels.

There are no ponds, streams or drainage ditches on or adjacent to the site. The nearest identified surface feature to the site is the Regents Canal, located approximately 1.1km to the north of the site. The River Thames is some 1.6km to the south.

Reference to '*The Lost Rivers of London'* (Barton, 1992) and '*London's Lost Rivers'* (Talling, 2011), indicates that the River Fleet historically flowed southwards (just to the west of the site). The current information confirms that this watercourse has been culverted in a sewer flowing beneath Phoenix Place, however, the alluvial tract of the original watercourse is expected to extend beneath the footprint of the site.

The indicative floodplain map for the area, published by the EA, shows that the site does not lie within the designated floodplain of the River Thames.

2.5 Site investigation, soil sampling and laboratory testing

The intrusive investigation was carried out between 26th September and 10th November 2016. The locations of the investigation points were pre-determined by the Engineer and the Designer to obtain geotechnical data below the footprints of the proposed buildings and in the area of the Royal Mail tunnel. Due to its location affecting the daily operations of the Royal Mail staff, the drilling of borehole BH02 (proposed to be carried out within the centre of the northern basement) has not been undertaken.

The ground investigation has been carried out using intrusive ground investigation techniques considering the anticipated ground conditions, existing land use, access constraints and the proposed development, in general accordance with the recommendations of BS5930: 2015 Code of practice for ground investigations, which maintains compliance with BS EN 1997-1 and 1997-2 and their related standards.

The sampling and insitu testing (including the self-boring pressuremeter testing) has been carried out in accordance with the requirements provided within the SI specification and agreed with the Engineer and the Designer.

Depths to groundwater were recorded by RSK on a single occasion, using an electronic dip meter. Further groundwater monitoring has been carried out by the Engineer and the results made available for comment.

The locations of the intrusive investigation are shown in Figure 4, and the rationale for these locations is given in Table 1.

Table 1: Exploratory hole location rationale

Exploratory hole number	Investigation Type	Rationale
All borehole locations	Diamond coring	To create openings in the surface hardstanding for follow-on drilling work
BH01 and BH03	Rotary coring method	To prove the geological succession beneath the site and obtain data for the purpose of geotechnical design. To enable installation of shallow and deep ground-gas and groundwater monitoring wells
BH04 to BH10 & BH16 to BH18	Light cable percussive method	
WS01 to WS12 & WS19 to WS30	Drive-in sampling method	To prove shallow ground conditions beneath the site and obtain data for the purpose of contamination analysis. To enable installation of shallow ground-gas and groundwater monitoring wells
TP11 to TP17	Machine excavated trial pits	To prove shallow ground conditions and obtain data for the purpose of contamination analysis and waste disposal purposes.
HP01 to HP07	Hand excavated trial pits	
BH05; BH06 & BH18	Self boring pressuremeter testing	To provide soil parameters for the purpose of geotechnical design
WS01 to WS12; BH05 to BH07 & BH16 to BH17	Down-hole UXO magnetometer survey	To confirm absence of unexploded ordnance to enable advancing exploratory holes
All BH's WS02 to WS12; WS19; WS21; WS23; WS24; WS26 & WS27	Monitoring well installations	To enable measurement of ground gas and groundwater levels

The exploratory holes were logged by an engineer in general accordance with the recommendations of BS 5930:2015 (which incorporates the requirements of BS EN ISO 14688-1, 14688-2 and 14689-1) and 'CIRIA C574 Engineering in Chalk'. (CIRIA 2002). Whilst every attempt was made to record full details of the strata encountered in the exploratory holes, techniques of hole formation and sampling will inevitably lead to disturbance, mixing or loss of material in some soils and rocks.

The sampling and in-situ testing strategy was designed to characterise the made ground and natural strata beneath the site, and to provide information on the mechanical characteristics of the underlying soils for the purpose of geotechnical design.

Standard penetration tests (SPTs) were carried out within the made ground and the natural strata, at regular intervals of approximately 1m in the initial 5m depths, and then at 1.5m intervals to the terminal depth of the boring. The tests were undertaken in

accordance with BS EN ISO 22476-3:2005 using a hammer, which had been calibrated for efficiency.

In cohesive strata the SPT tests were alternated with collecting undisturbed ‘thin wall’ UT100 samples. In addition, Category A Class 1 undisturbed samples were obtained by sub-sampling the rotary core in BH03, and preserved in accordance with BS 5930:2015. Further small and bulk disturbed samples were taken from each strata encountered to facilitate subsequent geotechnical classification analysis.

The testing was undertaken in accordance with BS 1377:1990 Method of Tests for Soils for Civil Engineering Purposes or, where superseded, by the relevant part of BS EN ISO 17892:2014 Geotechnical investigation and testing – Laboratory Testing of Soil. The tests were carried out within RSK’s UKAS accredited laboratory

The site work, in-situ and laboratory testing are detailed in the Ground Investigation (GIR) Report.

3 GROUND CONDITIONS AND GEOTECHNICAL PARAMETERS

3.1 Stratigraphy

The exploratory holes revealed that the site is initially underlain by a variable thickness of made ground over the Alluvium and Hackney Gravel Member (River Terrace Deposits). The solid geology was encountered as a succession comprising the London Clay Formation, the Lambeth Group and the Thanet Sand Formation, with the White Chalk Sub-group encountered at depth. For the purpose of discussion, the ground conditions are summarised in Table 2.

Table 2: General succession of strata encountered

Strata	Exploratory holes encountered	Depth to top of stratum m bgl (mAOD)	Thickness (m)[1)]
Made ground	All	Ground Level (14.44 to 19.95)	0.42 to 10.50 (not proven in WS01; WS03; WS07; WS10; WS11; WS25; WS28 to WS30; TP11; TP16 and all HPs)
Alluvium	BH06 to BH08; WS12; WS19 and TP12	3.40 to 10.50 (7.93 to 11.14)	0.50 to 2.50 (not proven in WS12; WS19 and TP12)
Hackney Gravel Member	BH08; BH09: BH18; WS09; WS27; TP13 and TP14	1.20 to 13.00 (5.43 to 13.36)	0.20 to 12.00 (not proven in WS09)
London Clay Formation	All (except BH08; BH09, and all locations where the superficial deposits were not proven)	0.42 to 11.00 (7.15 to 14.85)	3.30 to 12.20 (not proven in all WS BHs; TPs and HPs)
Lambeth Group	All (except all WS BHs; TPs and HPs)	9.80 to 19.50 (-1.13 to 2.65)	11.60 to 18.80 (not proven in BH07)
Thanet Sand Formation	All (except in BH07, and all WS BHs, TPs and HPs)	24.00 to 35.40 (-16.92 to -9.27)	4.00 to 6.50 (not proven in BH01; BH08 and BH09)
White Chalk Sub-group	All (except BH01; BH07 to BH09, and all WS BHs, TPs and HPs)	35.30 to 39.50 (-22.68 to -19.45)	proven to 40mbgl (-25.28mAOD)

As shown on the investigation hole logs (Appendix B) and cross sections given in Appendix C, the made ground was of mixed lithology, its base (where proven) at between 7.65mAOD and 14.85mAOD. The alluvial deposits were only encountered towards the western portion of the site as predominantly soft, low strength silts and clays, with thickness of between 0.5m to 2.5m (base at between 5.43mOAD to 8.27mOAD). The medium dense (locally dense) sands and gravels of the Hackney Gravel were proven to levels of between 7.15mAOD and 13.16mOAD, with the exception of the north western part of the site (BH08 and BH09), where its base was confirmed at between -1.13mOAD to -0.57mAOD, indicating the presence of drift filled hollow in this area.

Apart from the area of the drift filled hollow, the London Clay Formation was encountered across the entire site comprising, generally high to very high strength, high to very high plasticity, silty clays with thickness of between 3.3m and 12.2m (base at between -1.13mAOD to 2.65mOAD). The Lambeth Group was encountered as predominantly high and very high strength, high to very high plasticity, silty clays, locally intebedded with dense to very dense sands, proven to levels between -16.92mAOD to -9.27mAOD. This was followed by the very dense, silty sands of the Thanet Sand Formation, to levels of between -22.68mAOD to -19.45mAOD, and the and basal beds of chalky flint pebbles and White Chalk recovered as sandy silt with flints to proven to the deepest level of investigation at -25.28mAOD.

Detailed descriptions of the strata encountered is given in the Ground Investigation (GIR) Report.

3.2 Characteristic geotechnical parameters

The characteristic geotechnical parameters for each stratum have been assessed by a combination of in-situ and laboratory test results and published correlations, statistical methods, and where no testing is available from tables with standard characteristic values and by well established experience.

3.2.1 Made ground

The made ground was encountered with variable thickness, ranging from 0.42m to 10.50m, and was found to generally comprise a silty, gravelly sand, with variable proportions of gravel and cobble size brick and concrete fragments, and rare to occasional anthropogenic materials such as glass, slate, ash, clinker, coal and metal fragments. In the boreholes which proved a greater thickness of made ground (situated at ground level outside of the Bathtub), the made ground generally became more cohesive with depth.

It is very likely that the made ground is site derived demolition rubble from former structures historically present at the site, used as a fill during different phases of development at the site.

No laboratory testing was carried out within this stratum due to the highly heterogeneous nature of the materials. The In-situ SPT testing returned highly variable SPT N_{60} values in the range of 0 to 49, indicating significant both vertical and lateral variability of the

stratum. A moderately conservative characteristic N value of 5 may be taken for the made ground.

In the absence of laboratory testing for the predominantly granular made ground materials, the following characteristic parameters are based on correlations with the in situ testing results and previous experience.

3.2.1.1 Bulk Unit Weight

A characteristic unit weight ($\gamma_{,k}$) of 18kN/m^2 (moist) to 19kN/m^2 may be taken for the made ground.

3.2.1.2 Strength parameters

Given the variability of the made ground a moderately conservative characteristic critical angle of effective friction ($\varphi'_{cv,k}$) of 28° with a cohesion of $c'_{,k}$=0kN/m^2 are recommended for design purposes.

3.2.1.3 Deformation and settlement parameters

A drained Young's modulus ($E'_{,k}$) of 5MN/m^2 is assumed for Made Ground with a Poisson's ratio (ν') of 0.3.

3.2.1.4 Earth Pressure Coefficients

For normally consolidated sands the coefficient of earth pressure at rest (k_0) may be calculated approximately using the Jaky's formula k_0=1–sinφ'. A coefficient of earth pressure at rest (k_0) of 0.530 can taken as the characteristic design value.

The active and passive earth pressure coefficients (k_a & k_p) have been derived from BS EN 1997-1: 2007 based on $\varphi'_{cv,k}$ for the made ground of 25° and assuming a horizontal ground surface (β=0) and wall adhesion equal to 2/3. $\varphi'_{cv,k}$. This gives characteristic values of $k_{a,k}$=0.354 and $k_{p,k}$=3.413. Based on guidance given in 'BRE Eurocode 7 a commentary' (1998) a minimum earth pressure coefficient for serviceability checks may be taken as K_{SLS}=1/2(ka+$k_{nc,k}$), where $k_{nc,k}$=1-sinϕ, which gives k_{SLS}=0.388.

3.2.2 Alluvium

The alluvial deposits were encountered beneath the made ground generally towards the western boundary of the site, at a depth of 3.40mbgl to 10.50mbgl (7.93mAOD to 11.14mAOD). The stratum comprised a layer of soft to firm, silty clay or sandy silt, and in one location (WS12) silty sand. The full extent of the Alluvium was proven in three locations ranging between 0.50m to 2.50m thickness.

3.2.2.1 Bulk Unit Weight and Classification

The single measured bulk density for the material of 1.96Mg/m^3 (unit weight of 19.6kN/m^3) was considered uncharacteristically high for alluvial clays, therefore a conservative characteristic unit weight ($\gamma_{,k}$) for the Alluvium can be taken as γ=18.5kN/m^3.

The moisture content ranges from 20% to 34%, with an average of approximately 26%. The plastic limit ranges from 20% to 27% with an average of 23%. The liquid limit ranges between 34% and 51% with an average of 42%. The plasticity index varies from 14% to 24% with an average of 19%. The consistency index varies from -0.22 to 0.98, which is indicative of a 'very soft to stiff' consistency.

The classification test results indicate that the Alluvium comprise low to high plasticity clay soils with natural moisture contents closer to its plastic limit.

3.2.2.2 Stress history - Overconsolidation Ratio (OCR)

One oedometer test result is available within the Alluvium at a depth of 12.5mbgl. Using the Casagrande graphical technique, a preconsolidation pressures (σ_p') in the range of 180kN/m^2 is estimated from the oedometer result and comparison with the existing overburden pressure indicates an OCR value in the order of 1, which is indicative of normally consolidated soils.

3.2.2.3 Strength parameters

In the absence of laboratory testing, the undrained (short term) strength data has been derived from the in situ testing using the empirical correlation with SPT 'N' value and plasticity index using the relationship described by Stroud (1989) of $c_u=f_1\times N$, with 'f_1' equal to 6 considered to provide a best fit based on the materials encountered.

In-situ SPT testing on the stratum indicates SPT N_{60} values of 6 and 7, which infers an undrained shear strength of the material (c_u) of 36kN/m^2 to 42kN/m^2. The undrained strength profile for the stratum is presented in Appendix D.

Given the limited data available for the made ground a conservative characteristic undrained strength ($c_{u,k}$) of 30kN/m^2 is recommended for the Alluvium.

Drained (long term) strength data has been obtained using empirical correlations between effective friction angles (peak and critical) and plasticity indices in the absence of drained laboratory strength tests.

A correlation between effective friction angle and plasticity index for normally consolidated marine clays has been reported by *Bowles, J.E* (1987). Using this correlation, and for an upper bound plasticity index for the Alluvium of 24%, a peak effective friction angle (φ'_{pk}) of 30° was obtained for undisturbed clays.

The fully softened effective friction angle can be estimated using a relationship with liquid limit, clay fraction and effective stress (after *Stark and Ei*d 1997), where less scatter occurs compared with correlations using plasticity index. An average effective normal stress is taken to be 100kPa, and a clay fraction of >20% is assumed based logging descriptions. Using the average liquid limit for the Alluvium of 42%, a fully softened friction angle of 27° is indicated from the *Stark and Eid* plot, with c'=0.

Effective strength parameters may also be corroborated by the use of empirical correlations published in PD 6694-1:2011. For an upper bound plasticity index of 24%, a conservative value of the critical angle of effective shearing resistance (φ'_{cv}) of 27° may be derived, with c'_k=0 kN/m^2.

A characteristic peak effective friction angle ($\varphi'_{pk,k}$) of 30° and critical angle of effective shearing resistance ($\varphi'_{cv,k}$) of 27° with an effective cohesion (c'_k) of 0kN/m^2 are recommended for design purposes.

3.2.2.4 Deformation and settlement parameters

One sample of Alluvium has been tested in a one dimensional oedometer consolidation machine. The results of the test are summarised in Table 3.

Table 3: Summary of oedometer testing – Alluvium

Sample	Pressure (kN/m^2)	m_v (m^2/MN)	c_v (root) (m^2/year)
BH08 at 12.5mbgl	125 to 250	0.18	6.0

The single oedometer test result available for the Alluvium indicates that it is of medium compressibility and a coefficient of compressibility (m_v) in the order of 0.2m^2/MN and c_v value of 6m^2/year.

Empirical correlation of coefficient of compressibility (m_v) with SPT 'N' values and average plasticity index using $m_v = 1/N \times f_2$ as described by Stroud infers m_v values in the range of 0.28 to 0.33 m^2/MN, which are higher than determined by the single laboratory test. Given the limited data available a conservative characteristic $m_{v,k}$ value of 0.25MN/m^2 is recommended.

Empirical correlation published by Lambe and Whitman (1979) has been referenced to corroborate the single c_v value of 6m^2/year obtained in the laboratory test. Lambe and Whitman correlate c_v values with the liquid limit and based on the measured range of Liquid Limits for the Alluvium this correlation indicates typical c_v values in the range of 7 to 10m^2/year. The laboratory result therefore lies just outside of the lower end of the typical range of c_v values expected for the soil type.

Young's modulus has also been derived from correlations with laboratory oedometer test data, directly from in situ testing using the pressuremeter testing and Standard Penetration Tests (SPT 'N'), and correlation between undrained strength (c_u) and index testing.

The estimation of Young's modulus (E_{oed}) from oedometer test has been made from the constrained modulus ($M=1/m_v$), with E related to M using a correction for Poisson's ratio $\nu' = 0.2$:

$$E = M.\left[\frac{(1+v).(1-2.v)}{(1-v)}\right]$$

A drained Young's modulus of E'= 5MN/m^2 has been derived from the above correlation.

Using the correlations suggested in CIRIA Report 143 (1995) [$E_u = 1.2 \times N_{60}$ and $E' = 0.9 \times N_{60}$], an undrained Young's modulus E_u=7.2 to 8.4MN/m^2 and drained Young's modulus E'=5.4 to 6.3MN/m^2 are derived directly from the in-situ SPT 'N' testing.

Correlation of undrained strength (c_u) and undrained stiffness (E_u) with plasticity indices and over consolidation ratio (OCR) is considered (Duncan & Buchignani, 1976). Adopting $E_u=300\times c_u$ and $c_{u,k}$ above gives an estimated of $E_u=9MN/m^2$. The drained stiffness (E') can then been approximated using the correlation $E'=0.8.E_u$. and a drained stiffness $E'=7.2MN/m^2$ is derived.

From consideration of the above, a conservative characteristic undrained Young's modulus ($E_{u,k}$) of $7MN/m^2$ and drained Young's modulus ($E'_{,k}$) of $5.5MN/m^2$ is recommended for the Alluvium. From reference to published data an undrained Poisson's ratio (ν_u) of 0.5 and drained Poisson's ratio (ν') of 0.2 may be assumed for design.

The drained Young's modulus profile derived from the insitu and laboratory testing have been plotted and summarised in Appendix D.

3.2.2.5 Earth Pressure Coefficients

A coefficient of earth pressure at rest (k_0) of 0.50 is recommended as the characteristic value for the Alluvium.

Based on $\varphi'_{cv,k}$ for the Alluvium of 27° and deriving values using the approach and assumptions outlined in Section 3.1.2.4. earth pressure coefficients of $k_{a,k}$ = 0.325 and $k_{p,k}$=3.834 may be calculated. Similarly a minimum earth pressure coefficient for serviceability checks may be taken as k_{SLS}=0.436.

3.2.3 Hackney Gravel Member

This Hackney Gravel was encountered directly beneath the made ground (with the exception of BH8, where it was overlain by Alluvium), at a depth of between 1.2mbgl to 13.0mbgl (5.43mAOD to 13.36mAOD) and ranged in thickness between 0.2m to 12.0m. The stratum generally comprised greenish brown near surface, becoming yellow orangish brown, gravelly, fine to coarse sand or sandy gravel of flint, locally clayey or silty.

In BH08 and BH09 (located along the north perimeter road) a possible drift filled hollow was encountered with the depth of Hackney Gravel encountered to between 13.0mbgl to 19.0mbgl (5.43mAOD to -0.57mAOD) and 10.87mbgl to 19.50mbgl (7.50mAOD to -1.13mAOD) respectively.

3.2.3.1 Bulk Unit Weight and Classification

Based on the stratum descriptions and guidance given in BS 8004:2015, characteristic unit weights ($\gamma_{,k}$) of $19kN/m^2$ (moist) to $21kN/m^2$ (saturated) are recommended for the Hackney Gravel Member.

Particle size distribution tests show that the Hackney Gravel soils have variable fines content ranging from 1% to 23%, sand content ranging from 14% to 52%, and gravel content between 47% and 70%, indicating variably clayey, silty, sandy GRAVEL.

The in-situ SPT testing on the stratum indicates SPT N_{60} values ranging from 19 to 36, giving the material a medium dense to dense relative density. The SPT N_{60} values exhibit a general linear increase with depth. A constant characteristic value of N=24 is

recommended or alternatively N=18 +1.8N×z (where z is depth below the surface of the stratum)

Given the predominantly granular nature of the stratum, no index properties were determined.

3.2.3.2 Strength parameters

The effective friction angle for the Hackney Gravel has been derived using correlations with the in-situ SPT 'N' test by *Peck et al.* (1974) and *Michell et al.* (1974), the latter recognising the influence of vertical effective stress.

Using these correlations, and adopting a constant characteristic SPT N_{60} value of 24, peak effective friction angles of φ'=35° and φ'=38° were obtained respectively.

Parameters for the calculation of earth pressures may also be corroborated by the use of empirical correlations published in BS8002:2015 Code of Practice for Earth Retaining Structures. Using this approach a peak angle of effective shearing resistance $\Phi'_{pk,k}$ of 38° may be anticipated and for the Hackney Gravel Member and at constant volume a critical angle of shearing resistance $\varphi'_{cv,k}$ of the order of 35° may be derived.

A characteristic peak effective friction angle $\varphi'_{pk,k}$=38° and critical angle of shearing resistance $\Phi'_{cv,k}$ of the order of 35°, with effective cohesion of $c'_{,k}$=0kN/m^2 are recommended.

3.2.3.3 Deformation and settlement parameters

For the purpose of establishing a Young's modulus for the Hackney Gravel, the correlation with the in-situ SPT 'N' test presented by Stroud (1989), contained within CIRIA Publication 143 was used. The correlation E' = N_{60} (MN/m^2) is considered a reasonable approximation for normally consolidated sands and gravels, resulting in a constant characteristic value of the Young's modulus $E'_{,k}$=24MN/m^2. Alternatively, a linear increase in depth may be adopted of $E'_{,k}$=18MN/m^2 at surface, increasing to 36MN/m^2 at the base may be used.

From published data a Poisson's ratio (ν') of 0.3 is recommended for the Hackney Gravel Member.

The deformation parameters derived from the above have been plotted and summarised in Appendix D.

3.2.3.4 Earth Pressure Coefficients

For normally consolidated sands the coefficient of earth pressure at rest (k_0) may be calculated approximately using the Jaky's formula k_0=1–sinφ'. Using $\varphi'_{cv,k}$ for the Hackney Gravel Member in this equation gives a recommended $k_{0,k}$ value of 0.43.

Using the approach and assumptions outlined in Section 3.1.2.4 earth pressure coefficients of $k_{a,k}$ = 0.229 and $k_{p,k}$ = 6.487 may be adopted. A minimum earth pressure coefficient for serviceability checks may be taken as k_{SLS}=0.328.

3.2.4 London Clay Formation

The London Clay Formation was encountered across the entire site, apart from the locations of BH08 and BH09, either beneath the Alluvium or the Hackney Gravel, at depths of between 0.42mbgl and 11.0mbgl (7.15mAOD to 14.85mAOD). This stratum can be described as a firm (occasionally soft near surface) to stiff, medium strength, brown, weathered silty clay, locally near surface, slightly sandy slightly gravelly, becoming stiff to very stiff, high to very high strength, fissured, brown, grey silty clay with occasional fine sand sized selenite crystals.

3.2.4.1 Bulk Density and Classification

The measured bulk densities for the material range between 1.95 Mg/m^3 and 2.05Mg/m^3 (unit weights of 19.5kN/m^3 and 20.5kN/m^3), and a characteristic unit weight ($\gamma_{,k}$) for the London Clay Formation can be taken as 20kN/m^3.

The moisture content ranges from 18% to 34%, with an average of approximately 27%. The plastic limit ranges from 19% to 32% with an average of 26%. The liquid limit ranges between 52% and 78% with an average of 63%. The plasticity index varies from 26% to 53% with an average of 37%. The consistency index varies from 0.81 to 1.10, which is indicative of a 'stiff to very stiff' consistency.

The classification test results indicate that the London Clay Formation comprises high to very high plasticity clay soils with natural moisture contents close to its plastic limit.

Particle size distribution tests on samples of the London Clay Formation indicate that the fine soils have a clay content ranging from 39% to 49%, a silt content ranging from 24% to 42%, sand content ranging from 7% to 37% and generally no gravel, occasionally up to 6%. These results indicate that the fine soils comprise locally sandy, silty CLAY/sandy, clayey SILT. Sandier layers (band of sand) within the London Clay Formation comprise 14% clay, 20% silt, 61% sand, and 5% gravel, indicating variably clayey, silty SAND.

3.2.4.2 Stress history - Overconsolidation Ratio (OCR)

The stress history and OCR for the London Clay Formation has been assessed from in-situ self boring pressuremeter (SBP) testing results.

The OCR values derived from in-situ SBP test carried out at depths between 10.5mbgl and 12.5mbgl generally range from 2.6 to 2.9, up to a maximum of 5.7 indicating lightly to heavily overconsolidated clays.

3.2.4.3 Strength parameters

The undrained (short term) strength data (c_u) has been obtained from the in situ testing using the empirical correlation with SPT 'N' value, the in-situ self boring pressuremeter testing, and the laboratory quick undrained triaxial test (UU100).

The undrained shear strength (c_u) obtained by empirical correlation with SPT 'N' and plasticity index use the relationship described by Stroud (1989) of $c_u=f_1 \times N$, with 'f_1' equal to 5 considered to provide a best fit based on the materials encountered. The in-situ SPT N_{60} values range between 8 and 51. This infers that c_u of the material ranges from

c_u=34kN/m^2 to c_u=219kN/m^2 and generally shows an increasing trend in strength with depth. The lower bound values of undrained strength inferred from this empirical correlation are considered uncharacteristically low and have not been considered when determining the characteristic design line.

The SPB testing was carried out at three locations and returned undrained shear strengths (c_u) of 103kN/m^2 to 197kN/m^2.

A total of 13No. quick unconsolidated undrained triaxial strength (UU) tests carried out on undisturbed samples of the London Clay Formation indicate undrained shear strengths ranging from c_u=61kN/m^2 to c_u=177kN/m^2. The lower bound value of undrained strength determined by the laboratory triaxial test in BH06 at 6.5mbgl is considered uncharacteristically low, probably as a result of disturbance caused during the sampling process, and has not been considered when determining the characteristic design line.

A characteristic design profile of $c_{u,k}$=80kN/m^2 at the surface of the stratum at (12.5mAOD), increasing linearly to c_u=120kN/m^2 at the base (2.5mAOD) is recommended, i.e. $c_{u,k}$ = 80kN/m^2+4.21kN/m^2×z (where z is depth below the surface of the stratum).

The results of all the undrained strength data have been plotted together and are presented in Appendix D.

Drained (long term) strength data has been obtained using a combination of empirical correlations between effective friction angles (peak and critical) and plasticity indexes and direct measurements by laboratory testing.

The empirical correlations discussed in Section 3.2.2.3 taking the average values returns a peak effective friction angle $\varphi'_{pk,k}$ of φ'=25° and critical angle of shearing resistance $\varphi'_{cv,k}$ of the order of 23° with effective cohesion of $c'_{,k}$=0kN/m^2 are recommended for design purposes.

3.2.4.4 Deformation and settlement parameters

One sample of the London Clay Formation has been tested in a one dimensional oedometer consolidation machine. The results of the test are summarised in Table 4.

Table 4: Summary of oedometer testing – London Clay Formation

Sample	Pressure (kN/m^2)	m_v (m^2/MN)	c_v (root) (m^2/year)
BH01 at 6.5mbgl	130 to 260	0.17	0.35

The single oedometer test result indicates that the London Clay Formation is of medium compressibility with a coefficient of compressibility (m_v) in the order of 0.2m^2/MN and coefficient of consolidation (c_v) of 0.4m^2/year.

Empirical correlation of coefficient of compressibility (m_v) with SPT 'N' values and average plasticity index using m_v = 1/N×f_2 as described by Stroud infers m_v values in the range of 0.046 m^2/MN to 0.29 m^2/MN, with the m_v measured by laboratory test falling within this range. On that basis a characteristic $m_{v,k}$ value of 0.2MN/m^2 is recommended.

The empirical correlations described in Section 3.2.2.4 and based on the measured range of Liquid Limits for the London Clay indicates typical c_v value around 2 to 6m^2/year. The laboratory result therefore lies outside of the lower end of the typical range of c_v values expected for the soil type.

Deformation and settlement parameters have also been derived from correlations with laboratory oedometer test data, directly from in situ testing using the Standard Penetration Tests (SPT 'N') and SBP testing, and correlation between undrained strength (c_u) and index testing, as described in Section 3.2.2.4.

The estimation of Young's modulus (E_{oed}) from oedometer test gives a drained stiffness of E'=5.29 MN/m^2.

Using the direct correlation with in-situ SPT N_{60} values, the undrained Young's modulus (E_u) ranges between 9.6MN/m^2 and 61.2MN/m^2, while the drained stiffness (E') is between 8.6MN/m^2 and 55MN/m^2.

The undrained secant Young's modulus (E_s) at 1% shear strain measured directly by the self boring pressuremeter testing ranges between 17MN/m^2 and 41.9MN/m^2.

Correlation of undrained shear strength (c_u) and undrained stiffness (E_u) with plasticity indices and over consolidation ratio (OCR) for the London Clay of E_u=400×c_u gives an undrained stiffness between E_u=32MN/m^2 and E_u=48MN/m^2, and drained stiffness between E'=26MN/m^2 and E'=38MN/m^2.

From consideration of the above, a characteristic undrained Young's modulus ($E_{u,k}$) of 28MN/m^2 +1.68MN/m^2×z (where z is depth below the surface of the stratum) and drained Young's modulus ($E'_{,k}$) of 22.4MN/m^2 +1.34MN/m^2×z is recommended for the London Clay.

From reference to published data an undrained Poisson's ratio (ν_u) of 0.5 and drained Poisson's ratio (ν') of 0.2 may be assumed for design.

The deformation parameters derived from the above have been plotted and summarised in Appendix D.

3.2.4.5 Earth Pressure Coefficients

The coefficient of earth pressure at rest (k_0) measured directly by the self boring pressuremeter testing ranges between 0.84 and 1.2. A coefficient of earth pressure at rest ($k_{0,k}$) of 1.2 can taken as the characteristic design value.

Based on a $\varphi'_{cv,k}$ for the London Clay of 23° and deriving values using the approach and assumptions outlined in Section 3.1.2.4. earth pressure coefficients of $k_{a,k}$ = 0.384 and $k_{p,k}$ = 3.039 may be adopted. A minimum earth pressure coefficient for serviceability checks may be taken as k_{SLS} =0.497.

3.2.5 Lambeth Group

The soils representative of the Lambeth Group were encountered at depths of 9.80mbgl to 19.00mbgl (-1.13mOAD to 2.65mAOD), with distinct cohesive and granular portions. The cohesive portion of the stratum formed the majority of the stratum, and was found to directly underlie the London Clay Formation, comprising stiff to very stiff, high to very

high and extremely high strength, multicoloured, silty, locally slightly sandy clay. The predominantly granular soils were encountered in BH04, BH05 and BH09, mostly towards the base of the stratum, and generally consist of very dense, grey, green, silty, clayey, locally very clayey, gravelly, fine to medium sand with gravel of black rounded fine to coarse pebbles.

3.2.5.1 Bulk Density and Classification

The measured bulk densities for the material range between 2.00 Mg/m^3 and 2.25Mg/m^3 (unit weights of 20.0kN/m^3 and 22.5kN/m^3), and a characteristic unit weight for the Lambeth Group can be taken as $\gamma_{,k}$ =20.0kN/m^3.

The moisture content ranges from 2% to 35%, with an average of approximately 22%. The plastic limit ranges from 16% to 33% with an average of 24%. The liquid limit ranges between 27% and 86% with an average of 58%. The plasticity index varies from 14% to 56% with an average of 35%. The consistency index varies from 0.81 to 1.54, which is indicative of a 'stiff to very stiff' consistency.

The classification test results indicate that the cohesive portion of the Lambeth Group comprise low to very high plasticity clay soils with natural moisture contents below its plastic limit.

Particle size distribution tests on samples of the cohesive Lambeth Group indicate that the fine soils have a clay content ranging from 20% to 81%, a silt content ranging from 16% to 63%, sand content ranging from 0% to 61% and generally no gravel, occasionally up to 6%. These results indicate that the fine soils comprise locally sandy, silty CLAY/sandy, clayey SILT. The granular portion of the stratum comprise 14% to 30% clay, 15% to 24% silt, 46% to 73% sand, and up to 4% gravel, indicating variably clayey, silty SAND.

3.2.5.2 Stress history - Overconsolidation Ratio (OCR)

The stress history and OCR for the Lambeth Group has been assessed from the in-situ self boring pressuremeter (SBP) testing results.

The OCR derived from in-situ SBP test carried out at depths between 15.5mbgl and 27.3mbgl range 2.0 to 6.3 indicating lightly to heavily overconsolidated clays.

3.2.5.3 Strength parameters

The undrained (short term) strength data (c_u) for the cohesive portion of the Lambeth Group has been obtained from the in situ testing using the empirical correlation with SPT 'N' value, the in-situ self boring pressuremeter testing, and the laboratory quick undrained triaxial test (UU100).

The c_u obtained by empirical correlation with SPT 'N' and plasticity index use the relationship described by Stroud (1989) of $c_u=f_1 \times N$, with 'f_1' equal to 4.6 considered to provide a best fit based on the materials encountered. The in-situ SPT N_{60} values range between 24 and 360 (extrapolated) at depth. This infers that the in-situ undrained strength of the material ranges from c_u=90kN/m^2 to c_u>500kN/m^2, typically 120kN/m^2 to 250kN/m^2 and generally shows an increasing trend in strength with depth.

The SPB testing was carried out at three locations, returned undrained shear strengths of c_u=134kN/m^2 to c_u=339kN/m^2.

A total of 23No. quick unconsolidated undrained triaxial strength (UU) tests carried out on undisturbed samples of the London Clay Formation indicate undrained shear strengths ranging from approximately c_u=22kN/m^2 to c_u=780kN/m^2, but more typically 106kN/m^2 to 310kN/m^2. The lower and upper bound values of undrained shear strength determined by the laboratory triaxial tests are considered uncharacteristic and have not been considered when determining the characteristic design line.

A characteristic design profile of $c_{u,k}$=120kN/m^2 at the surface of the stratum at (2.5mAOD), increasing linearly to $c_{u,k}$=220kN/m^2 at the base of the stratum (-15.0mAOD) is recommended.

Drained (long term) strength data has been obtained using a combination of empirical correlations between effective friction angles (peak and critical) and plasticity indexes and direct measurements by laboratory testing.

The empirical correlations discussed in Section 3.2.2.3 taking into account the average values returns a peak effective friction angle φ_{pk} of φ'=26° and critical angle of shearing resistance φ'_{cv} of the order of 24° with effective cohesion of c'=0kN/m^2.

Three consolidated undrained triaxial compression tests carried out on the cohesive Lambeth Group at depths on 12.7mbgl, 20.1mbgl and 30.5mbgl returned peak effective friction angles of between φ'_{pk}=10.5° and φ'_{pk} =26.5°, and effective cohesion of c'=0 to c'=40kPa. The lower bound value of φ'_{pk}=10.5° is considered uncharacteristically low when compared to the values derived with empirical correlations above.

The effective friction angle measured by the in-situ SBP testing range from φ'=23.1° to φ'=30.6°, while the effective cohesion measured by the same method is between c'=64kPa to c'=153kPa.

Considering all of the above results moderately conservative characteristic values of peak effective friction angle $\varphi'_{pk,k}$ of 26° and critical angle of shearing resistance $\varphi'_{cv,k}$ of 24° with effective cohesion of $c'_{,k}$=0kN/m^2 are recommended.

Using correlations described in Section 3.2.3.2 for the sand horizons encountered towards the base of the stratum, characteristic peak effective friction angle $\varphi'_{pk,k}$ of 38° and critical angle of shearing resistance $\varphi'_{cv,k}$ of 32° with effective cohesion of $c'_{,k}$=0kN/m^2 are recommended.

The results of undrained strength data have been plotted together and are presented in Appendix D.

3.2.5.4 Deformation and settlement parameters

Three samples of the cohesive Lambeth Group have been tested in a one dimensional oedometer consolidation machine. The results of the test are summarised in Table 5.

Table 5: Summary of oedometer testing – cohesive Lambeth Group

Sample	Pressure (kN/m^2)	m_v (m^2/MN)	c_v (root) (m^2/year)
BH01 at 14.4mbgl	150 to 300	0.080	0.78
BH04 at 30.6mbgl	300 to 600	0.032	24
BH16 at 23.1mbgl	460 to 920	0.021	7.7

The oedometer test results indicate that the Lambeth Group is of low compressibility with a coefficient of compressibility (m_v) in the order of 0.08m^2/MN towards the surface of the stratum, reducing to 0.02 to 0.03 m^2/MN with depth, and a highly variable coefficient of consolidation (c_v) between 0.78m^2/year and 24m^2/year.

Empirical correlation of coefficient of compressibility (m_v) with SPT 'N' values and average plasticity index using $m_v = 1/N \times f_2$ as described by Stroud infers m_v values in the range of 0.006m^2/MN to 0.097m^2/MN. The laboratory results are therefore within the typical range of c_v values expected for the soil type.

The empirical correlations described in Section 3.2.2.4 and based on the measured range of Liquid Limits for the Lambeth Group indicates typical c_v values of 1.6 to 17m^2/year. The laboratory results are therefore within the typical range of c_v values expected for the soil type.

Deformation and settlement parameters have also been derived from correlations with laboratory oedometer test data, directly from in situ testing using the Standard Penetration Tests (SPT 'N') and SBP testing, and correlation between undrained strength (c_u) and index testing, as described in Section 3.2.2.4.

The estimation of Young's modulus (E_{oed}) from oedometer test gives a drained stiffness of E'=11MN/m^2 to 43MN/m^2.

Using the direct correlation with in-situ SPT N_{60} values, the undrained Young's modulus (E_u) ranges between 20MN/m^2 at surface to 240MN/m^2 towards the base, with moderately conservative values of 34MN/m^2 at surface to 60MN/m^2 towards the base. This gives derived drained stiffness (E') values between 27MN/m^2 and 72MN/m^2.

The Secant Young's modulus (E_s) at 1% shear strain measured directly by the self boring pressuremeter testing ranges between 31.3MN/m^2 and 248MN/m^2.

Correlation of undrained strength (c_u) and undrained stiffness (E_u) with plasticity indices and over consolidation ratio (OCR) gives an undrained stiffness between E_u=48MN/m^2 and E_u=88MN/m^2, with resulting drained stiffness between of E'=38.4MN/m^2, E'=70.4MN/m^2.

From consideration of the above, a characteristic undrained Young's modulus ($E_{u,k}$) of 32MN/m^2+2.74MN/m^2×z (where z is depth below the surface of the stratum) and drained Young's modulus ($E'_{,k}$) of 25.6MN/m^2+2.19MN/m^2×z is recommended for the Lambeth Group clays.

From reference to published data an undrained Poisson's ratio (ν_u) of 0.5 and drained Poisson's ratio (ν') of 0.2 may be assumed.

The deformation parameters for the granular soils of the Lambeth Group are obtained using the correlation $E'=2\times N_{60}$ (MN/m^2) for overconsolidated sands presented by Stroud (1989), resulting in a moderately conservative constant characteristic value of the Young's modulus $E'_{,k}$=110MN/m^2. From published data a Poisson's ratio (ν') of 0.3 is recommended.

The deformation parameters derived from the above have been plotted and summarised in Appendix D.

3.2.5.5 Earth Pressure Coefficients

The coefficient of earth pressure at rest (k_0) measured directly by the self boring pressuremeter testing ranges between 0.83 and 1.33. A coefficient of earth pressure at rest ($k_{0,k}$) of 1.2 at the surface of the stratum, reducing to 1.0 at the base, can taken as the characteristic design values.

Based on a $\varphi'_{cv,k}$ for the Lambeth Group of 24° and deriving values using the approach and assumptions outlined in Section 3.1.2.4. earth pressure coefficients of $k_{a,k}$ = 0.368 and $k_{p,k}$ = 3.215 may be adopted. A minimum earth pressure coefficient for serviceability checks may be taken as k_{SLS} =0.481.

3.2.6 Thanet Sand Formation

The Thanet Sand Formation was encountered in all deep boreholes, beneath the Lambeth Group, its thickness was proven to be between 4.00m to 6.50m described as very dense, green, grey, silty clayey, fine to medium sand, locally grading into sandy silt.

3.2.6.1 Bulk Density and Classification

The measured remoulded bulk densities for the material range between 1.87 Mg/m^3 and 1.99Mg/m^3 (unit weights of 18.7kN/m^3 and 19.9kN/m^3), and a characteristic unit weight for the Thanet Sands can be taken as $\gamma_{,k}$ =20.0kN/m^3.

Particle size distribution tests show that the Thanet Sand Formation has a variable clay content ranging from 7% to 18%, silt content between 9% to 70%, sand content ranging from 30% to 84%, and gravel between 0% and 4%, indicating silty, clayey, SAND, locally grading onto clayey, sandy, SILT.

The in-situ SPT testing on the stratum indicates SPT N_{60} values ranging from 60 to 360 (extrapolated), giving the material a very dense relative density.

Given the predominantly granular nature of the stratum, no index properties were determined.

3.2.6.2 Stress history - Overconsolidation Ratio (OCR)

The OCR of 2.1 was derived from in-situ self boring pressuremeter (SBP) testing at a depth of 31.5mbgl, indicating lightly overconsolidated sands.

3.2.6.3 Strength parameters

The effective friction angle for the Thanet Sand Formation has been derived using correlations described in Section 3.2.3.2, derived from the in-situ self boring

pressuremeter testing, and measured in the laboratory by consolidated drained shear box test.

Using the empirical correlations, a peak effective friction angle of φ'=43° was obtained, the SBP test returned effective friction angle of φ'=38.7° and φ'_{cv}=32° with effective cohesion of c'=76kN/m^2, while the shear box test returned effective friction angle of between φ'=33° to φ'=34° and effective cohesion of c'=20kN/m^2 to c'=30kN/m^2. However, due to the nature of the material the particulate cementation will result in the effective friction angles determined by the shear box testing being highly conservative.

Based on the above, a characteristic effective friction angle of $\varphi'_{pk,k}$ =38° and critical angle of shearing resistance $\varphi'_{cv,k}$ of 32° with effective cohesion of c'=0kN/m^2 are recommended for design purposes

3.2.6.4 Deformation and settlement parameters

Using the correlation described in Section 3.2.5.4, gives values of drained Young's modulus (E') in the range of 120 to 600MN/m^2.

The secant Young's modulus (E_s) at 1% shear strain inferred from in-situ self boring pressuremeter testing range between 202.4MN/m^2 and 275.1MN/m^2.

A constant characteristic value of the Young's modulus $E'_{,k}$=200MN/m^2. From published data a Poisson's ratio (ν') of 0.3 is recommended.

The deformation parameters derived from the above have been plotted and summarised in Appendix D.

3.2.6.5 Earth Pressure Coefficients

For overconsolidated sands the coefficient of earth pressure at rest (k_0) may be calculated approximately using the Mayne and Kulhawy's formula $k_{0OC}=k_{0NC}\times OCR^{\sin\varphi'}$, where $k_{0NC}=1-\sin\varphi'$ using Jaky's formula. Using $\varphi'_{cv,k}$ and OCR for the Thanet Sand Formation in this equation gives a recommended $k_{0,k}$ value of 0.69.

Using the approach and assumptions outlined in Section 3.1.2.4 earth pressure coefficients of $k_{a,k}$ = 0.262 and $k_{p,k}$ = 5.267 may be adopted. A minimum earth pressure coefficient for serviceability checks may be taken as k_{SLS}=0.396.

3.2.7 White Chalk Sub-group

The White Chalk was encountered at depths of between 35.3mbgl to 39.5mbgl (-22.68mAOD to -19.45mAOD) and was proven to 40.0mbgl (-25.28mAOD). As a result of the percussive drilling technique adopted, the stratum was recovered as a structureless melange of sandy silty gravel of chalk with frequent flints.

3.3 Summary of geotechnical design parameters

The geotechnical design parameters presented in Table 6 are based on the results of the fieldwork, in situ and laboratory testing and derived values summarised above, and reflect RSK's understanding of the proposed construction at the time this report was written. The designer should assess the applicability of the characteristic values

provided below for the design situation under consideration and to ensure that it is a cautious estimate of the value affecting the occurrence of the relevant limit state(s).

Table 6: Summary of geotechnical design parameters

Design parameter	Stratum					
	Made ground	Alluvium	Hackney Gravel	London Clay Formation	Lambeth Group	Thanet Sand
Unit weight - $\gamma_{,k}$ (kN/m^3)	18.0[1)]	18.5	19.0 (moist) 21.0 (sat)[1)]	20.0	20.0	20.0[1)]
SPT N_{60} value	5	6	24 or 18+1.8N×z	8 to 51	24 to 360	Av. 125
Undrained shear strength – $c_{u,k}$ (kN/m^2)	-	30	-	80@ 12.5mOD increasing to 120@ 2.5mOD	120@ 2.5mOD increasing to 220@ -15mOD	-
OCR	1[1)]	1	1[1)]	3.0	3.0@ surface to 2.0@ base	2.1
Peak Effective Angle of Friction - $\varphi'_{pk,k}$ (°)	-	30	38	25	26 (38 sand)	38
Critical State Angle of Friction - $\varphi'_{cv,k}$ (°)	28[1)2)]	27	35	23	24 (32 sand)	32
Effective cohesion - $c'_{,k}$ (kN/m^2)	0	0	0	0	0	0
Earth pressure coefficient at rest - $k_{0,k}$	0.53	0.50	0.43	1.20	1.20 @ surface to 1.00 @ base	0.69
Active earth pressure coefficient at rest - $k_{a,k}$	0.354	0.325	0.229	0.384	0.368	0.262
Passive earth pressure coefficient at rest – $k_{p,k}$	3.413	3.834	6.487	3.039	3.215	5.267

Design parameter	Stratum					
	Made ground	Alluvium	Hackney Gravel	London Clay Formation	Lambeth Group	Thanet Sand
Coefficient of volume compressibility - $m_{v,k}$ (m^2/MN)	-	0.25	-	0.2	0.08@ 2.5mOD to 0.03@-15mOD	-
Coefficient of consolidation - $c_{v,k}$ (m^2/yr)	-	6	-	0.4 to 2.0	0.8 to 2.0	-
Young's modulus – $E_{u,k}$ (MN/m^2)[3)]	-	7	-	28@ 12.5mOD increasing to 44.8@ 2.5mOD	32@ 2.5mOD increasing to 80@ -15.0mOD	-
Young's modulus - $E'_{,k}$ (MN/m^2)[3)]	5[1)]	5.5	24 or 18@surface to 36@ base	22.4@ 12.5mAOD increasing to 35.8@ 2.5mAOD	25.6@ 2.5mAOD increasing to 64@ -15mAOD (110 sand)	200

[1)] assumed empirical values in the absence of testing
[2)] assumed predominantly granular soils

It should also be noted that the stiffness adopted for the design of structures is entirely dependant on the magnitude of strain expected during loading and unloading. It is therefore important to determine / reassess the stiffness for every stratum on a proposal specific basis.

3.4 Groundwater

Hydrogeological properties of the strata, as encountered during the site investigation are summarised in Table 7.

Table 7: Summary of hydrogeology

BH	Strata	Strike or seepage (mbgl) (mAOD)	Monitoring Results (mbgl) (mAOD)			
			RSK	Levels provided by Waterman		
			28/11/16	GW level 1	GW level 2	GW level 3
BH1	MG	ND	2.84 (11.89)	3.41 (11.32)	-	-
BH3	MG	ND	Dry	1.56 (13.17)	-	-

BH	Strata	Strike or seepage (mbgl) (mAOD)	Monitoring Results (mbgl) (mAOD)			
			RSK	Levels provided by Waterman		
			28/11/16	GW level 1	GW level 2	GW level 3
	LG	ND	Dry	18.66 (-3.93)	-	-
BH4	MG	ND	4.48 (15.47)	4.51 (15.44)	-	-
	LCF	14.0	10.81 (9.14)	-	-	-
BH5	MG	ND	1.23 (13.36)	-	-	-
	LG	ND	19.31 (-4.72)	-	-	-
BH6	MG / AL	ND		3.66 (11.11)	-	-
BH7	MG / AL	5.0	3.70 (11.03)	3.70 (11.03)	3.71 (11.02)	3.66 (11.07)
BH8	MG	8.0	7.38 (11.05)	7.36 (11.07)	7.39 (11.13)	-
	AL	13.0	7.32 (11.11)	10.44 (7.99)	7.35 (11.08)	-
BH9	MG	6.8	7.28 (11.09)	7.02 (11.35)	6.69 (11.68)	-
	LG	22	7.00 (11.37)	7.09 (11.28)	10.22 (8.15)	-
BH10	MG	5.5	5.10 (13.55)	5.25 (13.40)	5.28 (13.37)	-
	LC	14	7.45 (11.20)	7.45 (11.20)	7.45 (11.20)	-
BH16	MG	4	2.67 (12.15)	2.88 (11.94)	2.59 (12.23)	-
	LG	20.5	19.38 (-4.56)	19.36 (-4.54)	19.04 (-4.22)	-
BH17	MG	ND	1.32 (13.20)	1.32 (13.20)	-	-
BH18	MG / HG	10.5	8.28 (9.87)	8.28 (9.87)	8.26 (9.89)	-
WS02	MG	ND	Dry	Dry	Dry	Dry
WS03A	MG	ND	-	-	-	-
WS04	MG	ND	1.34 (13.26)	1.36 (13.24)	1.32 (13.28)	-

BH	Strata	Strike or seepage (mbgl) (mAOD)	Monitoring Results (mbgl) (mAOD)			
			RSK	Levels provided by Waterman		
			28/11/16	GW level 1	GW level 2	GW level 3
WS05	MG	ND	1.29 (13.26)	1.30 (13.25)	1.29 (13.26)	-
WS06	MG	ND	1.44 (13.25)	1.43 (13.26)	-	-
WS07A	MG	ND	-	1.47[1)]	1.46[1)]	-
WS08	MG / LCF	ND	1.44 (13.27)	1.46 (13.25)	-	-
WS09	MG	ND	2.89 (11.96)	2.9 (11.95)	2.96 (11.89)	-
WS10	MG	ND	Dry	Dry	Dry	Dry
WS11	MG	ND	Dry	Dry	Dry	Dry
WS12	MG	ND	3.98 (10.96)	4.00 (10.94)	3.99 (10.95)	3.98 (10.96)
WS19	MG	ND	Dry	Dry	Dry	Dry
WS20	MG/ LCF	ND	2.84 (11.89)	3.36 (11.37)	-	-
WS21	MG/LCF	ND	2.34 (12.39)	3.77 (10.96)	2.56 (12.17)	2.41 (12.32)
WS23	MG/LCF	ND	Dry	1.37 (13.35)	1.37 (13.35)	1.40 (13.32)
WS24	MG/LCF	ND	Dry	Dry	Dry	-
WS26	MG	ND	1.38 (13.09)	1.38 (13.09)	1.37 (13.10)	1.38 (13.09)
WS27	MG	ND	Dry	-	-	-

MG= Made Ground; AL = Alluvium; HG= Hackney Gravel; LCF = London Clay Formation; LG= Lambeth Group
ND = not determined during drilling;
[1)] well level not determined

It can be inferred from the groundwater monitoring results that the general groundwater table in the made ground, Alluvium and Hackney Gravel is resting at levels of between 7.99mAOD and 15.47mAOD, but generally around 11.00 to 12.00mAOD, and is likely to be in hydraulic continuity. In addition, small rates of groundwater seepage were noted within the Lambeth Group at levels of between -3.93mAOD and -4.72mAOD.

It should be noted that groundwater levels might fluctuate for a number of reasons including seasonal variations.

4 ENGINEERING CONSIDERATIONS

4.1 Proposed construction

It is understood that the proposed development is to involve the demolition of existing buildings and structures in the central and northern part of the site, and construction of six new buildings ranging from three to twelve storeys, with associated infrastructure and car parks. Areas of hard and soft landscaping are also proposed to provide public and private areas of open space.

The main sorting office building will be retained and refurbished with a construction of an acoustic roof deck over the existing servicing yard to the south. In addition, the proposals include alterations of the public highway and the construction of a new dedicated vehicle ramp to basement level to service Royal Mail operations.

At this stage no specific information relating to building loads has been provided, however, it is likely that the proposed structures will be framed, with variable and generally relatively high column loads anticipated.

4.2 Geotechnical hazards

A summary of commonly occurring geotechnical hazards is given in Table 8 together with an assessment of whether the site may be affected by each of the stated hazards.

Table 8: Summary of main potential geotechnical hazards that may affect site

Hazard category (excluding contamination issues)	Hazard status based on investigation findings and proposed development			Engineering considerations if hazard affects site
	Found to be present on site	Could be present but not found	Unlikely to be present and/or affect site	
Sudden lateral changes in ground conditions	✓	Significant variability in the thickness of the made ground and superficial deposits across the site A drift filled hollow encountered in boreholes BH08 and BH09, in the northern part on the site Interbedded cohesive and granular deposits within the Lambeth Group		Likely to affect ground engineering and foundation design and construction
Shrinkable clay soils			✓	Design to NHBC Standards Chapter 4 or similar
Highly compressible and	✓	Soft / loose non-engineered		Likely to affect ground

Hazard category (excluding contamination issues)	Hazard status based on investigation findings and proposed development			Engineering considerations if hazard affects site
	Found to be present on site	Could be present but not found	Unlikely to be present and/or affect site	
low bearing capacity soils, (including peat and soft clay)		made ground across entire site Alluvial soils with soft consistency / low strength at relatively shallow depths		engineering and foundation design and construction
Silt-rich soils susceptible to loss of strength in wet conditions	✓	Variable and locally significant silt content in all geological units encountered		Likely to affect ground engineering and foundation design and construction
Running sand at and below water table		✓	Likely in sands/gravels below the water table in open excavations and pile bores	Likely to affect ground engineering and foundation design and construction
Karstic dissolution features (including 'swallow holes' in Chalk terrain)			✓	May affect ground engineering and foundation design and construction – refer to Section 4.1.2
Evaporite dissolution features and/or subsidence			✓	May affect ground engineering and foundation design and construction
Ground subject to or at risk from landslides			✓	Likely to require special stabilisation measures
Ground subject to peri-glacial valley cambering with gulls possibly present	✓	A drift filled hollow encountered in boreholes BH08 and BH09, in the northern part on the site likely to have originated as peri-glacial feature		Likely to affect ground engineering and foundation design and construction
Ground subject to or at risk from coastal or river erosion			✓	Likely to require special protection/stabilisation measures
High groundwater table (including waterlogged ground)	✓	Locally high perched groundwater within the made ground and alluvial deposits; generally within the Hackney Gravel River Terrace Deposits		May affect temporary and permanent works
Rising groundwater table	✓	See Section 3.2.2		May affect deep

Hazard category (excluding contamination issues)	Hazard status based on investigation findings and proposed development			Engineering considerations if hazard affects site
	Found to be present on site	Could be present but not found	Unlikely to be present and/or affect site	
due to diminishing abstraction in urban area				foundations, basements and tunnels
Underground mining			✓	Likely to require special stabilisation measures
Existing sub-structures (e.g. tunnels, foundations, basements, and adjacent sub-structures)	✓	Foundations of historical buildings, and existing buildings and other structures on site Royal Mail tunnel and Thames Water sewer beneath the site LUL District Line tunnel and culverted River Fleet adjacent to site (see Section 4.2.1 and RSK Utility Survey Report, ref:191747 R09(00))		Likely to affect ground engineering and foundation design and construction
Filled and made ground (including embankments, infilled ponds and quarries)	✓	Variable and locally significant thickness of made ground, also as also highly variable in composition		Likely to affect ground engineering and foundation design and construction
Adverse ground chemistry (including expansive slags and weathering of sulphides to sulphates)	✓	Section 4.6		May affect ground engineering and foundation design and construction
Note: Seismicity is not included in the above table as this is not normally a design consideration in the UK				

4.3 Ground Model

The preliminary ground model summarised in Table 9 has been adopted for the purpose of the preliminary foundation design recommendations.

Table 9: Ground model derived from site investigation

Strata	Level at top of stratum (mAOD)	Level at base of stratum (mAOD)
Made ground	14.50 – in the Bathtub area 20.00 – around the perimeter	12.50 – in the Bathtub area 10.00 – around the perimeter
Alluvium[1)]	8.50	7.50
Hackney Gravel Member[1)]	7.50	7.00 (-0.75 – at the location of the

Strata	Level at top of stratum (mAOD)	Level at base of stratum (mAOD)
		drift filled hollow)
London Clay Formation	12.50	2.50
Lambeth Group[2)]	2.50 (-0.75 – at the location of the drift filled hollow)	-15.00
Thanet Sand Formation	-15.00	-22.50
White Chalk Sub-group	-22.50	proven to -25.30mAOD

[1)] where present
[2)] assumed cohesive soils throughout entire thickness of the stratum

The general groundwater table appears to be 'resting' within the made ground and superficial deposits at a typical level of circa 11mAOD.

4.4 Foundations

4.4.1 General suitability

In view of the significant depth of low strength/compressible made ground and alluvial deposits encountered across the site and the anticipated high loading from the proposed development, it is considered that pile foundations would be the most suitable foundation option. The pile design and layout will need to take account of the Post Office Tunnels/Thames Water sewer located beneath the site and ensure these are not adversely affected. It is understood that others will be undertaking a detailed assessment of the potential ground movements/increase in stress associated with the proposed development to inform the foundation design.

4.4.2 Piled foundations

Recommendations for the design and construction of pile foundations in relation to the ground conditions are set out in Table 10.

Table 10: Design and construction of piled foundations

Design/construction considerations	Design/construction recommendations
Pile type and possible constraints on the pile type	The construction of rotary bored and CFA is considered technically feasible at this site. Given the close proximity of the tunnels and other infrastructure, it is considered that the use of driven piles will not be acceptable due to the vibration, noise and heave associated with pile driving.
Temporary casing	Given the presence of groundwater strikes over the depth of the investigation bored piles will require either temporary casing throughout their depth or some form of support fluid. Alternatively, the use of continuous-flight-auger (CFA) injected bored piles usually overcomes this issue.

Design/construction considerations	Design/construction recommendations		
Man-made obstructions	The presence of buried sub-structures or other obstructions within made ground may lead to some difficulty during piling. It is recommended that once the proposed pile layout has been determined, pre-pile probing be carried out at each of the pile positions. Reference should also be made to RSK Geophysical Investigation Report, ref: 191747 R09(00), for likely obstruction locations. Where buried obstructions are encountered, it will be necessary to either relocate the pile(s) or make allowance for removing the obstruction.		
Hard strata	An allowance should be made for chiselling thin 'rock' bands (claystone, cemented sandstone) within the London Clay Formation and the Lambeth Group.		
Pile design parameters for made ground and Alluvium	Ignored		
Pile design parameters for granular deposits	Shaft friction factor ($k_s \times \tan \delta$)	0.1 – Hackney Gravel 0.36 – Thanet Sand Formation	
	End bearing factor N_q	45 – Thanet Sand	
Pile design parameters for cohesive deposits	Undrained shear strength c_u (kN/m^2)	London Clay Formation	80 – at surface 120 – at base
		Lambeth Group	120 – at surface 220 – at base
	Adhesion factor α	0.5 – London Clay Formation 0.4 – Lambeth Group	
	Bearing capacity factor N_c	9.0	
General parameters	Maximum Limiting Shaft Friction	140 kN/m^2	
	Average Limiting Shaft Friction	110 kN/m^2	
	Limiting concrete stress[1)] ($R_{c,pl,d}$)	10 N/mm^2	
	Model factor (γ_{Rd})	1.4	
	SLS Partial Factor on Ultimate Shaft Friction	1.2	
Special precautions relating to bored pile shafts and bases	Bored pile concrete should be cast as soon after completion of boring as possible and in any event the same day as boring. Prior to casting the base of the pile bore should be clean, otherwise a reduced safe working load will be required. Similarly, if the pile bore is left open the shaft walls may relax/soften, leading to a reduced safe working load.		

[1)] assuming C35 concrete used for piles (f_{ck}=28N/mm^2)

The design resistance has been calculated in accordance with BS EN 1997-1 and the UK National Annex, using partial resistance factors for bored piles, given in Table 11.

Table 11: Partial resistance factors (γ_R)

Resistance	Set	
	DA1 C1	DA1 C2[1)]
Base - γ_b	1.0	2.0
Shaft (compression) - γ_s	1.0	1.6
Total (compression) - γ_t	1.0	2.0

1) no serviceability verification

The design procedure for piles varies considerably, depending on the proposed type of pile. However, for illustrative purposes, based on the design parameters outlined in above tables, Table 12 and Table 13 give likely pile design resistances for the Bathtub and the northern perimeter area, respectively for bored, cast-in-situ concrete piles of various diameters and lengths.

It is recommended, however, that the detailed advice of a specialist-piling contractor be sought as to the most suitable type of pile for the prevailing ground conditions and as to their lengths and diameters to support the required design loads.

Table 12: Typical pile design resistances for bored cast-in-situ piles – Bathtub area

Typical Design resistance for DA1 – Combinations C1 & C2 (kN)								
Pile toe level (mAOD)	Pile diameter							
	450mm		600mm		750mm		900mm	
	C1	C2	C1	C2	C1	C2	C1	C2
-5.0	1099	666	1540	925	2018	1203	2532	1499
-7.0	1247	757	1742	1049	2277	1361	2851	1693
-9.0	1404	854	1957	1181	2552	1529	3189	1898
-11.0	1571	956	2184	1320	2842	1706	3545	2115
-13.0	1590[1)]	1065	2423	1467	3148	1893	3919	2343
-15.0		1179	2675	1622	3469	2090	4312	2583
-17.0		1590[1)]	2827[1)]	2718	4417[1)]	3513	6361[1)]	4500[2)]

1) limited by maximum concrete stress
2) limited by SLS partial factor on the ultimate shaft resistance

Table 13: Typical pile design resistances for bored cast-in-situ piles – northern perimeter (area of drift filled hollow)

Typical Design resistance for DA1 – Combinations C1 & C2 (kN)								
Pile toe level (mAOD)	Pile diameter							
	450mm		600mm		750mm		900mm	
	C1	C2	C1	C2	C1	C2	C1	C2
-5.0	628	373	905	531	1216	707	1562	899
-7.0	769	459	1099	650	1467	859	1872	1087
-9.0	921	553	1309	778	1737	1023	2206	1288
-11.0	1085	653	1534	915	2026	1198	2562	1503
-13.0	1260[1)]	731	1773	1062	2334	1385	2941	1733
-15.0	1446	876	2028	1217	2660	1585	3342	1977
-17.0	1590[1)]	1527	2827[1)]	2245[2)]	4417[1)]	2807[2)]	6361[1)]	3368[2)]

[1)] limited by maximum concrete stress
[2)] limited by SLS partial factor on the ultimate shaft resistance

When dimensioning a pile the design load must be multiplied by the appropriate partial factor, γ_G.

It should be stressed that the above capacities do not take into consideration pile group effects which is more pronounced for a large number of closely spaced piles. To take account of the pile group effects, an efficiency factor (η) may be applied to the pile working loads given above for a single pile.

The Converse Labare Formula is one of the most widely used formulas and is expressed as:

$$(\eta) = 1 - \theta\{[(n - 1)\times m + (m - 1)n]/90\times m\times n\}$$

Where:

m = number of rows in a group

n = number of piles in a row

$\theta = \tan^{-1}(d/s)$

d = diameter of the piles

s = spacing of the piles

Using the above, the following efficiency factors given in Table 14 are calculated for a range of pile spacing to diameter ratios and pile group types.

Table 14: Pile group efficiency factors

Efficiency factor (η)			
Pile group	**d/s = 2.0**	**d/s = 2.5**	**d/s = 3.0**
2 pile group (2 by 1)	0.85	0.88	0.90
4 pile group (2 by 2)	0.70	0.76	0.80
6 pile group (3 by 2)	0.66	0.72	0.76
9 pile group (3 by 3)	0.61	0.68	0.73

4.5 Floor slabs

The site is generally underlain by a significant thickness of made ground and due to the variable nature of the fill materials it is recommended that for the proposed office and residential blocks suspended floor slabs are adopted.

Re-use of parts of existing slab within the proposed podium area could be considered subject to further investigation works and confirmation of performance.

4.6 Retaining wall design parameters

It is likely that the proposed development will include some retaining structures to achieve the proposed finished levels. Furthermore, the retaining structures to the current basement level will presumably be retained where possible for reuse in the new development. On the basis of the ground investigation information, the following soil parameters in Table 15 may used for preliminary retaining wall design purposes.

Table 15: Retaining wall design parameters

Soil type	Unit weight γ_k (kN/m^3)	Short Term Parameters		Long Term Parameters		Earth Pressure Coefficients		
		$c_{u,k}$ (kN/m^2)	$\phi'_{cv,k}$ (°)	$c'_{,k}$ (kN/m^2)	$\phi'_{cv,k}$ (°)	$K_{o,k}$	$K_{ac,k}$/ $K_{pc,k}$	$K_{a,k}$/ $k_{p,k}$
Made Ground	18.0	N/A[1)]	28	0	28	0.53	-	0.354/ 3.413
Alluvium	18.5	30	-	0	27	0.50	-	0.325/ 3.834
Hackney Gravel	19 (moist) 21 (sat.)	N/A[1)]	35	0	35	0.43	-	0.229/ 6.487
London Clay Formation	20.0	80 + 4.z	-	0	23	1.20	2.39	0.384/ 3.039
Lambeth Group - cohesive	20.0	120 + 5.71.z	-	0	24	1.2 – 1.0	2.39	0.368/ 3.215

[1)] assumed predominantly granular soils

Groundwater was encountered at levels of between 7.99mAOD to 15.47AOD, therefore allowance should be made for hydrostatic pressures acting behind retaining structures. Furthermore, any new basement construction must be designed to be fully sealed to prevent any future groundwater ingress.

In order to prevent damage to adjacent structures, the design of the retaining wall must address the risk of excessive deformation of the wall. Bracing, both in the temporary and permanent condition will therefore be required, to ensure that the horizontal and vertical soil movement around and below the excavation remain within acceptable levels.

4.7 Chemical attack on buried concrete

This assessment of the potential for chemical attack on buried concrete is based on current BRE guidance. The available information for the site indicates that for the purposes of this assessment of the aggressive chemical environment, the site should be considered as a brownfield development / site where disturbance of pyrite-bearing ground could result in additional sulphate. An extended suite of chemical analyses appropriate to this site classification was carried out on soil samples by RSK.

“Characteristic value” is the highest result, or mean of the two highest if you have 5 to 9 readings from one area. Based on testing results, Table 16 gives the characteristic water-soluble sulphate content values soil for each of the geological units encountered on site.

Table 16: Characteristic WSO_4 values for soils beneath the site

Soil type	Water Soluble Sulphate (mg/l)	Characteristic Value of Water Soluble Sulphate (mg/l)
Made Ground	13 to 1180	1175
Hackney Gravel	<10 to 15	15
London Clay Formation	26 to 972	885
Lambeth Group	9.8 to 1380	1163
Thanet Sand Formation	150 to 1490	891
White Chalk Sub-group	73	73

Based on the results above and following the steps outlined in the BRE guidance, the Design Sulphate Classes and Chemical Environment for Concrete classifications are summarised in Table 17 for each stratum.

Table 17: DS and ACEC-AC Classification

Soil type	Design Sulphate Class	Aggressive Chemical Environment for Concrete Class
Made Ground	DS-2	AC-2
Hackney Gravel	DS-1	AC-1

Soil type	Design Sulphate Class	Aggressive Chemical Environment for Concrete Class
London Clay Formation	DS-2	AC-2
Lambeth Group		
Thanet Sand Formation	DS-2	AC-2
White Chalk Sub-group	DS-1	AC-1

The recommended ACEC Classification is therefore AC-2 with a Design Sulphate Class for the site of DS-2.

However, if the proposals include the reuse of the pyritic London Clay Formation, the recommended ACEC Classification will increase to AC-4 with a Design Sulphate Class for the site of DS-4.

BIBLIOGRAPHY

BS EN 1997-2: 2007. Eurocode 7 – Geotechnical Design – Part 2: Ground Investigation and Testing.

BS 5930: 1999+A2 (2010). Code of Practice for Site Investigations.

BS EN ISO 14688-1: 2002+C2 (2007). Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 1: Identification and Description.

BS EN ISO 14688-2: 2004+C1 (2007). Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 2: Principles for a Classification.

BS EN 22476-3: 2005+A1: 2011. Geotechnical Investigation and Testing - Field Testing – Part 3: Standard Penetration Test.

BS 8002:1994 (2001). Code of Practice for Earth Retaining Structures.

BS EN 1997-1:2004. Eurocode 7: Geotechnical Design -Part 1: General Rules. BSI.

CIRIA Report 143 (1995). The Standard Penetration Test (SPT): Methods and Use. CIRIA.

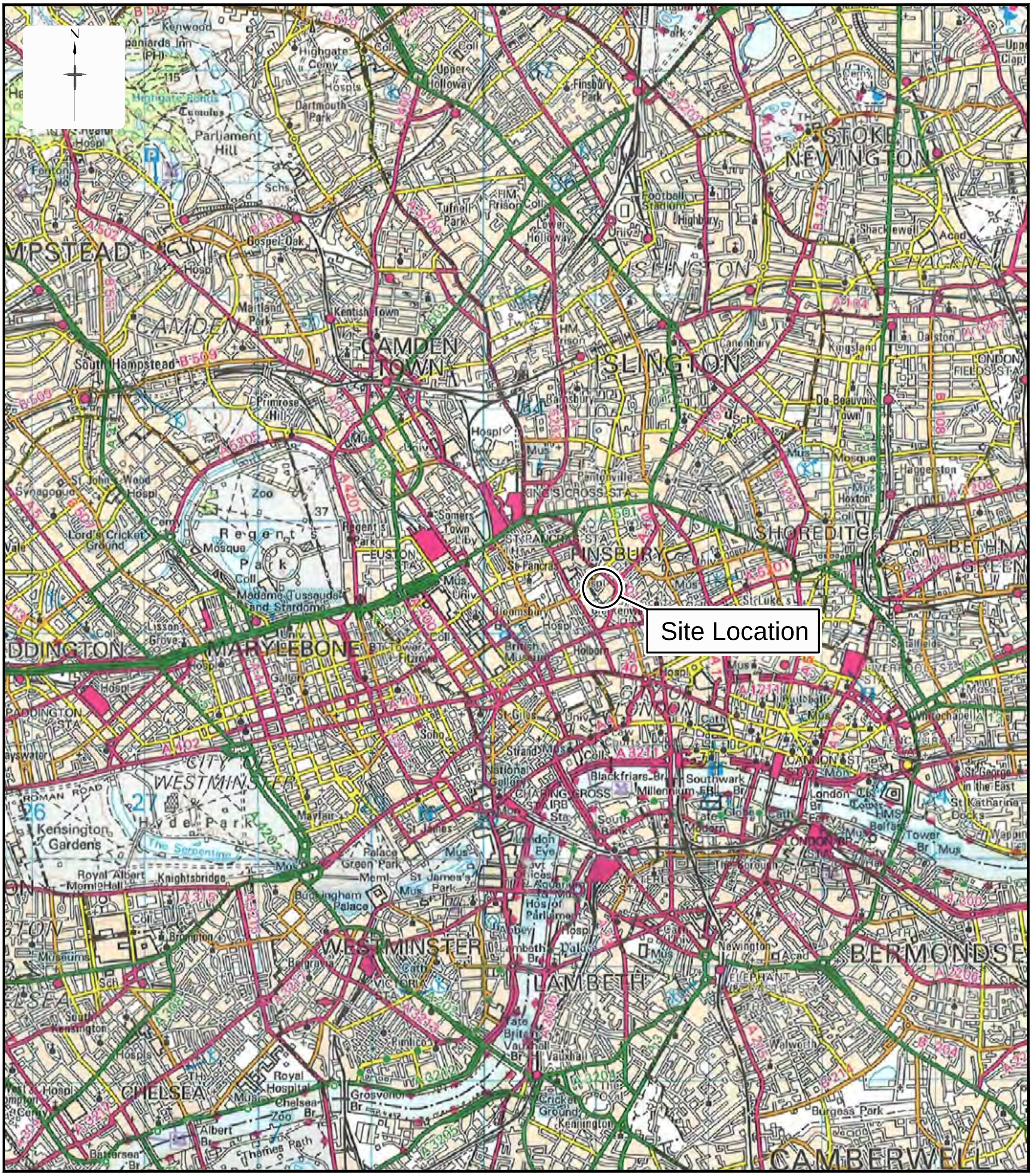
Bowles J E, 1997. Foundation Analysis and Design (5th Edition). McGraw-Hill International Editions.

Building Research Establishment (2005), BRE Special Digest 1: Concrete in aggressive ground (London: BRE).

BS 8500-1:2006, Concrete – Complementary British Standard to BS EN103

Lord, J. A., Clayton, C. R. I. and Mortimore, R. N. (2002), *CIRIA Report C574 Engineering in chalk* (London: CIRIA).

FIGURES



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RSK Group PLC, 18 Frogmore Road, Hemel Hempstead, Hertfordshire, HP3 9RT.

RSK

18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom

Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Field	Value
Client	ROYAL MAIL GROUP LIMITED
Project Title	ROYAL MAIL MOUNT PLEASANT SORTING OFFICE - CALTHORPE SITE
Drawing Title	SITE LOCATION PLAN
Project Number	28549 - R01 (00)
Drawing File	28549 - SLP.dwg
Drawing Number	FIGURE 1

Rev	Drawn	Date	Checked	Date	Approved	Date
01	ASC	05.12.16	ST	05.12.16	ST	05.12.16

Dimensions	Scale	Original Size
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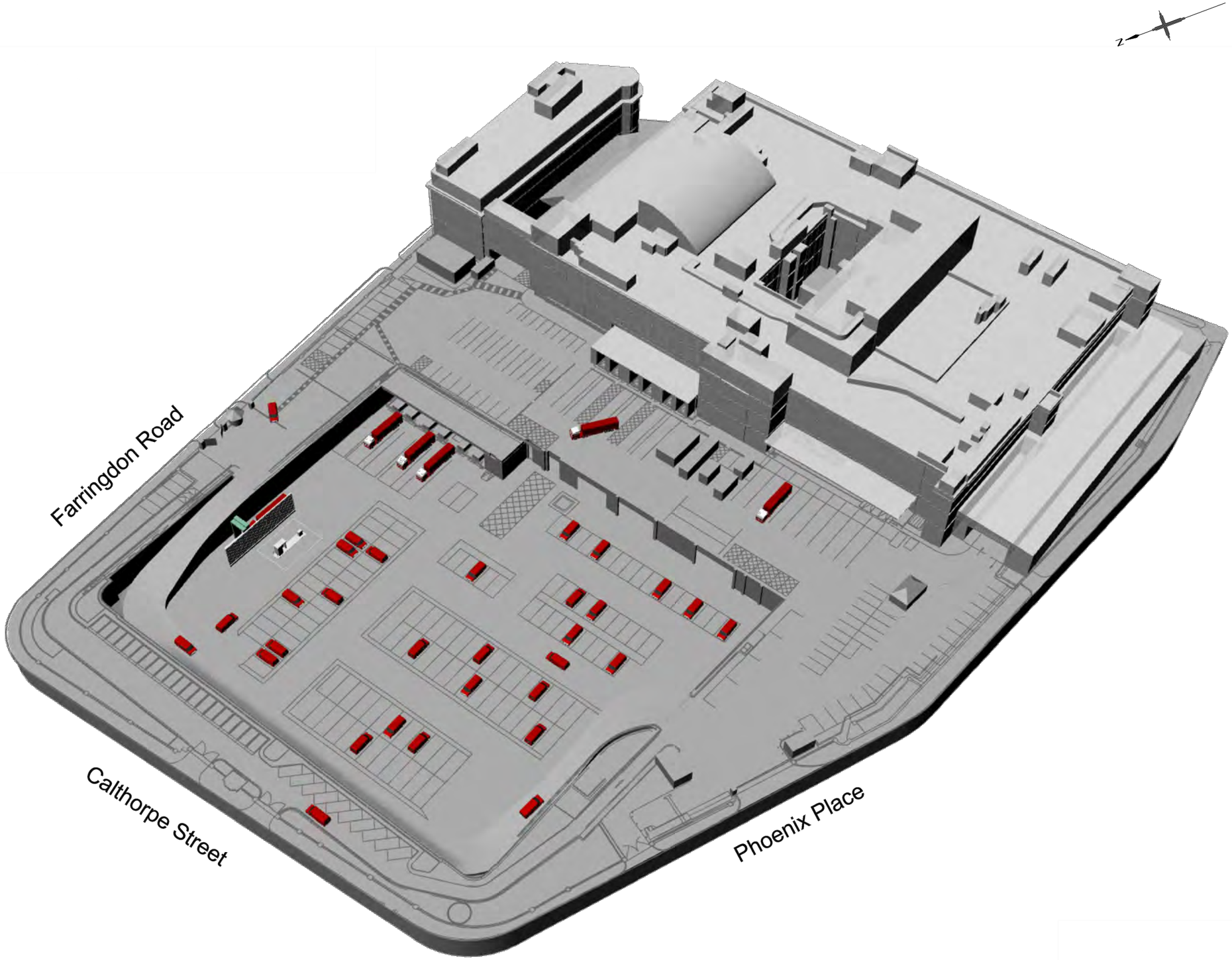


LEGEND

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK

18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom

Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client

ROYAL MAIL GROUP LIMITED

Project Title

ROYAL MAIL MOUNT PLEASANT
SORTING OFFICE
- CALTHORPE SITE

Drawing Title

EXISITNG
SITE
LAYOUT

Drawn	Date	Checked	Date	Approved	Date
ASC	05.12.16	ST	05.12.16	ST	05.12.16

Scale	Orig Size	Dimensions
NTS	A3	m

Project No.	Drawing File
28549 - R01 (00)	28549 (R01-00) Fig 2.dwg

Drawing No.	Rev.
FIGURE 2	P1

LEGEND

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK

18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom

Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client

ROYAL MAIL GROUP LIMITED

Project Title

ROYAL MAIL MOUNT PLEASANT
SORTING OFFICE
- CALTHORPE SITE

Drawing Title

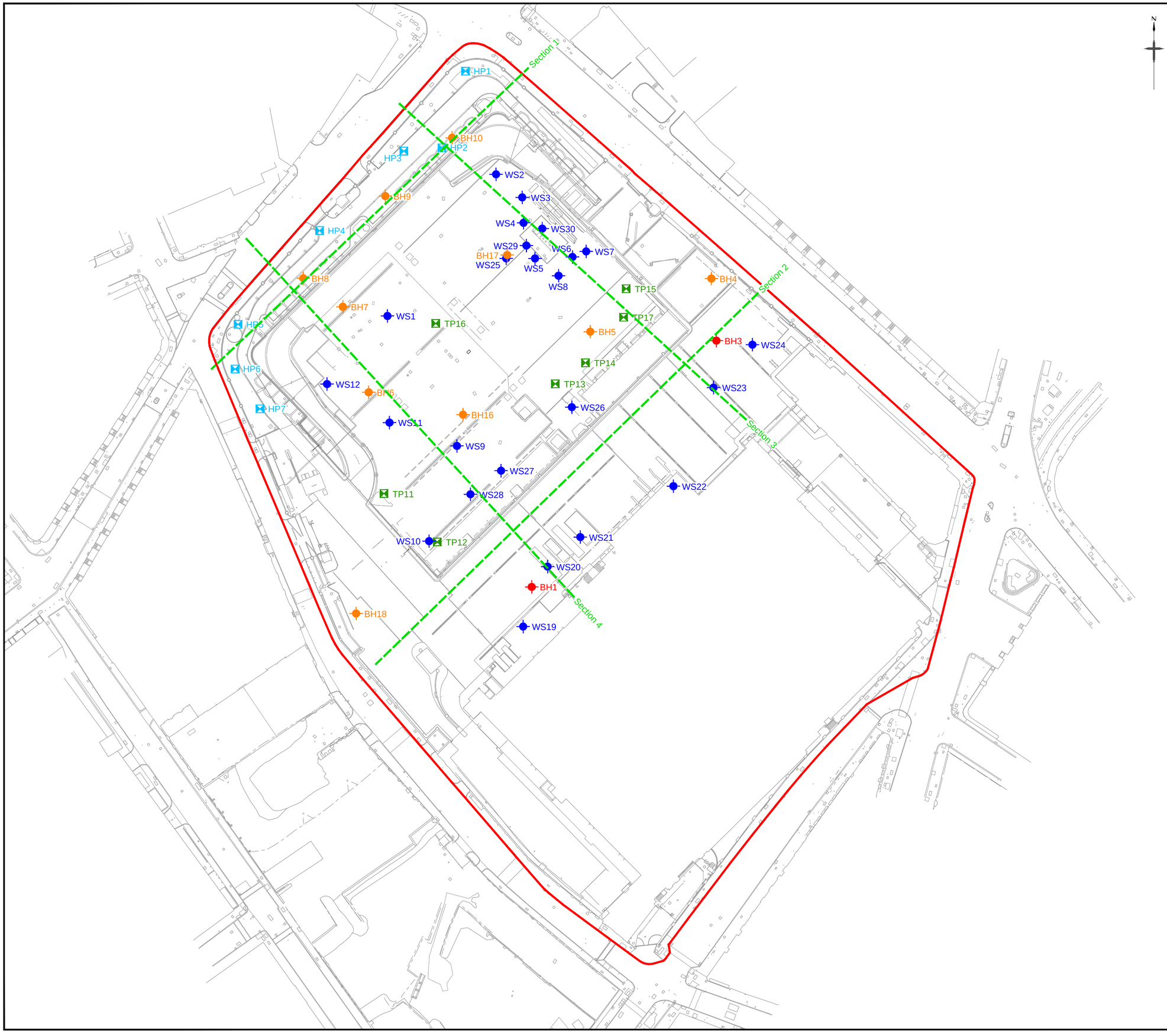
PROPOSED
DEVELOPMENT
PLAN

Drawn	Date	Checked	Date	Approved	Date
ASC	05.12.16	ST	05.12.16	ST	05.12.16

Scale	Orig Size	Dimensions
NTS	A3	m

Project No.	Drawing File
28549 - R01 (00)	28549 (R01-00) Fig 3.dwg

Drawing No.	Rev.
FIGURE 3	P1



LEGEND

- Site Boundary
- Rotary Borehole Location
- Cable Percussive Borehole Location
- Window Sample Borehole Location
- Machine Excavated Trial Pit Location
- Hand Excavated Trial Pit Location
- Section Line

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK

18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom

Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client

ROYAL MAIL GROUP LIMITED

Project Title

ROYAL MAIL MOUNT PLEASANT
SORTING OFFICE
- CALTHORPE SITE

Drawing Title

EXPLORATORY HOLE LOCATION PLAN

Drawn	Date	Checked	Date	Approved	Date
ASC	05.12.16	ST	05.12.16	ST	05.12.16

Scale	Orig Size	Dimensions
1:800	A2	m

Project No.	Drawing File
28549 - R01 (00)	28549 (R01-00) Fig 4.dwg

Drawing No.	Rev.
FIGURE 4	P1

Scale 1 : 800

0 10 20 30 40 50 60m

APPENDIX A
SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Royal Mail Group Limited (the "client") in accordance with the terms of a contract between RSK and the "client", dated 8th November 2016. The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.

2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed in writing the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**

4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.

6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.

7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.

8. The intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (boreholes, trial pits etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.

APPENDIX B
EXPLORATORY HOLE RECORDS

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**24.10.16** End: **03.11.16**	**14.73**	**E:531080.9 N:182339.3**	**1** of **5**

Mechanical Log					Samples & Testing			Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	Type	Results						
										MADE GROUND: Concrete slab.	14.23	(0.50) 0.50	
0.50						PID	0.0ppm			MADE GROUND: Dark brown silty gravelly fine to coarse SAND. Gravel is subrounded to subangular fine to coarse flint with occasional brick and concrete.	13.73	(0.50) 1.00	
0.55					1	ES	J+V+T						
0.80					2	ES	J+V+T						
1.00-2.00										MADE GROUND: Dark reddish brown silty very sandy fine to medium GRAVEL. Gravel is subangular fine flint with frequent brick, concrete and mortar.	13.23	(0.50) 1.50	
1.00-1.45	100				1	SPT	3,3/4,1,1,1 N=7						
1.00					3	ES	J+V+T						
1.00						PID	0.0ppm						
1.01-1.45					1	D							
1.50					4	ES	J+V+T			MADE GROUND: Soft dark brown to greyish black sandy slightly gravelly silty CLAY. Gravel is subrounded to subangular fine to coarse flint with occasional brick, concrete and chalk.	12.73	(0.50) 2.00	
1.50						PID	0.0ppm						
1.80					2	D							
2.00-3.00	100									MADE GROUND: Soft to firm dark brown slightly sandy slightly gravelly CLAY. Gravel is subrounded to subangular fine to coarse flint with occasional brick and coal.	12.13	(0.60) 2.60	
2.00-2.45					3	D							
2.00					5	ES	J+V+T						
2.00						PID	0.0ppm						
2.20-2.65					2	SPT	2,2/3,2,3,3 N=11			MADE GROUND: Soft to firm dark orangish brown to dark brown slightly sandy very gravelly CLAY. Gravel is subangular to subrounded fine to coarse flint with occasional brick fragments, concrete and mortar.	11.13	(1.00) 3.60	
2.50	100				6	ES	J+V+T						
2.50						PID	0.0ppm						
2.80					4	D							
3.00-4.00										Stiff light orangish brown mottled dark bluish grey silty slightly sandy CLAY. With rare relict roots, shell fragments and possible selenite crystals. (LONDON CLAY FORMATION)	8.43	(2.70) 6.30	
3.00-3.45					3	SPT	1,1/1,3,2,3 N=9						
3.00					7	ES	J+V+T						
3.00	100					PID	0.0ppm						
3.01-3.45					5	D							
3.50					8	ES	J+V+T						
3.70					6	D							
4.00-5.00													
4.00-4.60					1	U	100% recovery						
4.00					9	ES	J+V+T						
4.00						PID	0.0ppm						
4.50	100				10	ES	J+V+T						
4.50						V	c_u=62						
4.90					7	D							
5.00-6.50										Stiff greyish brown extremely closely spaced fissured silty CLAY. With rare relict roots, shell fragments and possible selenite crystals. (LONDON CLAY FORMATION)	7.03	(1.40) 7.70	
5.00-5.45					4	SPT	2,2/2,3,3,3 N=11						
5.00					11	ES	J+V+T						
5.00						PID	0.0ppm						
5.01-5.45					8	D							
5.50	100				9	D							
6.00					12	ES	J+V+T						
6.00						V	c_u=75						
6.00						PID	0.0ppm						
6.40					10	D							
6.50-8.00										Stiff dark greyish brown very closely spaced fissured slightly sandy silty CLAY. Sand is coarse quartz. (LONDON CLAY FORMATION)	6.73	(1.27) 8.00	
6.50-7.10					2	U	100% recovery						
7.00					11	D							
7.00	100				13	ES							
7.00						PID	0.0ppm						
7.30						V	c_u=95						
										Description on next sheet			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
24/10/16	09:39		None	146	-
24/10/16	17:00	2.45	2.00	146	-
25/10/16	08:00		None	146	-
25/10/16	18:00	9.50	None	146	2.36
26/10/16	06:00	9.50	None	146	2.97
26/10/16	18:00	15.20	None	146	-
27/10/16	06:00	15.20	None	146	2.76
27/10/16	18:00	22.10	22.10	146	0.00

General Remarks

1. 300mm concrete core to 500mm followed by hand dug inspection pit to 1.20m bgl.
2. Clean drilling techniques adopted. Bentonite seal created before reduction in casing size.
3. Borehole cored to 22.10m in 146mm core barrel casing in SW; from 22.10m to 25.00m in 116mm core barrel casing in PW and open hole drilling in 100mm diameter to 36.40m.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Concrete coring (300mm) + Rotary Cored	**Comacchio GEO 250**	**DM**	**JTownsend**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**24.10.16** End: **03.11.16**	**14.73**	**E:531080.9 N:182339.3**	**2** of **5**

Mechanical Log					Samples & Testing			Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	Type	Results						
8.00-9.50										Stiff high strength dark greyish brown extremely closely spaced fissured silty CLAY. With occasional shell fragments and possible selenite. (LONDON CLAY FORMATION) *(stratum copied from 8.00m from* previous sheet)			
8.00-8.45	100				5	SPT	1,2/2,4,5,5 N=16						
8.00					14	ES	J+V+T						
8.00						V	c_u=76						
8.00						PID	0.0ppm						
8.01-8.45					12	D							
9.00					15	ES							
9.00	100					V	c_u=98					(4.90)	
9.00						PID	0.0ppm						
9.50-11.00													
9.50-9.95					6	SPT	3,3/3,4,5,7 N=19						
9.50					13	D							
9.50-9.95					14	D							
10.00					16	ES	J+V+T						
10.00						PID	0.0ppm						
10.50	100				15	D							
10.50						V	c_u=101						
11.00-12.50													
11.00-11.60					3	U	100% recovery						
12.00					16	D							
12.00						V	c_u=108						
12.50-12.90	100										1.83	12.90	
12.90-14.40										Stiff becoming very stiff with depth light orangish brown mottled light bluish grey fissured silty CLAY, with rare relict roots. Fissures are randomly orientated and planar with occasional polished surfaces. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
12.90-13.35					7	SPT	6,6/6,6,6,6 N=24						
12.91-13.35					17	D							
13.00	100					V	c_u=>120					(1.70)	
13.50					18	D							
14.00						V	c_u=>120						
14.40-15.20											0.13	14.60	
14.40-15.00	100				4	U	100% recovery			Stiff to very stiff reddish brown mottled bluish grey fissured silty CLAY. Fissures are horizontal to sub-horizontal planar and occasionally polished. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
15.00					19	D							
15.00						V	c_u=>120					(1.40)	
15.20-15.60	100												
15.60-17.10											-1.27	16.00	
16.00					17	ES	J+V+T			Very stiff light greenish brown mottled light bluish grey fissured silty CLAY with occasional subangular fine to medium Mudstone gravel. With rare shell fragments , relict rootlets and randomly orientated fissuring. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
16.00					20	D							
16.00	100					PID	0.0ppm						
17.10-18.50													
17.10-17.55	100				8	SPT	6,5/7,9,9,13 N=38					(3.50)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
28/10/16	06:00	22.10	22.10	116	-
28/10/16	18:00	23.50	22.10	116	3.12
01/11/16	06:00	23.50	22.10	116	-
01/11/16	18:00	25.00	22.10	100	-
02/11/16	18:00	36.40	22.10	100	-

General Remarks

4. Monitoring well installations: Pipe 1 - 50mm HDPE response zone between 1.0 and 4.0mbgl.
5. Borehole backfilled with 3mm shingle gravel filter between 1.0m to 4.0mbgl; sand filter from 0.8m to 1.0m bgl & bentonite seal/grouting between 0.2 and 1.0m & 4.0m bgl to base of borehole with flush cover concreted at surface.
6. Groundwater level not observed accurately during drilling due to addition of water flush for coring.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Concrete coring (300mm) + Rotary Cored	**Comacchio GEO 250**	**DM**	**JTownsend**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **03.11.16**	**14.73**	**E:531080.9 N:182339.3**	**3** of **5**

Mechanical Log					Samples & Testing			Backfill & Instru-mentation	Water	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	Type	Results						
18.00	100				21	D				Very stiff light greenish brown mottled light bluish grey fissured silty CLAY with occasional subangular fine to medium Mudstone gravel. With rare shell fragments , relict rootlets and randomly orientated fissuring. (LAMBETH GROUP - UPPER MOTTLED BEDS) *(stratum copied from 16.00m from* previous sheet)	-4.77	19.50	
18.50-20.00													
18.50					5	U	100% recovery						
19.00					18	ES							
19.00	100					PID	0.0ppm						
20.00-21.50										Very stiff light greyish brown extremely closely spaced silty CLAY. With occasional silty horizons with rare shell fragments and lignitic bands. (LAMBETH GROUP - LAMINATED BEDS)		(1.50)	
20.00-20.45					9	SPT	8,9/10,12,12,15 N=49						
20.85	100				22	D					-6.27	21.00	
21.20					23	D				Very stiff to hard light green mottled greenish brown slightly gravelly silty CLAY. Gravel is subrounded fine to coarse Calcrete nodules. With occasional shell fragments. (LAMBETH GROUP - LOWER MOTTLED BEDS)	-6.67	21.40	
21.50-22.10												(1.20)	
21.50-21.94	100				10	SPT	6,10/9,11,15,15 for 63mm N=52*						
21.50	100				24	D				Very stiff light green mottled light reddish brown very closely spaced friable silty slightly sandy CLAY. With rare shell fragments. (LAMBETH GROUP - LOWER MOTTLED BEDS) Becomming dark grey	-7.87	22.60	
22.10-22.20													
22.20-23.50	100											(1.40)	
23.40					25	D							
23.50-25.00										Very stiff to hard light brown mottled light bluish grey fissured slightly sandy silty CLAY. (LAMBETH GROUP - LOWER MOTTLED BEDS)	-9.27	24.00	
23.50-23.68					11	SPT	17,8/31,19 for 20mm N=158*						
24.20	40				26	D				Dense light greenish brown clayey silty fine to coarse quartz SAND. (LAMBETH GROUP - UPNOR FORMATION) Poor recovery	-9.77	(0.50) 24.50	
										Light greyish brown fine SAND. (THANET SAND FORMATION)			

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

7. PID = Photo ionisation detector with 10.6eV bulb

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Concrete coring (300mm) + Rotary Cored	**Comacchio GEO 250**	**DM**	**JTownsend**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**24.10.16** End: **03.11.16**	**14.73**	**E:531080.9 N:182339.3**	**4** of **5**

Mechanical Log					Samples & Testing			Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	Type	Results						
										Light greyish brown fine SAND. (THANET SAND FORMATION) *(stratum copied from 24.50m from* previous sheet)		(11.90)	
										. . . At 36.40m bgl driller indicated bouncing of drill rods on flints (WHITE CHALK SUBGROUP).			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Concrete coring (300mm) + Rotary Cored	**Comacchio GEO 250**	**DM**	**JTownsend**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**24.10.16** End: **03.11.16**	**14.73**	**E:531080.9 N:182339.3**	**5** of **5**

Mechanical Log					Samples & Testing			Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	Type	Results						
										Light greyish brown fine SAND. (THANET SAND FORMATION) *(stratum copied from 24.50m from previous sheet)*	-21.67	36.40	
										Borehole terminated at 36.40m bgl.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Concrete coring (300mm) + Rotary Cored	**Comacchio GEO 250**	**DM**	**JTownsend**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**03.11.16** End: **07.11.16**	**14.73**	**E:531080.5 N:182416.1**	**1** of **5**

Mechanical Log					Samples & Testing							
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
0.35					1	ES	J+V+T			MADE GROUND: Concrete.			
0.35						PID	0.0ppm				13.88	(0.85)	
												0.85	
0.85					2	ES	J+V+T			MADE GROUND: Dark reddish brown silty gravelly fine to coarse SAND. Gravel is subangular to rounded fine to medium flint, concrete, brick and glass. With occasional whole bricks and occasional soft light brown clay.			
0.85						PID	0.0ppm						
1.00-1.40	100											(0.90)	
1.00-1.23					1	SPT	25/25,25 for 75mm N=100*				12.98		
	100											1.75	
1.40-2.00													
1.50					3	ES	J+V+T			Firm to stiff high strength dark greyish brown extremely closely spaced fissured silty CLAY. With rare shell fragments and possible selenite crystals. (LONDON CLAY FORMATION)			
1.50						PID	0.0ppm						
1.80					1	D							
2.00-3.00	100											(1.75)	
2.00-2.45					2	SPT	1,1/1,2,2,3 N=8						
2.00					4	ES	J+V+T						
2.00						PID	0.0ppm						
2.50					5	ES	J+V+T						
2.50	100					PID	0.0ppm				11.23	3.50	
2.85						V	c_u=98						
2.90					2	D							
3.00-4.00													
3.00-3.60					3	U	100% recovery			Stiff dark greyish brown extremely closely spaced fissured silty CLAY. With rare shell fragments and possible selenite crystals. (LONDON CLAY FORMATION)			
3.00					6	ES	J+V+T						
3.00						PID	0.0ppm						
3.50					7	ES	J+V+T						
3.50						PID	0.0ppm						
3.70					3	D							
3.85	100					V	c_u=110						
4.00-4.45					3	SPT	1,1/3,4,5,5 N=17						
4.00					8	ES	J+V+T						
4.00						PID	0.0ppm						
4.20-5.70													
4.45-4.70					1	C							
4.50					9	ES	J+V+T					(5.50)	
4.50						V	c_u=90						
4.70	100				4	D							
4.85-5.20					2	C							
5.00					10	ES	J+V+T						
5.00						V	c_u=120						
5.00						PID	0.0ppm						
5.70-7.20													
5.70-6.15					4	SPT	4,4/4,6,6,7 N=23						
6.00					11	ES	J+V+T						
6.00						PID	0.0ppm						
6.15-6.40	67				3	C							
6.50						V	c_u=>120						
6.55-6.75					4	C							
6.75-6.96					5	C							
7.00					12	ES	J+V+T						
7.00	100				5	D					5.73	9.00	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
03/11/16	06:00	0.00	None	146	-
03/11/16	18:00	2.00	None	146	-
04/11/16	06:00	2.00	None	146	-
04/11/16	18:00	9.70	4.00	146	2.20
05/11/16	06:00	9.70	4.00	146	-
05/11/16	18:00	17.20	None	146	4.40
06/11/16	06:00	17.20	None	146	3.85
06/11/16	18:00	23.45	3.87	146	-

General Remarks

1. 300mm concrete core to 850mm followed by hand dug inspection pit to 1.20m bgl.
2. Clean drilling technques adopted. Bentonite seal created before reduction in casing size.
3. Borehole cored to 24.50m in 146mm core barrel casing in SW; from 24.50m to 30.50m in 116mm core barrel casing in PW and open hole drilling in 100mm diameter to 40.0m.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Concrete coring (300mm) + Rotary Cored	**Comacchio GEO 205**	**DM**	**JTownsend**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**03.11.16** End: **07.11.16**	**14.73**	**E:531080.5 N:182416.1**	**2** of **5**

Mechanical Log					Samples & Testing			Backfill & Instru-mentation	Water	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	Type	Results						
7.00						PID	0.0ppm			Stiff to very stiff dark greyish brown fissured silty slightly sandy CLAY. Fissures are randomly orientated. (LONDON CLAY FORMATION)			
7.20-8.70													
7.20-7.65	100				5	SPT	4,4/6,7,7,9 N=29						
8.00					13	ES	J+V+T						
8.00						V	c_u=>120						
8.00						PID	0.0ppm						
8.70-9.70													
8.70-9.10					6	C							
9.00	100				14	ES	J+V+T						
9.00						PID	0.0ppm						
9.70-11.20												(3.80)	
9.70-10.15					6	SPT	5,6/6,7,10,10 N=33						
10.00					15	ES	J+V+T						
10.00						PID	0.0ppm						
10.15-10.40					7	C							
10.50-10.75					8	C							
10.75-11.00	100				9	C							
10.80						V	c_u=>120						
11.00					6	D							
11.20-12.70													
11.20-11.65					7	SPT	6,8/8,9,10,11 N=38				1.93	12.80	
11.70-12.10					10	C				Very stiff high strength light brown mottled light bluish grey fissured silty CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
12.50					7	D							
12.70-14.20													
12.70-13.15	100				8	SPT	10,9/10,10,14,15 N=49						
13.00					16	ES	J+V+T						
13.00						PID	0.0ppm					(2.20)	
13.50-13.90					11	C							
14.00					8	D							
14.20-15.70													
14.20-14.65					9	SPT	5,5/5,8,9,10 N=32						
14.70-14.95					12	C							
14.90	100					V	c_u=>120				-0.27	15.00	
15.50-15.75					13	C				Stiff to very stiff dark reddish brown mottled light bluish grey fissured silty CLAY. Fissures are randomly orientated. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
15.60					9	D							
15.70-17.20													
15.70-16.15					10	SPT	6,8/8,10,11,13 N=42						
16.00	100				17	ES	J+V+T						
16.50-16.75					14	C						(3.20)	
17.00						PID	0.0ppm						
17.20-18.50													
17.20-17.65	100				11	SPT	5,10/10,10,11,14 N=45						

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
07/11/16	06:00	23.00	24.50	146	4.28
07/11/16	18:00	26.00	24.50	116	-
08/11/16	06:00	26.00	24.50	116	
08/11/16	06:00	26.00	24.50	116	
08/11/16	09:00	26.00	24.50	116	
08/11/16	13:00	40.00	24.50	100	

General Remarks

4. Monitoring well installations: Pipe 1 - 33mm PVC response zone between 1.0m and 1.5m bgl; Pipe 2 - 50mm HDPE response zone between 18.0m and 22.0m bgl.
5. Borehole backfilled with 3mm shingle gravel filter between 1.0m to 1.5m bgl & 18.0m to 22.0m bgl; sand filter from 17.5m to 18.0m bgl & bentonite seal/grouting between 0.2 and 1.0m bgl & 1.5m to 17.5m bgl & 22.0m bgl to base of borehole with flush cover concreted at surface.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Concrete coring (300mm) + Rotary Cored	**Comacchio GEO 205**	**DM**	**JTownsend**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**03.11.16** End: **07.11.16**	**14.73**	**E:531080.5 N:182416.1**	**3** of **5**

Mechanical Log					Samples & Testing			Backfill & Instru-mentation	Water	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	Type	Results						
											-3.47	18.20	
18.20	100				10	D				Very stiff high strength light brown mottled light bluish grey fissured silty CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
18.50-20.00												(1.00)	
18.50-18.92					12	SPT	10,15/15,13,15,7 for 40mm N=57*				-4.47	19.20	
18.60	100					V	c_u=>120			Very stiff light greenish brown mottled light greyish blue fissured silty CLAY. With rare relict roots and randomly orientated fissuring. (LAMBETH GROUP - UPPER MOTTLED BEDS)		(0.70)	
18.95-19.20					15	C							
19.00					18	ES	J+V+T						
19.00						PID	0.0ppm				-5.17	19.90	
19.75-20.00					16	C							
19.80					11	D					-5.47	20.20	
20.00-21.50													
20.00					12	D				Very stiff light greenish brown very sandy clayey SILT.Sand is fine quartz. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
20.00-20.33					13	SPT	11,14/20,22,8 for 30mm N=83*						
	100											(1.70)	
20.00					19	ES	J+V+T			Very stiff dark brownish grey to light grey extremely closely spaced slightly sandy silty CLAY. Sand is fine (sand: 0.063 - 0.2mm) Quartz. With occasional lens of silty sand, shell fragments and layers of lignite. (LAMBETH GROUP - LAMINATED BEDS)			
20.00						PID	0.0ppm				-7.17	21.90	
21.40					13	D							
21.50-23.00													
21.50-21.95					14	SPT	8,7/11,13,12,14 N=50						
												(0.70)	
										Very stiff light greenish blue mottled light yellowish brown fissured slightly gravelly silty CLAY. Gravel is angular coarse calcrete. (LAMBETH GROUP - LOWER MOTTLED BEDS)	-7.87	22.60	
22.80					14	D							
23.00-24.50													
23.00-23.45					15	SPT	4,7/10,10,14,13 N=47						
	100									Very stiff light reddish brown mottled light bluish green fissured silty CLAY. Fissures are randomly orientated. (LAMBETH GROUP - LOWER MOTTLED BEDS)		(2.40)	
24.50-26.00											-10.27	25.00	
25.00					20	ES	J+V+T			Dense greenish brown to bluish grey very clayey very silty fine quartz SAND. (LAMBETH GROUP - LOWER MOTTLED BEDS)		(0.50)	
25.00	100					PID	0.0ppm						
25.20					15	D					-10.77	25.50	
25.80					16	D				Stiff to very stiff light greyish brown mottled bluish grey extremely closely spaced fissured silty CLAY. (LAMBETH GROUP - LOWER MOTTLED BEDS)		(0.80)	
26.00-27.50											-11.57	26.30	
26.50-26.81	87				16	SPT	6,6/15,25,10 for 10mm N=94*			Very dense greenish brown silty slightly gravelly fine to medium quartz SAND. Gravel is subrounded coarse Flint.		(0.70)	
											-12.27	27.00	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

6. Groundwater level not observed accurately during drilling due to addition of water flush for coring.
7. PID = Photo ionisation detector with 10.6eV bulb

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Concrete coring (300mm) + Rotary Cored	**Comacchio GEO 205**	**DM**	**JTownsend**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**03.11.16** End: **07.11.16**	**14.73**	**E:531080.5 N:182416.1**	**4** of **5**

Mechanical Log					Samples & Testing			Backfill & Instru-mentation	Water	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	Type	Results						
26.80					17	D				(LAMBETH GROUP - LOWER MOTTLED BEDS - SAND CHANNEL)			
	87											(0.80)	
27.40					18	D				Very stiff greenish brown mottled reddish brown fissured sandy slightly gravelly silty CLAY. Sand is fine to coarse quartz. Gravel is rounded medium to coarse flint. With rare shell fragments. (LAMBETH GROUP - LOWER MOTTLED BEDS)	-13.07	27.80	
27.50-29.00													
	100											(0.80)	
28.50-28.75					17	C					-13.87	28.60	
28.80					19	D				Very dense bluish green mottled reddish brown silty fine to medium quartz SAND. (LAMBETH GROUP - LOWER MOTTLED BEDS)	-14.17	28.90	
29.00-30.50													
29.50					20	D				Very stiff light grey mottled dark grey extremely closely spaced fissured slightly sandy silty CLAY. (LAMBETH GROUP - LOWER MOTTLED BEDS)		(1.60)	
	73												
30.00					21	ES	J+V+T			Very dense dark greenish black silty clayey slightly gravelly fine to coarse quartz SAND. Gravel is well rounded fine to medium flint. With rare shell fragments. (LAMBETH GROUP - UPNOR FORMATION)			
30.00-30.40					22	B							
30.00						PID	0.0ppm				-15.77	30.50	
30.50-30.63					17	SPT	25/50 for 50mm N=300*						
										Very dense light grey quartz SAND. (THANET SAND FORMATION)		(6.50)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Concrete coring (300mm) + Rotary Cored	**Comacchio GEO 205**	**DM**	**JTownsend**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**03.11.16** End: **07.11.16**	**14.73**	**E:531080.5 N:182416.1**	**5** of **5**

Mechanical Log					Samples & Testing			Backfill & Instru-mentation	Water	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	Type	Results						
										Very dense light grey quartz SAND. (THANET SAND FORMATION) *(stratum copied from 30.50m from* previous sheet)	-22.27	37.00	
										Cuttings indicate presence of chalk. (WHITE CHALK SUBGROUP)	-25.27	(3.00) 40.00	
										Borehole completed at 40.0m bgl.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Concrete coring (300mm) + Rotary Cored	**Comacchio GEO 205**	**DM**	**JTownsend**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**08.11.16** End: **10.11.16**	**19.95**	**E:531078.9 N:182435.4**	**1** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.00-0.50	1	LB				MADE GROUND: Concrete.	19.65	0.30	
0.40-0.50	1	ES	J+V+T			MADE GROUND: Dark reddish brown gravelly silty fine to coarse SAND. Gravel is subangular to subrounded flint, brick, concrete, with occasional coal, wire and fragments of wood.		(0.50)	
0.40		PID	0.0ppm				19.15	0.80	
0.80-1.00	2	ES	J+V+T			MADE GROUND: Concrete and brickwork recovered as sandy gravel and cobbles.			
0.80		PID	0.0ppm						
1.00-1.50	2	LB						(1.30)	
1.60	3	ES	J+V+T						
1.60		PID	0.0ppm				17.85	2.10	
2.00-2.50	3	LB				MADE GROUND: Brown to dark brown slightly sandy slightly gravelly CLAY. Gravel is subrounded to subangular fine to coarse flint and brick with rare oyster shells.			
2.10	4	ES	J+V+T						
2.10		PID	0.0ppm					(1.00)	
2.60	5	ES	J+V+T						
2.60		PID	0.0ppm				16.85	3.10	
3.00-3.45	1	SPT(c)	1,1/1,1 N=2			MADE GROUND: Dark brown to black gravelly clayey SAND. Sand is fine to coarse with ash. Gravel is subrounded to subangular fine to coarse flint and brick with rare oyster shells.			
3.00-3.50	4	LB							
3.10	6	ES	J+V+T						
3.10		PID	0.0ppm						
3.80	1	D						(2.00)	
4.00-4.45	2	SPT(c)	1/,1 N=1						
4.00-4.50	5	LB							
4.00	7	ES	J+V+T						
4.00		PID	0.0ppm						
4.50	8	ES	J+V+T						
4.50		PID	0.1ppm						
4.80	2	D					14.85	5.10	
5.00-5.45	3	SPT(c)	1,2/2,1,2,3 N=8			Stiff high to very high strength brownish grey to grey closely spaced fissured silty CLAY. (LONDON CLAY FORMATION)			
5.00-5.50	6	LB							
5.00		PID	0.2ppm						
5.00	9	ES	J+V+T						
6.00	3	D				. . . At 6.0m pockets of fine to coarse sand			
6.00	10	ES	J+V+T						
6.00		PID	0.0ppm						
6.50-6.95	4	SPT	2,2/3,4,4,5 N=16						
7.00	11	ES	J+V+T						
7.00		PID	0.0ppm						
7.50	4	D							
8.00-8.45	1	U	55 blows 100% recovery						
8.00	12	ES	J+V+T						
8.00		PID	0.0ppm						
8.50	5	D							

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
08/11/16	18:54	14.00	9.00	250	14.00
08/11/16	18:54	24.00	24.00	200	Dry
09/11/16	07:54	24.50	24.00	200	24.50
09/11/16	18:54	40.00	26.50	150	Dry
10/11/16	12:51		-		Dry

Chiselling / Slow Progress

From	To	Duration (hh:mm)
0.80	2.10	04:00

General Remarks

1. 300mm concrete core to 300mm followed by hand dug inspection pit to 0.80m bgl.
2. Borehole progressed through machine excavated pit by JCB to 3.5m bgl due to presence of concrete and brickwork obstruction from 0.8m to 2.1m bgl.
3. Clean drilling technques adopted. Bentonite

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**08.11.16** End: **10.11.16**	**19.95**	**E:531078.9 N:182435.4**	**2** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
9.00	6	D				Stiff high to very high strength brownish grey to grey closely spaced fissured silty CLAY. (LONDON CLAY FORMATION) *(stratum copied from 5.10m from previous sheet)*			
9.00	13	ES	J+V+T						
9.00		PID	0.0ppm						
9.50-9.95	5	SPT	3,3/4,4,4,5 N=17						
10.00	14	ES	J+V+T						
10.00		PID	0.0ppm						
10.50	7	D							
11.00-11.45	2	U	55 blows 100% recovery					(12.20)	
11.50	8	D							
12.00	9	D							
12.50-12.95	6	SPT	7,7/9,10,10,12 N=41						
13.00	15	ES	J+V						
13.00		PID	0.0ppm						
13.50	10	D							
14.00-14.45	3	U	60 blows 100% recovery						
14.50	11	D							
15.00	12	D							
15.50-15.95	7	SPT	4,5/6,7,7,7 N=27						
16.00	16	ES	J+V						
16.00		PID	0.0ppm						
16.50	13	D							
17.00-17.45	4	U	65 blows 100% recovery				2.65	17.30	
17.50	14	D				Very stiff high to very high strength light brown mottled light bluish grey fissured silty CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

seal created before reduction in casing size.
4. Borehole drilled in following diameters: 24.0m bgl in 250mm; 35.4m bgl in 200mm; 40.0m bgl in 150mm casing to 7.5m bgl in 250mm and 26.5m bgl in 200mm diameter.
5. Monitoring well installations: Pipe 1 - 50mm HDPE response zone between 3.0 and

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**08.11.16** End: **10.11.16**	**19.95**	**E:531078.9 N:182435.4**	**3** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
18.00	15	D				Very stiff high to very high strength light brown mottled light bluish grey fissured silty CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS) *(stratum copied from 17.30m from previous sheet)*			
18.50-18.95	8	SPT	5,5/7,5,7,9 N=28						
19.00	17	ES	J+V						
19.00		PID	0.0ppm						
19.50	16	D							
20.00-20.45	5	U	65 blows 100% recovery						
20.00	18	ES	J+V						
20.00		PID	0.0ppm						
20.50	17	D						(6.70)	
21.00	18	D							
22.50	19	D							
23.00-23.45	6	U	70 blows 100% recovery						
23.50	20	D							
							-4.05	24.00	
24.00	21	D		≈		Stiff to very stiff dark brownish grey slightly sandy slightly silty CLAY. Sand is fine to medium with occasional shell fragments. With closely spaced laminations and partings of light grey silty fine sand and lignitic deposits. (LAMBETH GROUP - LAMINATED BEDS)			
24.50-24.95	9	SPT	6,6/9,11,11,13 N=44						
25.00	19	ES	J+V						
25.00		PID	0.0ppm					(2.50)	
26.00-26.45	10	SPT	7,8/11,12,14,13 for 70mm N=51*						
							-6.55	26.50	
						Description on next sheet			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

6.0mbgl. Pipe 2 - 33mm PVC response zone 13.5m to 14.5m bgl.

6. Borehole backfilled with 3mm shingle gravel filter between 3.0m to 6.0mbgl & 13.5m to 14.5m bgl; sand filter from 2.5m to 3.0m bgl & bentonite seal/grouting between 0.2 and 2.5m bgl; 6.0m to 8.0m bgl; 11.5 to 13.5m bgl;

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**08.11.16** End: **10.11.16**	**19.95**	**E:531078.9 N:182435.4**	**4** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
27.50-27.95	7	U	70 blows 100% recovery			Stiff to very stiff light bluish grey mottled pinkish brown closely spaced fissured silty CLAY. (LAMBETH GROUP - LOWER MOTTLED BEDS) *(stratum copied from 26.50m from previous sheet)*		(3.50)	
29.00-29.43	11	SPT	7,7/11,13,14,12 for 53mm N=54*				-10.05	30.00	
30.00 30.00	20	ES PID	J+V 0.0ppm			Stiff to very stiff dark green mottled orangish purple sandy silty CLAY. Sand is fine to medium. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
30.50-30.95	8	U	95 blows 100% recovery					(3.00)	
32.00-32.18	12	SPT	25/35,15 for 25mm N=150*				-13.05	33.00	
33.50-34.00 33.50-33.95	7 9	LB U	110 blows 0% recovery			Dense to very dense dark greenish grey very clayey slightly gravelly silty fine to medium SAND. (LAMBETH GROUP - UPNOR FORMATION)		(1.50)	
35.00-35.50 35.00-35.15	8 13	LB SPT	25/50 for 75mm N=200*			Dark greenish grey very gravelly slightly sandy silty CLAY. Sand is fine to medium. Gravel is rounded flat fine to coarse of black pebbles. (LAMBETH GROUP - UPNOR FORMATION)	-14.55	34.50	
35.00	21	ES	J+V			Very dense grey fine SAND. (THANET SAND FORMATION)	-15.45	(0.90) 35.40	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

14.5m to 16.5m bgl & 26.5m to 28.5m bgl with compacted backfill (sand/clay) to base of borehole and installation of flush cover.

7. PID = Photo ionisation detector with 10.6eV bulb
8. Small rate of groundwater seepage observed by the driller at 14.0m bgl and 24.5m bgl;

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **10.11.16**	**19.95**	**E:531078.9 N:182435.4**	**5** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
36.50-36.63	14	SPT	25/50 for 50mm N=300*			Very dense grey fine SAND. (THANET SAND FORMATION) *(stratum copied from 35.40m from previous sheet)*		(4.00)	
38.00-38.15	15	SPT	25/50 for 70mm N=214*				-19.45	39.40	
39.50-39.63	16	SPT	25/50 for 50mm N=300*			Recovery of off white silty chalky subangular fine to coarse GRAVEL of flint. (WHITE CHALK SUBGROUP)	-20.05	(0.60) 40.00	
40.00 40.00	22	ES PID	J+V 0.0ppm			Borehole completed at 40.0m bgl.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

sealed out at 26.5m bgl.
9. 200L of water added to drill through the Thanet Sand.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH05**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **07.11.16**	**14.59**	**E:531041.1 N:182418.9**	**1** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Concrete.	14.34	0.25	
						MADE GROUND: Light brown silty gravelly SAND. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse Flint with frequent brick and concrete fragments.	14.09	0.50	
0.50	1	ES	J+V+T			MADE GROUND: Concrete and brickwork recovered as sandy gravel and cobbles.		(1.30)	
0.50		PID	0.0ppm						
1.00	2	ES	J+V+T						
1.00		PID	0.0ppm						
1.50	3	ES	J+V+T						
1.50		PID	0.0ppm				12.79	1.80	
1.80-2.00	1	LB				Firm dark brownish grey slightly sandy slightly gravelly clay. Sand is fine to medium. Gravel is subangular to rounded fine Flint. (LONDON CLAY FORMATION)		(0.65)	
2.00-2.45	2	U	40 blows 100% recovery				12.14	2.45	
2.00	4	ES	J+V+T			Stiff to very stiff high strength dark brownish grey slightly sandy CLAY. Sand is fine to medium. (LONDON CLAY FORMATION)			
2.00		PID	0.0ppm						
2.45-2.55	3	D							
2.50-3.00	4	LB							
2.50	5	ES	J+V+T						
2.50		PID	0.0ppm						
3.00	6	ES	J+V+T						
3.00		PID	0.0ppm						
3.50-3.95	5	SPT	5,6/5,5,5,5 N=20						
3.50	7	ES	J+V+T						
3.50		PID	0.0ppm						
4.00-4.50	6	LB							
4.00	8	ES	J+V+T						
4.00		PID	0.0ppm						
4.50-4.95	7	U	50 blows 100% recovery						
4.50	9	ES	J+V+T						
4.50		PID	0.0ppm						
4.95-5.05	8	D							
5.00-5.50	9	LB							
5.00	10	ES	J+V+T						
5.00		PID	0.0ppm						
5.50-5.95	10	SPT	2,2/3,4,4,5 N=16						
6.00	11	ES	J+V+T						
6.00		PID	0.0ppm						
6.00-6.50	11	LB							
7.00	12	ES	J+V+T						
7.00		PID	0.0ppm						
7.00-7.45	12	U	40 blows 100% recovery					(10.25)	
7.45-7.55	13	D							
8.00	13	ES	J+V+T						
8.00-8.30	14	LB							
8.00		PID	0.0ppm						
8.50-8.95	15	SPT	2,3/3,3,4,5 N=15						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
24/10/16	18:07	5.05	4.50	250	-
25/10/16	18:04	15.50	7.50	250	-
26/10/16	08:04	15.00	7.50	250	10.00
26/10/16	18:11	26.80	25.00	200	-
27/10/16	17:13	31.50	25.00	200	-
28/10/16	17:06	32.00	25.00	200	-
04/11/16	13:06	40.00	25.00	150	-
07/11/16	10:30		-		

Chiselling / Slow Progress		
From	To	Duration (hh:mm)
0.50	1.80	01:00

General Remarks

1. 300mm concrete core to 250mm followed by hand dug inspection pit to 0.50m bgl.
2. Borehole progressed through machine excavated pit by JCB to 1.8m bgl due to presence of concrete and brickwork obstruction from 0.5m to 1.8m bgl.
3. Clean drilling technques adopted. Bentonite

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Machine dug	**Dando 3000**	**M Reeves**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH05**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**24.10.16** End: **07.11.16**	**14.59**	**E:531041.1 N:182418.9**	**2** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
9.00	14	ES	J+V+T			Stiff to very stiff high strength dark brownish grey slightly sandy CLAY. Sand is fine to medium. (LONDON CLAY FORMATION) *(stratum copied from 2.45m from previous sheet)*			
9.00-9.30	16	LB							
9.00		PID	0.0ppm						
10.00	15	ES	J+V+T						
10.00-10.45	17	U	50 blows 100% recovery						
10.00		PID	0.0ppm						
10.45-10.55	18	D							
11.30	19	D							
11.50-11.95	20	SPT	3,4/4,5,5,6 N=20				1.89	12.70	
12.70	21	D				Stiff to very stiff high strength light brown mottled light bluish grey fissured silty CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
13.00	16	ES	J+V+T						
13.00-13.45	22	SPT	7,8/10,10,12,15 N=47					(1.30)	
13.00		PID	0.0ppm				0.59	14.00	
14.00	23	D				Stiff to very stiff high to very high strength dark reddish brown mottled light bluish grey silty slightly sandy CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
14.50-14.95	24	U	60 blows 100% recovery						
15.50	25	D						(3.00)	
16.00	17	ES	J+V+T						
16.00	26	D							
16.00-16.45	27	SPT	7,8/8,10,13,13 N=44				-2.42	17.00	
17.00	28	D				Stiff to very stiff light brown mottled light bluish grey fissured slightly silty slightly sandy CLAY. Sand is fine. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
17.50-17.95	29	U	100 blows 100% recovery					(1.50)	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

seal created before reduction in casing size.
4. Borehole drilled in following diameters: 20.5m bgl in 250mm; 31.0m bgl in 200mm; 40m bgl in 150mm diameter casing to 7.5m bgl in 250mm and 28m bgl in 200mm diameter.
5. Monitoring well installations: Pipe 1 - 50mm HDPE response zone between 1.0 and

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Machine dug	**Dando 3000**	**M Reeves**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH05**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**24.10.16** End: **07.11.16**	**14.59**	**E:531041.1 N:182418.9**	**3** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
17.95	30	D					-3.92	18.50	
18.50	31	D				Dark brownish grey extremely closely spaced slightly sandy slightly silty CLAY. Sand is fine to medium with occasional shell fragments. (LAMBETH GROUP - LAMINATED BEDS)			
19.00	18	ES	J+V+T					(1.50)	
19.00-19.45	32	SPT	3,5/7,7,8,10 N=32						
19.00		PID	0.0ppm				-5.42	20.00	
20.00	19	ES	J+V+T			Very stiff reddish purple mottled light bluish grey fissured slightly silty CLAY. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
20.00	33	D						(1.00)	
20.00		PID	0.0ppm				-6.42	21.00	
20.50-20.95	34	U	100 blows 90% recovery						
21.00	35	D				Stiff light orangish brown mottled light bluish grey slightly sandy CLAY. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
22.00-22.43	36	SPT	8,10/10,12,15,13 for 56mm N=53*					(2.00)	
							-8.42	23.00	
23.00	37	D				Stiff dark reddish brown mottled green sandy silty CLAY. Sand is predominately fine with occasional subangular fine to medium calcrete gravel. (LAMBETH GROUP - LOWER MOTTLED BEDS)		
23.50-23.95	38	SPT	7,7/8,10,15,15 N=48						
24.30	39	D							
25.00	20	ES	J+V+T					(4.50)	
25.00-25.37	40	SPT	8,10/16,16,18 for 70mm N=68*						
25.00		PID	0.0ppm						
26.00	41	D							
26.50-26.95	42	SPT	5,5/10,10,11,13 N=44						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

1.5mbgl. Pipe 2 - 50mm HDPE response zone 18.0m to 23.0m bgl.

6. Borehole backfilled with 3mm shingle gravel filter between 1.0m to 1.5m bgl & 18.0m to 23.0m bgl; sand filter from 17.5m to 18.0m bgl & bentonite seal/grouting between 0.2 and 1.0mbg; 1.5m to 17.5m bgl & 23.0 to 25.0m

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Machine dug	**Dando 3000**	**M Reeves**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH05**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**24.10.16** End: **07.11.16**	**14.59**	**E:531041.1 N:182418.9**	**4** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
							-12.92	27.50	
27.50	43	D				Stiff greenish brown very sandy slightly gravelly CLAY. Sand is fine to coarse quartz. Gravel is rounded medium to coarse flint. (LAMBETH GROUP - LOWER MOTTLED BEDS)		(1.00)	
28.00-28.31	44	SPT	10,15/21,22,7 for 10mm N=94*				-13.92	28.50	
29.00	45	D				Very dense dark grey gravelly slightly clayey fine to medium SAND. Gravel is rounded fine to coarse black pebbles. (LAMBETH GROUP - UPNOR FORMATION)			
29.50-29.73	46	SPT(c)	12,13/25,25 for 50mm N=120*					(3.00)	
30.00	21	ES	J+V+T						
30.00-30.50	46	LB							
30.00		PID	0.0ppm						
31.00-31.27	48	SPT(c)	10,15/25,25 for 60mm N=111*				-16.92	31.50	
31.50	48	D				Initially very stiff sandy clayey SILT grading in to very dense grey fine silty slightly clayey SAND. (THANET SAND FORMATION)			
33.00-33.11	50	SPT(c)	25/50 for 60mm N=250*					(4.60)	
34.00-34.18	51	SPT(c)	15,10/50 for 75mm N=200*						
35.00	22	ES	J+V+T						
35.00-35.11	52	SPT(c)	25/50 for 60mm N=250*						
35.00		PID	0.0ppm						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

bgl with compacted backfill (clay/sand) to base of borehole and flush cover installed at surface.

7. PID = Photo ionisation detector with 10.6eV bulb
8. Groundwater seepage/ strike not observed by driller due to addtion of water for in situ

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Machine dug	**Dando 3000**	**M Reeves**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH05**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**24.10.16** End: **07.11.16**	**14.59**	**E:531041.1 N:182418.9**	**5** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
36.00-36.02	53	SPT(c)	25/50 for 12mm N=1250*			Recovery of off white chalky gravel of flint. (WHITE CHALK SUBGROUP)	-21.52	36.10	
37.00-37.24	54	SPT(c)	17,8/25,25 for 60mm N=111*						
38.00-38.21	55	SPT(c)	22,3/24,26 for 45mm N=125*					(3.90)	
39.00-39.03	56	SPT(c)	25/50 for 17mm N=882*						
40.00 40.00	23	ES PID	J+V+T 0.0ppm			Borehole completed at 40.0m bgl.	-25.42	40.00	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

pressuremeter testing.
9. 89.0mm Digital 3 arm weak rock self boring pressuremeter testing conducted at depths of 11.0m bgl; 15.5m bgl ; 27.3m bgl & 33.0m bgl (test failed).
10. 200L of water added to drill through the Thanet Sand.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Machine dug	**Dando 3000**	**M Reeves**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH06**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**02.11.16** End: **07.11.16**	**14.77**	**E:530972.0 N:182400.0**	**1** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Asphalt.	14.62	0.15	
						MADE GROUND: Concrete.	14.52	0.25	
0.50	1	ES	J+V+T			MADE GROUND: Light brown slightly gravelly fine to coarse SAND with a low cobble content. Gravel is subangular to rounded fine to coarse of flint, brick, concrete with rare coal and slate. Cobbles are of concrete and brick.		(1.55)	
0.50		PID	0.0ppm						
0.80	2	ES	J+V+T						
0.80		PID	0.0ppm						
1.50	3	ES	J+V+T				12.97	1.80	
1.50		PID	0.0ppm						
2.00	4	ES	J+V+T			MADE GROUND: Dark brown gravelly clayey SAND. Gravel is subangular to rounded fine to coarse with occasional brick, concrete and slate.		(3.50)	
2.00		PID	0.0ppm						
2.50	5	ES	J+V+T						
2.50		PID	0.0ppm						
3.00-3.45	1	SPT(c)	1,2/1,2,2,2 N=7						
3.00		PID	0.0ppm						
3.00-3.45	1	LB							
3.00	6	ES	J+V+T						
3.50	7	ES	J+V+T						
3.50		PID	0.0ppm						
3.80	1	D							
4.00-4.45	2	SPT(c)	1,1/1,1,1 N=3						
4.00	8	ES	J+V+T						
4.00		PID	0.0ppm						
4.00-4.45	2	LB							
4.50	9	ES	J+V+T						
4.50		PID	0.0ppm						
4.80	2	D					9.47	5.30	
5.00-5.45	3	SPT(c)	1,1/1,1,2,3 N=7			Firm light grey mottled orangish brown CLAY with occasional subrounded to subangular fine to medium flint. (ALLUVIUM)		(1.20)	
5.00	10	ES	J+V+T						
5.00		PID	0.0ppm						
5.50		PID	0.0ppm						
6.00	3	D					8.27	6.50	
6.00	11	ES	J+V+T						
6.00		PID	0.0ppm						
6.50-6.95	1	U	50 blows 100% recovery			Stiff high strength dark brownish grey closely spaced fissured silty CLAY. (LONDON CLAY FORMATION)			
7.00	4	D							
7.00	12	ES	J+V+T						
7.00		PID	0.0ppm						
7.50	5	D							
8.00-8.45	4	SPT	2,3/3,2,3,3 N=11						
8.00	13	ES	J+V+T						
8.00		PID	0.0ppm						

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
02/11/16	17:24	15.50	7.50	250	Dry
03/11/16	08:24	20.50	7.50	250	20.50
03/11/16	18:24	26.50	22.50	200	Dry
04/11/16	17:24	31.00	22.50	200	Dry
07/11/16	17:21	40.00	22.50	150	15.80

Chiselling / Slow Progress

From	To	Duration (hh:mm)

General Remarks

1. 300mm concrete core to 250mm followed by hand dug inspection pit to 1.20m bgl.
2. Borehole progressed through machine excavated pit by JCB to 3.0m bgl due to potential to encounter concrete and brickwork obstructions.
3. Clean drilling technques adopted. Bentonite

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Machine dug	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH06**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**02.11.16** End: **07.11.16**	**14.77**	**E:530972.0 N:182400.0**	**2** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
9.00	6	D				Stiff high strength dark brownish grey closely spaced fissured silty CLAY. (LONDON CLAY FORMATION) *(stratum copied from 6.50m from previous sheet)*		(5.70)	
9.00	14	ES	J+V+T						
9.00		PID	0.0ppm						
9.50-9.95	2	U	55 blows 100% recovery						
10.00	7	D							
10.00	15	ES	J+V+T						
10.00		PID	0.0ppm						
11.20	8	D							
11.50-11.95	5	SPT	3,3/4,5,4,6 N=19				2.57	12.20	
12.50	9	D				Stiff to very stiff high to very high strength light brown mottled light bluish grey closely spaced fissured silty CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
13.00-13.45	3	U	65 blows 100% recovery						
13.00	16	ES	J+V+T						
13.00		PID	0.0ppm						
13.50	10	D							
14.00	11	D							
14.50	12	D							
15.00-15.45	6	SPT	4,5/5,4,5,6 N=20			. . . Below 15.0m bgl locally light bluish grey mottled red.			
16.00	13	D						(7.80)	
16.00	17	ES	J+V+T						
16.00		PID	0.0ppm						
16.50-16.95	4	U	65 blows 100% recovery						
17.00	14	D							
17.50	15	D							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

seal created before reduction in casing size.
4. Borehole drilled in following diameters: 20.5m bgl in 250mm; 31.0m bgl in 200mm; 40.0m bgl in 150mm casing to 7.5m bgl in 250mm and 22.5m bgl in 200mm diameter.
5. Monitoring well installations: Pipe 1 - 50mm HDPE response zone between 5.5 and 8.5m

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Machine dug	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH06**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**02.11.16** End: **07.11.16**	**14.77**	**E:530972.0 N:182400.0**	**3** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
18.00-18.45	7	SPT	5,5/7,8,9,10 N=34			Stiff to very stiff high to very high strength light brown mottled light bluish grey closely spaced fissured silty CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS) *(stratum copied from 12.20m from previous sheet)*			
19.00	16	D							
19.00	18	ES	J+V+T						
19.00		PID	0.0ppm						
19.50-19.95	5	U	75 blows 100% recovery				-5.23	20.00	
20.00	17	D				Stiff dark grey and light grey silty CLAY. (LAMBETH GROUP - LAMINATED BEDS)			
20.00	19	ES	J+V+T	≈					
20.50	18	D							
20.60	19	D				. . . At 20.6 m bgl very thin bed of light grey clayey silt.		(1.50)	
							-6.73	21.50	
						Very stiff very high strength light bluish grey and reddish brown closely spaced fissured silty CLAY. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
22.00	20	D							
22.50-22.95	6	U	75 blows 100% recovery						
23.00	21	D						(3.70)	
23.50	22	D							
24.00-24.45	8	SPT	5,6/7,6,7,9 N=29						
25.00	20	ES	J+V+T				-10.43	25.20	
25.00	23	D				Very stiff dark green mottled orangish brown sandy silty CLAY. Sand is fine to medium. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
25.00		PID	0.0ppm						
26.00	24	D						(2.30)	
26.50	25	D							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

bgl.

6. Borehole backfilled with 3mm shingle gravel filter between 5.5m to 8.5m bgl; sand filter from 5.0m to 5.5m bgl & bentonite seal/grouting between 0.3 and 1.3mbg; 4.0m to 5.0m bgl; 8.5m to 12.5m bgl & 21.50m to 22.50m bgl with compacted backfill

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Machine dug	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH06**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **07.11.16**	**14.77**	**E:530972.0 N:182400.0**	**4** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
27.00-27.45	7	U	100 blows 100% recovery				-12.73	27.50	
27.50	26	D				Very stiff dark grey silty CLAY with very closely to closely spaced thin laminations and partings of light grey silty fine sand. (LAMBETH GROUP - UPNOR FORMATION)		(1.50)	
28.00	27	D							
28.50-28.94	9	SPT	8,10/11,12,15,12 for 60mm N=53*				-14.23	29.00	
29.00-29.50	3	LB				Dark grey very gravelly sandy CLAY. Gravel is rounded to flat fine to coarse of black pebbles. (LAMBETH GROUP - UPNOR FORMATION)		(0.50)	
29.00-29.15	10	SPT(c)	15,10/50 for 50mm N=300*				-14.73	29.50	
29.00	28	D				Very dense grey fine silty slightly clayey SAND. (THANET SAND FORMATION)			
30.00-30.13	11	SPT	25/50 for 75mm N=200*						
30.00 30.00	21	ES PID	J+V+T 0.0ppm						
31.00	29	D						(5.80)	
31.50-31.65	12	SPT	15,10/50 for 50mm N=300*						
32.50	30	D							
33.00-33.15	13	SPT	25/50 for 75mm N=200*						
34.00	31	D							
34.50-34.63	14	SPT	25/50 for 50mm N=300*						
35.00 35.00	22	ES PID	J+V+T 0.0ppm				-20.53	35.30	
35.50	32	D				Recovery of off white chalky GRAVEL of subangular fine to coarse flint. (WHITE CHALK SUBGROUP)			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

(clay/sand) between 1.3m to 4.0m bgl; 12.50m to 21.50m bgl & 22.50m bgl to base of borehole with flush cover installed at surface.
7. PID = Photo ionisation detector with 10.6eV bulb
8. Small rate of groundwater seepage observed by driller at 20.50m bgl; sealed out at 22.5m

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Machine dug	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH06**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**02.11.16** End: **07.11.16**	**14.77**	**E:530972.0 N:182400.0**	**5** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
36.00-36.18	15	SPT(c)	15,10/50 for 75mm N=200*			Recovery of off white chalky GRAVEL of subangular fine to coarse flint. (WHITE CHALK SUBGROUP) *(stratum copied from 35.30m from previous sheet)*			
37.00	33	D							
37.50-37.65	16	SPT(c)	25/50 for 75mm N=200*					(4.70)	
38.50	34	D							
39.50-39.68	17	SPT(c)	15,10/50 for 70mm N=214*						
40.00	23	ES	J+V+T				-25.23	40.00	
40.00	35	D				Borehole completed at 40.0m bgl.			
40.00		PID	0.0ppm						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

bgl.
9. 89.0mm Digital 3 arm weak rock self boring pressuremeter testing conducted at depths of 10.5m bgl; 20.9m bgl ; 25.6m bgl (test fail due to stiff strata) & 31.5m bgl.
10. 200L of water added to drill through the Thanet Sand.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Machine dug	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH07**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**29.09.16** End: **30.09.16**	**14.73**	**E:530963.9 N:182426.6**	**1** of **2**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
0.00-0.50	1	B				MADE GROUND: Asphalt.	14.53	0.20	
						MADE GROUND: Brownish grey silty fine to coarse SAND and GRAVEL with a medium cobble content. Gravel is subrounded to subangular fine to coarse of flint, concrete and brick. Cobbles are of concrete and brick.		(1.00)	
0.50	1	ES	J+V+T						
0.50-1.00	2	B							
0.50		PID	0.0ppm						
1.00	2	ES	J+V+T				13.53	1.20	
1.00		PID	0.0ppm						
1.10	1	D				MADE GROUND: Greyish brown clayey fine to coarse SAND and GRAVEL with a low cobble content. Gravel is subrounded to subangular fine to coarse of flint, concrete and brick. Cobbles are of concrete and brick.			
1.20-1.65	1	SPT(c)	3,4/4,5,4,6 N=19						
1.20-1.70	3	B							
1.50	3	ES	J+V+T						
1.50		PID	0.0ppm						
1.90	2	D							
2.00-2.45	2	SPT(c)	3,3/5,4,5,6 N=20						
2.00-2.50	4	B							
2.00	4	ES	J+V+T						
2.00		PID	0.0ppm					(3.80)	
2.50	5	ES	J+V+T						
2.50		PID	0.1ppm						
2.80	3	D							
3.00-3.45	3	SPT(c)	5,5/6,7,9,10 N=32						
3.00-3.50	5	B							
3.00	6	ES	J+V+T						
3.00		PID	0.0ppm						
3.50	7	ES	J+V+T						
3.50		PID	0.0ppm						
3.80	4	D				. . . Below 4.0m bgl dark brown and occasional fragments of charcoal.			
4.00-4.45	4	SPT(c)	1,2/2,1,2,3 N=8	1					
4.00-4.50	6	B					9.73	5.00	
4.00	8	ES	J+V+T			MADE GROUND: Soft dark brown very sandy slightly gravelly silty CLAY. Gravel is subrounded to subangular fine to medium flint and fine brick.			
4.00		PID	0.0ppm					(1.00)	
4.50	9	ES	J+V+T						
4.50		PID	0.0ppm						
4.80	5	D					8.73	6.00	
4.80	10	ES	J+V+T						
5.00-5.45	5	SPT(c)	0,1/,1 N=1			Soft dark greyish brown silty CLAY. (ALLUVIUM)		(0.50)	
5.00-5.50	7	B					8.23	6.50	
5.00		PID	0.0ppm						
5.20	11	ES	J+V+T			Firm to stiff very high strength brown mottled light greyish blue CLAY. (LONDON CLAY FORMATION)			
6.00	6	D							
6.20	12	ES	J+V+T						
6.20		PID	0.0ppm						
6.50-6.95	6	SPT	3,3/4,5,5,6 N=20						
6.70	13	ES	J+V+T						
7.50	7	D							
7.70	14	ES	J+V+T						
7.70		PID	0.1ppm						
8.00-8.45	1	U	60 blows 100% recovery					(3.30)	
8.50	8	D							
8.70	15	ES	J+V+T						

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
30/09/16	11:48	1.20	-	300	Dry
29/09/16	15:49	2.00	2.00	200	Dry
30/09/16	06:50	2.00	2.00	200	
30/09/16	07:50	5.00	4.50	200	5.00
30/09/16	10:51	10.00	9.00	200	Dry

Chiselling / Slow Progress

From	To	Duration (hh:mm)

General Remarks

1. 300mm concrete core to 200mm followed by hand dug inspection pit to 1.20m bgl.
3. Clean drilling technques adopted. Bentonite seal created before reduction in casing size.
4. Borehole drilled in following diameters: 6.5m bgl in 200mm; 10.0m bgl in 150mm casing to 6.5m bgl in 200mm and 9.0m bgl in 150mm diameter.
5. Monitoring well installations: Pipe 1 - 50mm HDPE response zone between 5.0m and 8.5m bgl.
6. Borehole backfilled with 3mm shingle gravel filter between 5.0m

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Hand excavation	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH07**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**29.09.16** End: **30.09.16**	**14.73**	**E:530963.9 N:182426.6**	**2** of **2**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
9.00	9	D				Firm to stiff very high strength brown mottled light greyish blue CLAY. (LONDON CLAY FORMATION) *(stratum copied from 6.50m from previous sheet)*			
9.50-9.95	7	SPT	3,3/4,5,5,5 N=19				4.93	9.80	
9.70	16	ES	J+V+T			Stiff light greyish blue mottled red CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)	4.73	10.00	
9.70		PID	0.0ppm						
10.00	10	D				Borehole completed at 10.0 m bgl.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

to 8.5m bgl; sand filter from 4.5m to 5.0m bgl & bentonite seal/grouting between 0.3 and 4.5mbg & 8.5m bgl to base of borehole.
7. PID = Photo ionisation detector with 10.6eV bulb
8. Groundwater strike observed by driller at 5.0m bgl rising to 4.7m bgl after 20 mins and sealed out at 6.5m bgl.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Hand excavation	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH08**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**13.10.16** End: **18.10.16**	**18.43**	**E:530951.6 N:182435.5**	**1** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Decorative block paving.	18.35	0.08	
						MADE GROUND: Brownish grey silty fine to coarse SAND and GRAVEL with a medium cobble content. Gravel is subrounded to subangular fine to coarse of flint, concrete and brick. Cobbles are of concrete and brick.	18.23	0.20	
0.50	1	ES	J+V+T			MADE GROUND: Greyish brown clayey gravelly fine to coarse SAND with a medium cobble content. Gravel is subrounded to subangular fine to coarse of flint, concrete and brick. Cobbles are of concrete and brick.			
0.50		PID	0.2ppm						
1.00	2	ES	J+V+T						
1.00		PID	0.3ppm						
1.40-1.85	1	SPT(c)	3,3/4,5,5,4 N=18						
1.40-1.90	1	B							
1.50	3	ES	J+V+T						
1.50		PID	0.0ppm						
2.00	1	D							
2.00-2.45	2	SPT(c)	1,1/1,1,1 N=3						
2.00-2.50	2	B							
2.00	4	ES	J+V+T						
2.00		PID	0.2ppm						
2.50	5	ES	J+V+T			. . . Below 3.0m bgl clayey to very clayey.		(6.20)	
2.50		PID	0.0ppm						
2.80	2	D							
3.00-3.45	3	SPT(c)	1,1/1,1,1 N=3						
3.00-3.50	3	B							
3.00	6	ES	J+V+T						
3.00		PID	0.2ppm						
3.50	7	ES	J+V+T						
3.50		PID	0.0ppm						
3.70	3	D							
4.00-4.45	4	SPT(c)	1,2/2,1,2,4 N=9						
4.00-4.50	4	B							
4.00	8	ES	J+V+T			. . . At 5.0m bgl recovery of high cobble content of brick.			
4.00		PID	0.0ppm						
4.50	9	ES	J+V+T						
4.50		PID	0.3ppm						
4.80	4	D							
5.00-5.45	5	SPT(c)	1,1/1,1 N=2						
5.00	10	ES	J+V+T						
5.00-5.50	5	B							
5.00		PID	0.0ppm				12.03	6.40	
5.50	11	ES	J+V+T			MADE GROUND: Recovery of wood fragments up to 200mm in length. Possible wood obstruction towards base of made ground.			
5.50		PID	0.1ppm						
6.00	5	D						(1.10)	
6.00	11	ES	J+V+T						
6.00	12	ES	J+V+T						
6.00		PID	0.0ppm						
6.00		PID	0.1ppm				10.93	7.50	
6.50-6.95	6	SPT(c)	1,1/1,1 N=2			MADE GROUND: Medium dense yellowish brown gravelly fine to coarse SAND. Gravel is rounded to subangular fine to coarse flint. (Possibly reworked material)			
6.50-7.00	6	B							
7.00	12	ES	J+V+T	1					
7.00		PID	0.1ppm						
7.50	6	D						(1.50)	
7.50	13	ES	J+V+T	1					
7.50		PID	0.1ppm						
8.00-8.45	7	SPT(c)	0,1/,1 N=1						
8.00	13	ES	J+V+T				9.43	9.00	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
13/10/16	10:00	8.50	8.00	250	8.50
13/10/16	14:00	13.00	10.50	250	13.00
13/10/16	18:00	21.00	19.00	200	-
14/10/16	10:00	24.80	21.00	200	24.80
14/10/16	10:15	34.00	26.50	150	
17/10/16	14:00	40.00	26.50	150	Dry

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

1. Hand dug inspection pit to 1.20m bgl.
3. Clean drilling technques adopted. Bentonite seal created before reduction in casing size.
4. Borehole drilled in following diameters: 12.5m bgl in 250mm; 26.0m bgl in 200mm; 40m bgl in 150mm casing to 12.0m bgl in 250mm and 26.5m bgl in 200mm diameter.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH08**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**13.10.16** End: **18.10.16**	**18.43**	**E:530951.6 N:182435.5**	**2** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
8.00-8.50	7	B				MADE GROUND: Medium dense dark grey very silty SAND and GRAVEL. Gravel is subrounded to subangular fine to medium of mixed lithologies, pebbles and coarse sand to fine gravel sized fragments of red brick.			
8.00		PID	0.2ppm						
8.50	14	ES	J+V+T						
8.50		PID	0.0ppm						
9.00	7	D						(1.50)	
9.00	14	ES	J+V+T						
9.00		PID	0.1ppm						
9.50-9.95	8	SPT(c)	4,4/6,7,7,7 N=27						
9.50	15	ES	J+V+T				7.93	10.50	
9.50-10.00	8	B				Firm grey silty CLAY. (ALLUVIUM)			
9.50		PID	0.1ppm						
10.00	15	ES	J+V+T						
10.00		PID	0.2ppm						
10.50	8	D							
10.50	16	ES	J+V+T						
10.50		PID	0.0ppm						
11.00-11.45	9	SPT	1,2/2,1,2,1 N=6					(2.50)	
12.00	9	D							
12.50-12.95	1	U	60 blows 100% recovery	2			5.43	13.00	
13.00	10	D				Medium dense to dense yellowish brown fine to coarse very sandy GRAVEL. Sand is medium to coarse. Gravel is rounded to subangular fine to coarse flint. (HACKNEY GRAVEL)			
13.00	16	ES	J+V+T						
13.00		PID	0.2ppm						
14.00-14.50	9	B							
14.00-14.45	10	SPT(c)	3,4/4,6,6,7 N=23						
14.00	17	ES	J+V+T						
14.00		PID	0.0ppm						
15.50-16.00	10	B							
15.50-15.95	11	SPT(c)	4,5/6,5,6,7 N=24					(6.00)	
16.00	17	ES	J+V+T						
16.00		PID	0.0ppm						
17.00-17.50	11	B				. . . below 17.00m sand and contend decreases. Becoming sandy silty clayey GRAVEL. Below 17.00m sand content decreases. becoming sandy silty clayey GRAVEL.			
17.00-17.45	12	SPT(c)	2,2/5,6,7,7 N=25						
17.00	18	ES	J+V+T						
17.00		PID	0.0ppm						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

5. Monitoring well installations: Pipe 1 - 50mm HDPE response zone between 4.0m and 10.5m bgl. Pipe 2 - 33mm PVC response zone 12.5m to 19.0m bgl.
6. Borehole backfilled with 3mm shingle gravel filter between 4.0m to 10.5m bgl & 12.5m to 19.0m bgl; sand filter from 3.5m to 4.0m bgl &

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH08**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**13.10.16** End: **18.10.16**	**18.43**	**E:530951.6 N:182435.5**	**3** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
18.50-19.00	12	B				Medium dense to dense yellowish brown fine to coarse very sandy GRAVEL. Sand is medium to coarse. Gravel is rounded to subangular fine to coarse flint. (HACKNEY GRAVEL) *(stratum copied from 13.00m from previous sheet)*	-0.57	19.00	
18.50-18.95	13	SPT(c)	5,5/7,7,7,9 N=30						
18.50	18	ES	J+V+T			Stiff grey fissured silty CLAY. With light grey silt on fissure surfaces. Locally laminated. (LAMBETH GROUP - UPPER MOTTLED BEDS)	-1.07	(0.50) 19.50	
18.50		PID	0.0ppm						
19.50	19	ES	J+V+T			Stiff light greyish blue mottled reddish brown CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
19.50		PID	0.0ppm						
20.00-20.45	14	SPT	6,5/7,9,10,12 N=38					(1.20)	
20.00	19	ES	J+V+T				-2.27	20.70	
20.00		PID	0.0ppm						
21.50-21.95	2	U	70 blows 100% recovery			Very stiff high strength grey slightly gravelly CLAY. Gravel is rounded to subrounded fine to medium black pebbles. (LAMBETH GROUP - UPPER MOTTLED BEDS)		(1.30)	
							-3.57	22.00	
22.00	17	D				Recovery of flat angular coarse gravel to cobble size fragments of weak to medium strong grey mudstone.	-3.77	22.20	
22.50	18	D				Stiff brown mottled light bluish grey CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)		(1.20)	
23.00-23.45	15	SPT	6,7/8,9,9,11 N=37				-4.97	23.40	
						Stiff grey fissured silty CLAY. With light grey silt on fissure surfaces. Locally laminated. (LAMBETH GROUP - LAMINATED BEDS)	-5.47	(0.50) 23.90	
24.00	19	D				Stiff to very stiff very high strength brown mottled light bluish grey CLAY. Locally silty and fissured with light grey fine sand infill of fissure surfaces. (LAMBETH GROUP - LOWER MOTTLED BEDS)		(0.90)	
24.50-24.95	3	U	70 blows 100% recovery	≈			-6.37	24.80	
						Grey fine SAND. (LAMBETH GROUP - LOWER MOTTLED BEDS)	-6.77	25.20	
25.00	20	ES	J+V+T						
25.00	20	D				Very stiff light green mottled light yellowish brown slightly sandy silty CLAY. Sand is fine to medium. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
25.00		PID	0.0ppm						
25.50	21	D						(1.80)	
26.00-26.45	16	SPT	7,7/10,10,12,13 N=45						
26.00	20	ES	J+V+T						
26.00		PID	0.1ppm				-8.57	27.00	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

bentonite seal/grouting between 0.3 and 3.5mbg; 10.5m and 12.5m bgl & 19.0m to 21.0m bgl backfilling with compacted arisings (clay/sand) to base of borehole and flush cover installed at surface.

7. PID = Photo ionisation detector with 10.6eV bulb

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH08**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**13.10.16** End: **18.10.16**	**18.43**	**E:530951.6 N:182435.5**	**4** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
27.00	22	D				Very stiff brown closely spaced fissured slightly sandy silty CLAY. (LAMBETH GROUP - LOWER MOTTLED BEDS)	-8.97	27.40	
27.50-27.95	4	U	70 blows 100% recovery			Stiff to very stiff high strength light grey slightly sandy silty CLAY. Sand is predominately fine. (LAMBETH GROUP - UPNOR FORMATION)			
28.00	23	D							
28.50	24	D						(2.60)	
29.00-29.44	17	SPT	7,8/11,12,15,12 for 60mm N=53*				-11.57	30.00	
30.00	21	ES	J+V+T			Very stiff dark greenish grey mottled closely spaced fissured slightly sandy silty CLAY. Sand is fine to medium glauconitic. Fissures are randomly orientated with light greyish green sandy silt infill. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
30.00	25	D							
30.00		PID	0.0ppm						
30.50-30.95	5	U	70 blows 100% recovery						
31.00	26	D							
31.50	27	D						(3.00)	
32.00-32.45	18	SPT	6,6/8,10,10,14 N=42				-14.57	33.00	
33.00	28	D				Stiff to very stiff dark greenish grey mottled gravelly slightly sandy CLAY. Sand is fine to medium glauconitic. Gravel is rounded to subrounded fine to medium of black pebbles. (LAMBETH GROUP - UPNOR FORMATION)	-15.07	(0.50) 33.50	
33.50-33.95	6	U	90 blows 0% recovery			Stiff to very stiff dark greenish grey mottled gravelly sandy CLAY. Sand is fine to medium glauconitic. Gravel is rounded to subrounded fine to medium of black pebbles. (LAMBETH GROUP - UPNOR FORMATION)	-15.57	(0.50) 34.00	
33.50-34.00	13	B							
34.00	29	D				Very dense grey fine very silty slightly clayey SAND. (THANET SAND FORMATION)			
35.00-35.32	19	SPT	12,13/20,20,10 for 20mm N=88*						
35.00	22	ES	J+V+T						
35.00		PID	0.0ppm						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

8. Groundwater strike (medium flow) observed by driller at 8.5m bgl rising to 8.1m bgl after 20 mins.
9. Groundwater strike (large flow) observed by driller at 13.0m bgl rising to 9.1m bgl after 20 mins.
10. Small rate of groundwater seepage observed

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH08**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**13.10.16** End: **18.10.16**	**18.43**	**E:530951.6 N:182435.5**	**5** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
36.00	30	D				Very dense grey fine very silty slightly clayey SAND. (THANET SAND FORMATION) *(stratum copied from 34.00m from previous sheet)*			
36.50-36.73	20	SPT	10,11/50 for 75mm N=200*					(6.00)	
37.50	31	D							
38.00-38.13	21	SPT	25/50 for 50mm N=300*						
39.50-39.68	22	SPT	15,10/50 for 75mm N=200*				-21.57	40.00	
40.00 40.00	23	ES PID	J+V+T 0.0ppm			Borehole completed at 40.0 m bgl.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

by the driller at 24.8m to 25.2m bgl.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH09**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**06.10.16** End: **12.10.16**	**18.37**	**E:530977.2 N:182461.1**	**1** of **5**

Depth	No	Type	Results	Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
0.00-0.50	1	B				MADE GROUND: Decorative block paving.	18.29	0.08	
						MADE GROUND: Brownish grey silty fine to coarse SAND and GRAVEL with a medium cobble content. Gravel is subrounded to subangular fine to coarse of flint, concrete and brick. Cobbles are of concrete and brick.			
0.50	1	ES	J+V+T						
0.50-1.00	2	B							
1.00	2	ES	J+V+T						
1.10	1	D							
1.20-1.65	1	SPT(c)	2,2/2,3,3,4 N=12						
1.20-1.70	3	B							
1.50	3	ES	J+V+T						
1.90	2	D							
2.00-2.45	2	SPT(c)	1,1/1,1,1 N=3						
2.00-2.50	4	B							
2.00	4	ES	J+V+T						
2.50	5	ES	J+V+T						
2.80	3	D							
3.00-3.45	3	SPT(c)	1,1/1,1 N=2			. . . Below 3.0m bgl clayey to very clayey.		(6.32)	
3.00-3.50	5	B							
3.00	6	ES	J+V+T						
3.50	7	ES	J+V+T						
3.80	4	D							
4.00-4.45	4	SPT(c)	1,1/1,1,2,1 N=5						
4.00-4.50	6	B							
4.00	8	ES	J+V+T						
4.50	9	ES	J+V+T						
4.80	5	D							
5.00-5.45	5	SPT(c)	1/,1 N=1	1					
5.00	10	ES	J+V+T						
5.00-5.50	7	B							
5.50	11	ES	J+V+T						
6.00	6	D							
6.00	12	ES	J+V+T				11.97	6.40	
6.50-6.95	6	SPT(c)	6,6/7,10,12,12 N=41	1		MADE GROUND: Recovery of wood fragments up to 200mm in length. Possible wood obstruction towards base of made ground.			
6.50-7.00	8	B						(1.10)	
							10.87	7.50	
7.50	7	D				Medium dense yellowish brown very gravelly medium to coarse SAND. Gravel is rounded to subangular fine to medium flint. (HACKNEY GRAVEL)			
7.50	13	ES	J+V+T						
8.00-8.45	7	SPT(c)	2,3/3,4,5,4 N=16						
8.00-8.50	9	B							
8.50	14	ES	J+V+T						

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress

From	To	Duration (hh:mm)

General Remarks

1. Hand dug inspection pit to 1.20m bgl.
2. Clean drilling technques adopted. Bentonite seal created before reduction in casing size.
3. Borehole drilled in following diameters: 18.5m bgl in 250mm; 22.5m bgl in 200mm; 40m bgl in 150mm casing to 18.0m bgl in 250mm; 22.5m bgl in 200mm & 26m bgl in 150mm

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH09**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**06.10.16** End: **12.10.16**	**18.37**	**E:530977.2 N:182461.1**	**2** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
9.00	8	D				Medium dense yellowish brown very gravelly medium to coarse SAND. Gravel is rounded to subangular fine to medium flint. (HACKNEY GRAVEL) *(stratum copied from 7.50m from previous sheet)*			
9.50-9.95	8	SPT(c)	3,4/4,5,7,8 N=24						
9.50-10.00	10	B							
9.50	15	ES	J+V+T						
10.50	9	D							
10.50	16	ES	J+V+T						
11.00-11.45	11	SPT(c)	3,3/4,5,5,5 N=19					(7.50)	
11.00	17	ES	J+V+T						
11.01-11.50	11	B							
12.00	10	D							
12.50-12.95	10	SPT(c)	3,3/4,5,6,4 N=19						
12.50-13.00	12	B							
13.50	11	D							
14.00-14.45	11	SPT(c)	3,4/5,6,7,7 N=25						
14.00-14.50	13	B							
14.00	18	ES	J+V+T				3.37	15.00	
15.00	12	D				Medium dense to dense yellowish brown very sandy GRAVEL. Sand is medium to coarse. Gravel is rounded to subangular fine to coarse flint. (HACKNEY GRAVEL)			
15.50-15.95	12	SPT(c)	4,5/6,5,6,7 N=24						
15.50-16.00	14	B							
16.50	13	D							
17.00-17.45	13	SPT(c)	5,5/6,7,7,8 N=28					(4.50)	
17.00-17.50	15	B							
17.00	19	ES	J+V+T						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

diameter.
4. Monitoring well installations: Pipe 1 - 50mm HDPE response zone between 8.0m and 11.0m bgl. Pipe 2 - 33mm PVC response zone 22.0m to 23.0m bgl.
5. Borehole backfilled with 3mm shingle gravel filter between 8.0m to 20.7m bgl & 22.0m to

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH09**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **12.10.16**	**18.37**	**E:530977.2 N:182461.1**	**3** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
18.00	14	D				Medium dense to dense yellowish brown very sandy GRAVEL. Sand is medium to coarse. Gravel is rounded to subangular fine to coarse flint. (HACKNEY GRAVEL) *(stratum copied from 15.00m from previous sheet)*	-1.13	19.50	
18.50-18.95	14	SPT(c)	4,5/5,7,8,10 N=30						
18.50-19.00	16	B							
19.50	15	D				Stiff light greyish blue mottled reddish brown CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)		(1.20)	
20.00-20.45	15	SPT(c)	4,5/5,4,5,6 N=20						
20.00-20.50	17	B							
20.00	20	ES	J+V+T				-2.33	20.70	
21.00	16	D				Very stiff grey slightly gravelly CLAY. Gravel is rounded to subrounded fine to medium black pebbles. (LAMBETH GROUP - UPPER MOTTLED BEDS)		(1.30)	
21.50-21.95	16	SPT	4,5/5,5,6,16 N=32	▼2			-3.63	22.00	
						Recovery of flat angular coarse gravel to cobble size fragments of weak to medium strong grey mudstone.	-3.83	22.20	
22.50	17	D				Stiff to very stiff high strength brown mottled light bluish grey CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)		(1.20)	
23.00-23.45	1	U	60 blows 100% recovery				-5.03	23.40	
23.50	18	D				Stiff grey fissured silty CLAY. With light grey silt on fissure surfaces. Locally laminated. (LAMBETH GROUP - LAMINATED BEDS)	-5.53	(0.50) 23.90	
24.00	19	D				Stiff to very stiff brown mottled light bluish grey CLAY. Locally silty and fissured with light grey fine sand infill of fissure surfaces. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
24.50-24.95	17	SPT	5,5/7,9,9,8 N=33						
25.00	21	ES							
25.50	20	D						(3.50)	
26.00-26.45	2	U	65 blows 100% recovery						
26.50	21	D							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

23.0m bgl; sand filter from 7.5m to 8.0m bgl & bentonite seal/grouting between 0.3 and 7.5mbg; 20.7m and 22.0m bgl & 23.0m to 25.0m bgl backfilling with compacted arisings (clay/sand) to base of borehole and flush cover installed at surface.

6. PID = Photo ionisation detector with 10.6eV

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH09**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **12.10.16**	**18.37**	**E:530977.2 N:182461.1**	**4** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
27.00	22	D					-9.03	27.40	
27.50-27.86	18	SPT	7,8/10,19,21 N:50 for 208mm			Dense to very dense light grey slightly silty slightly clayey fine SAND. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
28.50	23	D							
29.00-29.32	19	SPT	10,10/17,24,9 N:50 for 170mm						
30.00	22	ES	J+V+T					(5.60)	
30.00	24	D							
30.50-30.78	20	SPT	10,15/30,20 N:50 for 125mm						
31.50	25	D							
32.00-32.32	21	SPT	10,11/17,24,9 N:50 for 170mm				-14.63	33.00	
33.00	26	D				Stiff to very stiff dark greenish grey mottled gravelly slightly sandy CLAY. Sand is fine to medium glauconitic. Gravel is rounded to subrounded fine to medium of black pebbles. (LAMBETH GROUP - UPNOR FORMATION)			
33.50-33.95	22	SPT(c)	7,8/9,11,11,12 N=43					(1.50)	
34.50	27	D					-16.13	34.50	
35.00-35.17	23	SPT	10,15/50 for 70mm N=214*			Very dense grey very silty slightly clayey fine SAND. (THANET SAND FORMATION)			
35.01	23	ES	J+V+T						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

bulb

7. Groundwater strike (medium flow) observed by driller at 6.8m bgl rising to 5.2m bgl after 20 mins.
8. Groundwater strike (large flow) observed by driller at 22.0m bgl rising to 18.1m bgl after 20 mins and sealed out at 20.7m bgl.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH09**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**06.10.16** End: **12.10.16**	**18.37**	**E:530977.2 N:182461.1**	**5** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
36.00	28	D				Very dense grey very silty slightly clayey fine SAND. (THANET SAND FORMATION) *(stratum copied from 34.50m from previous sheet)*			
36.50-36.65	24	SPT	25/35,15 N:50 for 100mm					(5.50)	
37.50	29	D							
38.00-38.10	25	SPT	25/50 N:50 for 50mm						
39.00	30	D				. . . below 39.00m becoming very sandy SILT.			
39.50-39.63	26	SPT	25/50 N:50 for 75mm				-21.63	40.00	
40.00	23	ES	J+V+T			Borehole completed at 40.0 m bgl.			
40.00	24	D							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

9. Falling head permeability test performed at 7.5m bgl in 250mm diameter casing.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH10**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**03.10.16** End: **05.10.16**	**18.65**	**E:530998.0 N:182479.3**	**1** of **5**

Depth	No	Type	Results	Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
0.00-0.50	1	B				MADE GROUND: Decorative block paving.	18.57	0.08	
						MADE GROUND: Brownish grey clayey fine to coarse SAND and GRAVEL with a medium cobble content. Gravel is subrounded to subangular fine to coarse of flint, concrete and brick. Cobbles are of concrete and brick.		(1.92)	
0.50	1	ES	J+V+T						
0.50-1.00	2	B							
0.50		PID	0.1ppm						
1.00	2	ES	J+V+T						
1.00		PID	0.1ppm						
1.10	1	D							
1.20-1.65	1	SPT(c)	3,3/4,4,5,5 N=18						
1.20-1.70	3	B							
1.50	3	ES	J+V+T				16.65	2.00	
1.90	2	D				MADE GROUND: Greyish brown sandy gravelly CLAY with a medium cobble content. Gravel is subrounded to subangular fine to coarse of flint, concrete and brick and occasional charcoal and clinker. Rare oyster shells. Cobbles are of concrete and brick.			
2.00-2.45	4	B							
2.00	4	ES	J+V+T						
2.00		PID	0.2ppm						
2.01-2.46	2	SPT(c)	1/ N=0						
2.50	5	ES	J+V+T			. . . Between approximately 2.0m and 3.0m bgl driller indicates possible void.		(2.00)	
2.80	3	D							
3.00-3.45	3	SPT(c)	1,2/2,3,2,4 N=11						
3.00-3.50	5	B							
3.00	6	ES	J+V+T						
3.00		PID	0.1ppm						
3.50	7	ES	J+V+T				14.65	4.00	
3.80	4	D				MADE GROUND: Brown sandy gravelly CLAY. Gravel is subrounded to subangular fine to coarse of flint, concrete and brick.		(0.50)	
4.00-4.45	4	SPT(c)	3,4/4,5,4,7 N=20				14.15	4.50	
4.00-4.50	6	B							
4.00	8	ES	J+V+T			MADE GROUND: Greyish brown clayey fine to coarse SAND and GRAVEL with a low cobble content. Gravel is subrounded to subangular fine to coarse of flint, concrete and brick. Cobbles are of concrete and brick.	13.85	4.80	
4.00		PID	0.0ppm						
4.50	9	ES	J+V+T						
4.80	5	D							
5.00-5.45	5	SPT(c)	1,1/2,3,2,2 N=9						
5.00	10	ES	J+V+T			MADE GROUND: Brown clayey fine to coarse SAND and GRAVEL. Gravel is subrounded to subangular fine to coarse of flint, concrete and brick.		(1.70)	
5.00-5.50	7	B							
5.00		PID	0.1ppm						
6.00	6	D							
6.00	11	ES	J+V+T						
6.00		PID	0.0ppm				12.15	6.50	
6.50-6.95	6	SPT(c)	1,1/1,1 N=2			MADE GROUND: Recovery of light brown wood fragments (approx. 200mm X 200mm X 100mm) strength retained.		(0.50)	
6.50-7.00	8	B					11.65	7.00	
						Firm to stiff grey fissured silty CLAY. (LONDON CLAY FORMATION)			
7.50	7	D							
8.00-8.45	7	SPT	3,3/4,4,4,5 N=17					(2.50)	
8.00	12	ES	J+V+T						
8.00		PID	0.1ppm						

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
03/10/16	20:15		-		Dry
03/10/16		5.50	5.00	250	5.50
13/10/16	14:18	12.00	7.00	250	12.00
03/10/16	08:15	20.00	7.00	250	Dry
04/10/16	06:56	20.00	7.00	250	18.60
04/10/16	13:00	30.20	15.00	250	Dry
04/10/16	18:02	34.20	31.50	150	Dry
05/10/16	07:03	34.20	31.50	150	Dry

Chiselling / Slow Progress

From	To	Duration (hh:mm)

General Remarks

1. Hand dug inspection pit to 1.20m bgl.
2. Clean drilling technques adopted. Bentonite seal created before reduction in casing size.
3. Borehole drilled in following diameters: 30.2m bgl in 250mm; 40m bgl in 150mm casing to 7.0m bgl in 250mm & 31.5m bgl in 150mm diameter.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH10**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**03.10.16** End: **05.10.16**	**18.65**	**E:530998.0 N:182479.3**	**2** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
9.00	8	ES	J+V+T			Firm to stiff grey fissured silty CLAY. (LONDON CLAY FORMATION) *(stratum copied from 7.00m from previous sheet)*	9.15	9.50	
9.00	8	D							
9.00		PID	0.0ppm						
9.50-9.95	1	U	55 blows 100% recovery			Stiff to very stiff high to very high strength grey fissured silty CLAY. (LONDON CLAY FORMATION)			
10.00	9	D							
10.00	9	ES	J+V+T						
10.00		PID	0.1ppm						
10.50	10	D							
11.00-11.45	8	SPT	3,3/4,4,4,5 N=17						
12.00	11	D							
12.50-12.95	2	U	60 blows 100% recovery						
13.00	12	D							
13.00	15	ES	J+V+T					(8.50)	
13.00		PID	0.0ppm						
13.50	13	D							
14.00-14.45	9	SPT	5,5/7,8,8,10 N=33						
15.00	14	D							
15.50-15.95	3	U	70 blows 100% recovery						
16.00	15	D							
16.00	16	ES	J+V+T						
16.00		PID	0.0ppm						
16.50	16	D							
17.00-17.45	10	SPT	5,6/7,6,7,9 N=29				0.65	18.00	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
05/10/16	13:03	40.00	-	150	Dry

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

4. Monitoring well installations: Pipe 1 - 50mm HDPE response zone between 4.5m and 6.5m bgl. Pipe 2 - 33mm PVC response zone 8.0m to 12.0m bgl.
5. Borehole backfilled with 3mm shingle gravel filter between 4.5m to 6.5m bgl & 8.0m to 12.0m bgl; sand filter from 4.0m to 4.5m bgl &

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH10**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**03.10.16** End: **05.10.16**	**18.65**	**E:530998.0 N:182479.3**	**3** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
18.00	17	D				Brown mottled light bluish grey CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
18.50-18.95	4	U	70 blows 100% recovery					(1.50)	
19.00	18	D							
							-0.85	19.50	
19.50	19	D				Stiff very high strength light greyish blue mottled reddish brown CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
20.00-20.45	11	SPT	7,7/9,10,10,12 N=41						
20.00 20.00	17	ES PID	J+V+T 0.0ppm						
21.00	20	D							
21.50-21.95	5	U	65 blows 100% recovery					(4.00)	
22.00	21	D							
22.50	22	D							
23.00-23.45	12	SPT	6,7/7,9,9,11 N=36						
							-4.85	23.50	
24.00	23	D				Very stiff grey fissured silty CLAY. With light grey silt on fissure surfaces. Locally laminated. (LAMBETH GROUP - LAMINATED BEDS)			
24.50-24.95	6	U	65 blows 100% recovery					(2.00)	
25.00 25.00 25.00	18 24	ES D PID	J+V+T 0.0ppm						
							-6.85	25.50	
25.50	26	D				Very stiff light bluish grey mottled brown fissured silty CLAY. With calcareous deposits (white dustings and infill) within the matrix. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
26.00-26.45	13	SPT	4,5/8,9,11,13 N=41					(1.50)	
							-8.35	27.00	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

bentonite seal/grouting between 0.3 and 4.0mbg; 6.5m and 8.0m bgl & 12.0m to 14.0m bgl backfilling with compacted arisings (clay/sand) to base of borehole and flush cover installed at surface.

6. PID = Photo ionisation detector with 10.6eV bulb

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH10**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **05.10.16**	**18.65**	**E:530998.0 N:182479.3**	**4** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
27.00	27	D				Stiff to very stiff extremely high strength light grey mottled orangish brown CLAY. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
27.50-27.95	7	U	65 blows 100% recovery						
28.00	28	D						(2.50)	
28.50	29	D							
29.00-29.45	14	SPT	7,8/9,10,12,14 N=45				-10.85	29.50	
						Very stiff grey very closely spaced fissured CLAY. With slight multi-coloured staining on fissure surfaces. (LAMBETH GROUP - LOWER MOTTLED BEDS)		(0.70)	
30.00	19	ES	J+V+T				-11.55	30.20	
30.00	30	D							
30.00		PID	0.0ppm			Brown silty fine SAND. (LAMBETH GROUP - LOWER MOTTLED BEDS)	-11.75	30.40	
30.50-30.95	15	SPT	7,8/11,12,15,12 N:50 for 295mm			Stiff to very stiff light green mottled reddish yellow sandy CLAY. Sand is fine to medium. Multi-coloured purple and orange mottled glauconitic clay. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
31.50	31	D							
32.00-32.45	8	U	90 blows 0% recovery					(3.90)	
33.00	32	D							
33.50-33.95	16	SPT	6,6/7,9,11,10 N=37				-15.65	34.30	
						Stiff to very stiff greenish grey very gravelly CLAY. Gravel is subrounded to rounded medium to coarse of black pebbles. (LAMBETH GROUP - UPNOR FORMATION)	-15.85	34.50	
34.50	33	D							
34.60	34	D							
35.00-35.33	17	SPT	10,10/17,20,13 N:50 for 183mm			Very dense brown silty slightly clayey fine SAND. (THANET SAND FORMATION)			
35.00	20	ES	J+V+T						
35.00		PID	0.0ppm						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

7. Groundwater strike (medium flow) observed by driller at 5.5m bgl rising to 4.9m bgl after 20 mins.
8. Small rate of groundwater seepage observed by the driller at approximately 14.0m bgl.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH10**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**03.10.16** End: **05.10.16**	**18.65**	**E:530998.0 N:182479.3**	**5** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
36.00	35	D				Very dense brown silty slightly clayey fine SAND. (THANET SAND FORMATION) *(stratum copied from 34.50m from previous sheet)*			
36.50-36.73	18	SPT	12,13/50 N:50 for 75mm					(5.00)	
37.50	36	D							
38.00-38.28	19	SPT	10,13/28,22 N:50 for 126mm						
39.00	37	D					-20.85	39.50	
39.50-39.89	20	SPT	10,15/20,12,15,3 N:50 for 240mm			Recovery of off white silty chalky GRAVEL of pebble beds. (WHITE CHALK SUBGROUP)	-21.35	(0.50) 40.00	
40.00 40.00	31	ES PID	J+V+T 0.0ppm			Borehole completed at 40.0 m bgl.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH16**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**26.10.16** End: **28.10.16**	**14.82**	**E:531001.4 N:182393.0**	**1** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
0.10	1	ES	J+V+T			MADE GROUND: Asphalt.	14.57	0.25	
0.15		PID	0.0ppm			MADE GROUND: Light reddish brown slightly clayey gravelly fine to coarse SAND. Gravel is subrounded to subangular fine to coarse flint, brick, mortar with occasional ash and clinker.		(0.60)	
0.50	2	ES	J+V+T				13.97	0.85	
0.50		PID	0.0ppm			MADE GROUND: Brick and concrete recovered as sandy gravel, cobbles and boulders.			
1.50	3	ES	J+V+T					(1.75)	
1.50		PID	0.0ppm				12.22	2.60	
2.60	4	ES	J+V+T			MADE GROUND: Brown to dark brown sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is subrounded to angular flint with occasional brick and mortar. With strong organic odour.	12.02	2.80	
2.60		PID	0.0ppm						
3.00	1	D				MADE GROUND: Soft to firm dark brown to black silty slightly gravelly CLAY. Gravel is subrounded to angular fine to medium flint, brick and concrete. With strong organic odour.			
3.00	5	ES	J+V+T					(1.90)	
3.00		PID	0.0ppm						
3.50-3.95	1	SPT(c)	1,1/1,1,1 N=3	1					
3.50	2	D							
3.50	6	ES	J+V+T						
3.50-4.00	1	B					10.12	4.70	
4.00-4.45	2	SPT(c)	3,4/4,5,5,6 N=20			Firm to stiff medium to high strength light orangish brown mottled bluish grey sandy slightly gravelly silty CLAY with occasional subrounded medium to coarse flint gravel with occasional relict roots. (LONDON CLAY FORMATION)			
4.00	7	ES	J+V+T						
4.00		PID	0.0ppm					(2.10)	
4.01-4.50	2	B							
4.50	8	ES	J+V+T						
4.70	3	D							
5.00-5.45	3	SPT	2,1/2,3,3,4 N=12						
5.00	9	ES	J+V+T						
5.00		PID	0.0ppm						
6.00	4	D							
6.00	10	ES	J+V+T						
6.50-6.95	1	U	55 blows 100% recovery				8.02	6.80	
7.00	5	D				Stiff becoming very stiff with depth high strength bluish grey closely spaced silty CLAY. With rare shell fragments and possible selenite crystals. (LONDON CLAY FORMATION)			
7.00	11	ES	J+V+T						
7.00		PID	0.0ppm						
7.50-7.95	4	U	75 blows 100% recovery						
7.50	6	D							
8.00-8.45	4	SPT	2,2/3,4,4,5 N=16						
8.00	12	ES	J+V+T						

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
26/10/16	09:30	4.00	4.00	250	4.00
26/10/16	16:30	20.50	5.00	250	20.50
26/10/16	18:00	22.00	5.00	250	Dry
26/10/16	18:00	40.00	23.50	200	Dry

Chiselling / Slow Progress

From	To	Duration (hh:mm)
0.85	2.60	06:00

General Remarks

1. 300mm concrete core to 250mm followed by hand dug inspection pit to 0.85m bgl.
2. Borehole progressed through machine excavated pit by JCB to 3.5m bgl due to presence of concrete and brickwork obstruction from 0.85m to 2.6m bgl.
3. Clean drilling technques adopted. Bentonite

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 3000**	**Dave Hutson**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH16**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**26.10.16** End: **28.10.16**	**14.82**	**E:531001.4 N:182393.0**	**2** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
9.00	7	D				Stiff becoming very stiff with depth high strength bluish grey closely spaced silty CLAY. With rare shell fragments and possible selenite crystals. (LONDON CLAY FORMATION) *(stratum copied from 6.80m from previous sheet)*		(5.70)	
9.00	13	ES	J+V+T						
9.00		PID	0.0ppm						
9.50-9.95	2	U	45 blows 100% recovery						
10.00	8	D							
10.00	14	ES	J+V+T						
10.00		PID	0.0ppm						
10.50	9	D							
11.00-11.45	5	SPT	3,3/4,5,5,5 N=19						
12.00	10	D					2.32	12.50	
12.50-12.95	3	U	60 blows 100% recovery			Stiff to very stiff high to very high strength light orangish brown mottled light bluish grey fissured silty CLAY. Fissures are randomly orientated. (LAMBETH GROUP - UPPER MOTTLED BEDS)		(7.00)	
13.00	11	D							
13.00	15	ES	J+V+T						
13.00		PID	0.0ppm						
13.50	12	D							
14.00-14.45	5	SPT	3,4/7,5,7,8 N=27						
15.00	13	D							
15.50-15.95	4	U	75 blows 100% recovery						
16.00	14	D							
16.00	16	ES	J+V+T						
16.00		PID	0.0ppm						
16.50	15	D							
17.00-17.45	6	SPT	6,6/8,9,9,10 N=36						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

seal created before reduction in casing size.

4. Borehole drilled in following diameters: 22.0m bgl in 250mm; 40.0m bgl in 200mm; casing to 5.0m bgl in 250mm and 23.5m bgl in 200mm diameter.
5. Monitoring well installations: Pipe 1 - 50mm HDPE response zone between 2.0 and 5.0m

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 3000**	**Dave Hutson**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH16**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**26.10.16** End: **28.10.16**	**14.82**	**E:531001.4 N:182393.0**	**3** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
18.00	16	D				Stiff to very stiff high to very high strength light orangish brown mottled light bluish grey fissured silty CLAY. Fissures are randomly orientated. (LAMBETH GROUP - UPPER MOTTLED BEDS) *(stratum copied from 12.50m from previous sheet)*			
18.50-18.95	5	U	85 blows 100% recovery						
19.00	17	ES	J+V+T						
19.10	17	D							
							-4.68	19.50	
19.50	18	D				Very stiff light greyish brown extremely closely spaced fissured slightly gravelly sandy clayey SILT. Sand is fine to medium quartz. With occasional shell fragments and lignite and weak organic odour. (LAMBETH GROUP - LAMINATED BEDS)			
20.00-20.45	7	SPT	6,6/7,7,8,9 N=31						
20.00	18	ES	J+V+T						
20.00		PID	0.0ppm					(2.00)	
21.00	19	D							
							-6.68	21.50	
21.50-21.95	8	SPT	6,6/8,8,10,10 N=36			Very stiff to hard very high to extremely high strength slightly light bluish grey mottled light orangish brown fissured slightly sandy silty CLAY. Sand is fine glauconite and calcite. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
22.50	20	D							
23.00-23.45	6	U	90 blows 100% recovery						
23.50	21	D							
24.00	22	D							
24.50-24.78	10	SPT	10,10/26,24 for 52mm N=118*						
25.00	19	ES	J+V+T						
25.00		PID	0.0ppm					(7.50)	
25.50	23	D							
26.00-26.45	7	U	95 blows 100% recovery						
26.50	24	D							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

bgl. Pipe 2- 33mm HDPE with adaptor and 19mm piezometer tip at 21.0m bgl.

6. Borehole backfilled with 3mm shingle gravel filter between 2.0m to 5.0m bgl; sand filter from 1.5m to 2.0m bgl & 20.0m to 22.0m bgl & bentonite seal/grouting between 0.3 and 1.5mbg; 5.0m to 7.0m bgl; 18.0m to 20.0m bgl

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 3000**	**Dave Hutson**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH16**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**26.10.16** End: **28.10.16**	**14.82**	**E:531001.4 N:182393.0**	**4** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
27.00	25	D				Very stiff to hard very high to extremely high strength slightly light bluish grey mottled light orangish brown fissured slightly sandy silty CLAY. Sand is fine glauconite and calcite. (LAMBETH GROUP - LOWER MOTTLED BEDS) *(stratum copied from 21.50m from previous sheet)*			
27.50-27.78	11	SPT	12,13/25,25 for 50mm N=120*						
28.50	26	D					-14.18	29.00	
29.00-29.45	8	U	110 blows 100% recovery			Very stiff to hard greenish brown friable very sandy slightly gravelly silty CLAY. Sand is fine to coarse quartz. Gravel is subrounded to subangular fine to coarse flint. (LAMBETH GROUP - UPNOR FORMATION)		(0.60)	
29.50	27	D					-14.78	29.60	
30.00	20	ES	J+V+T			Very dense light brown to light greenish brown silty slightly clayey SAND. Sand is fine quartz with occasional subrounded to subangular fine to medium flint gravel. (THANET SAND FORMATION)			
30.00	28	D							
30.00		PID	0.0ppm						
30.50-30.74	12	SPT	12,13/35,15 for 15mm N=167*						
31.50	29	D						(6.20)	
32.00-32.13	13	SPT	25/50 for 50mm N=300*						
33.00	30	D							
33.50-33.63	14	SPT	25/50 for 50mm N=300*						
34.50	31	D							
35.00-35.25	15	SPT	12,12/35,15 for 25mm N=150*						
35.00	21	ES	J+V+T				-20.98	35.80	
35.00		PID	0.0ppm						
						Description on next sheet			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

& 22.0m to 24.0m bgl with compacted backfill (clay/sand) between 7.0m to 18.0m bgl & 24.0m bgl to base of borehole with flush cover installed at surface.

7. PID = Photo ionisation detector with 10.6eV bulb
8. Groundwater strike (medium flow) observed

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 3000**	**Dave Hutson**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH16**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**26.10.16** End: **28.10.16**	**14.82**	**E:531001.4 N:182393.0**	**5** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
36.00	32	D				Very dense dark greenish brown slightly sandy GRAVEL. Sand is fine to coarse quartz. Gravel is subangular to angular fine to coarse flint. *(stratum copied from 35.80m from previous sheet)*		(1.70)	
36.50-37.00	3	B							
36.50-36.77	16	SPT	10,11/28,22 for 47mm N=123*						
							-22.68	37.50	
37.50	33	D				Structureless CHALK recovered as off white' slightly sandy slightly gravelly SILT Gravel is subangular fine to medium flint. (WHITE CHALK SUBGROUP)			
38.00-38.13	17	SPT	25/50 for 50mm N=300*					(2.50)	
39.00	34	D							
39.50-39.63	18	SPT	25/50 for 50mm N=300*						
							-25.18	40.00	
40.00	22	ES	J+V+T			Borehole completed at 40.0m bgl.			
40.00	35	D							
40.00		PID	0.0ppm						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

by driller at 4.0m bgl rising to 3.8m bgl after 20 mins and sealed out at 4.6m bgl.

9. Small rate of groundwater seepage observed by driller at 20.50m to 21.0m bgl; sealed out at 22.0m bgl.
10. 300L of water added to drill through the Thanet Sand.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 3000**	**Dave Hutson**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH17**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**28.10.16** End: **01.11.16**	**14.52**	**E:531015.2 N:182442.8**	**1** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Concrete. JCB backfill.	14.22	0.30	
0.25	1	ES	J+V+T						
0.25		PID	0.0ppm			MADE GROUND: Greyish brown SAND and GRAVEL. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse.	14.02	0.50	
						MADE GROUND: Concrete and cemented whole bricks.		(1.00)	
							13.02	1.50	
1.50	2	ES	J+V+T			Firm to stiff medium strength light brownish grey to dark orangish brown slightly silty slightly sandy CLAY. Sand is fine to coarse. (LONDON CLAY FORMATION)			
1.50		PID	0.0ppm						
1.50-2.00	1	LB							
2.00	3	ES	J+V+T					(1.50)	
2.00		PID	0.0ppm						
2.00-2.45	1	U	55 blows 100% recovery						
2.50	4	ES	J+V+T						
2.50	1	D							
2.80	2	D					11.52	3.00	
3.00	5	ES	J+V+T			Stiff medium to high strength dark greyish brown fissured silty CLAY. (LONDON CLAY FORMATION)			
3.00		PID	0.0ppm						
3.00-3.45	1	SPT	2,2/3,4,4,5 N=16						
3.50	6	ES	J+V+T						
3.70	3	D							
4.00-4.45	2	U	50 blows 100% recovery						
4.00	7	ES	J+V+T						
4.00		PID	0.0ppm						
4.50	4	D							
4.50	8	ES	J+V+T						
4.80	5	D							
5.00-5.45	2	SPT	2,3/4,4,5,5 N=18						
5.00	9	ES	J+V+T						
5.00		PID	0.0ppm						
6.00	6	D							
6.00	10	ES	J+V+T						
6.50-6.95	3	U	55 blows 100% recovery						
7.00	7	D							
7.00	11	ES	J+V+T						
7.00		PID	0.0ppm					(9.30)	
7.50	8	D							
8.00-8.45	3	SPT	3,3/4,4,5,7 N=20						
8.00	12	ES	J+V+T						

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
28/10/16	06:57	0.00	-		Dry
28/10/16	18:00	16.00	4.00	250	Dry
31/10/16	06:57	16.00	4.00	250	Dry
31/10/16	09:16	20.00	4.00		20.00
31/10/16	18:00	33.00	22.50	200	
01/11/16	07:00	33.00	22.50	200	
01/11/16	09:01	35.40	22.50	200	
01/11/16	12:03	40.00	22.50	150	

Chiselling / Slow Progress

From	To	Duration (hh:mm)
0.50	1.50	02:00

General Remarks

1. 300mm concrete core to 300mm followed by hand dug inspection pit to 0.50m bgl.
2. Borehole progressed through machine excavated pit by JCB to 1.5m bgl due to presence of concrete and brickwork obstruction from 0.50m to 1.5m bgl.
3. Clean drilling technques adopted. Bentonite

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH17**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**28.10.16** End: **01.11.16**	**14.52**	**E:531015.2 N:182442.8**	**2** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
9.00	9	D				Stiff medium to high strength dark greyish brown fissured silty CLAY. (LONDON CLAY FORMATION) *(stratum copied from 3.00m from previous sheet)*			
9.00	13	ES	J+V+T						
9.00		PID	0.0ppm						
9.50-9.95	4	U	60 blows 100% recovery						
10.00	10	D							
10.00	14	ES	J+V+T						
10.00		PID	0.0ppm						
10.50	11	D							
11.00-11.45	4	SPT	3,4/4,5,5,6 N=20						
12.00	12	D					2.22	12.30	
12.30	13	D				Very stiff very high strength light brown mottled bluish grey slightly sandy silty CLAY. Sand is fine to medium. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
12.50-12.95	5	U	65 blows 100% recovery						
13.00	14	D							
13.00	15	ES	J+V+T						
13.00		PID	0.0ppm						
13.50	15	D							
14.00-14.45	5	SPT	5,5/7,7,8,10 N=32						
15.00	16	D							
15.50-15.95	6	U	70 blows 100% recovery					(7.20)	
16.00	16	ES	J+V+T						
16.00	17	D							
16.00		PID	0.0ppm						
16.50	18	D							
17.00-17.45	6	SPT	5,5/7,9,9,11 N=36						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

seal created before reduction in casing size.
4. Borehole drilled in following diameters: 19.5m bgl in 250mm; 35.4m bgl in 200mm; 40m bgl in 150mm casing to 4.0m bgl in 250mm and 22.5m bgl in 200mm diameter.
5. Monitoring well installations: Pipe 1 - 50mm HDPE response zone between 1.0 and 1.5m

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH17**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**28.10.16** End: **01.11.16**	**14.52**	**E:531015.2 N:182442.8**	**3** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
18.00	19	D				Very stiff very high strength light brown mottled bluish grey slightly sandy silty CLAY. Sand is fine to medium. (LAMBETH GROUP - UPPER MOTTLED BEDS) *(stratum copied from 12.30m from previous sheet)*			
18.50-18.95	7	U	65 blows 100% recovery						
19.00	17	ES	J+V+T						
19.00	20	D					-4.98	19.50	
19.50	21	D		≈		Stiff to very stiff dark grey to light grey silty sandy CLAY. Sand is fine. (LAMBETH GROUP - LAMINATED BEDS)			
20.00-20.45	7	SPT	5,5/7,6,6,8 N=27					(1.50)	
20.00	18	ES	J+V+T						
20.00		PID	0.0ppm				-6.48	21.00	
21.00	22	D				Stiff to very stiff dark grey to light brownish grey extremely closely spaced silty slightly sandy CLAY. Sand is fine to coarse. With frequent white speckles and thin laminations of lignite. (LAMBETH GROUP - LAMINATED BEDS)		(1.00)	
21.50-21.95	8	U	85 blows 100% recovery				-7.48	22.00	
22.00	23	D				Stiff to very stiff orangish brown mottled light bluish grey extremely closely spaced silty CLAY. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
22.50	24	D							
23.00-23.44	8	SPT	7,8/10,12,14,14 for 61mm N=52*					(3.50)	
24.00	25	D							
24.50-24.95	9	U	90 blows 100% recovery						
25.00	19	ES	J+V+T						
25.00	26	D					-10.98	25.50	
25.00		PID	0.0ppm			Stiff to very stiff dark brownish grey slightly sandy CLAY. Sand is fine to medium. (LAMBETH GROUP - LOWER MOTTLED BEDS)	-11.48	(0.50) 26.00	
26.00-26.30	9	SPT	10,10/15,35 for 75mm N=100*			Stiff to very stiff high to very high strength dark reddish brown to bluish grey slightly sandy CLAY. Sand is fine to medium. (LAMBETH GROUP - LOWER MOTTLED BEDS)		(1.00)	
							-12.48	27.00	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

bgl.

6. Borehole backfilled with 3mm shingle gravel filter between 1.0m to 1.5m bgl; sand filter from 0.7m to 1.0m bgl & bentonite seal/grouting between 0.3 and 0.7m bgl and 1.5m to 3.5m bgl with compacted backfill (clay/sand) between 3.5m bgl to base of

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH17**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**28.10.16** End: **01.11.16**	**14.52**	**E:531015.2 N:182442.8**	**4** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
27.00	27	D				Very stiff bluish grey mottled dark reddish brown extremely closely spaced sandy CLAY. Sand is fine to coarse. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
27.50-27.95	10	U	100 blows 100% recovery						
28.00	28	D						(2.50)	
29.00	2	LB							
29.00-29.15	10	SPT(c)	25/50 for 75mm N=200*				-14.98	29.50	
						Very dense slightly clayey SAND. Sand is predominantly fine with rare rounded to well rounded medium black pebbles. (THANET SAND FORMATION)			
30.00	20	ES	J+V+T						
30.00	29	D							
30.00		PID	0.0ppm						
30.50-30.63	11	SPT	25/50 for 50mm N=300*						
31.50	30	D							
32.00-32.17	12	SPT	15,10/50 for 70mm N=214*					(6.10)	
33.00	31	D							
33.50-33.63	13	SPT	25/50 for 75mm N=200*						
34.50	32	D							
35.00-35.18	14	SPT	15,10/50 for 75mm N=200*						
35.00	21	ES	J+V+T				-21.08	35.60	
35.00		PID	0.0ppm						
35.50	33	D				*Description on next sheet*			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

borehole with flush cover installed at surface.
7. PID = Photo ionisation detector with 10.6eV bulb
8. Small rate of groundwater seepage observed by driller at 20.0m bgl; sealed out at 22.0m bgl.
9. 200L of water added to drill through the

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH17**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**28.10.16** End: **01.11.16**	**14.52**	**E:531015.2 N:182442.8**	**5** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
36.00	34	D				Dark greenish grey to white slightly sandy slightly clayey GRAVEL. Gravel is subrounded to angular fine to coarse Flint and chalk. (WHITE CHALK SUBGROUP)		(0.90)	
							-21.98	36.50	
36.50-36.60	15	SPT	25/50 for 50mm N=300*			*(stratum copied from 35.60m from previous sheet)* Recovery of off white silty chalky very gravelly firm to stiff CLAY chalk. (WHITE CHALK SUBGROUP)			
37.50	35	D							
38.00-38.10	16	SPT	25/50 for 50mm N=300*					(3.50)	
39.00	36	D							
39.50-39.62	17	SPT	25/50 for 60mm N=250*						
							-25.48	40.00	
40.00	22	ES	J+V+T			Borehole completed at 40.0m bgl.			
40.00	37	D							
40.00		PID	0.0ppm						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

Thanet Sand; 150L of water added from 29.5m to 33.0m bgl.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JSmith**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH18**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **24.10.16**	**18.15**	**E:530968.1 N:182331.0**	**1** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Concrete.	17.65	(0.50) 0.50	
0.50	1	ES	J+V+T			MADE GROUND: Medium dense light reddish brown very gravelly fine to coarse SAND. Gravel is subrounded to subangular fine and coarse flint. With frequent brick fragments and concrete.		(0.80)	
0.50		PID	0.0ppm						
1.00	2	ES	J+V+T				16.85	1.30	
1.00		PID	0.0ppm						
						MADE GROUND: Concrete. . . . At 1.3 to 1.45m bgl cemented granite cobbles.	16.15	(0.70) 2.00	
2.00-2.45	1	SPT(c)	3,4/5,6,7,6 N=24			MADE GROUND: Very loose dark brown silty very gravelly fine to medium SAND with a low cobble content. Gravel is subrounded to subangular fine to medium flint, brick, concrete, chalk, glass and slate. Cobbles are subrounded to subangular brick and concrete. Occasional sandy clay.			
2.00	3	ES	J+V+T						
2.00		PID	0.1ppm						
2.01-2.50	1	B							
2.50	4	ES	J+V+T						
2.50		PID	0.0ppm						
2.80	1	D							
3.00-3.45	2	SPT(c)	1,2/2,2,1,2 N=7						
3.00	5	ES	J+V+T						
3.00		PID	0.2ppm						
3.01-3.50	2	B							
3.50	6	ES	J+V+T						
3.50		PID	0.1ppm						
3.80	2	D							
4.00-4.45	3	SPT(c)	1,1/1,1 N=2						
4.00	7	ES	J+V+T						
4.00		PID	0.0ppm						
4.01-4.50	3	B						(6.00)	
4.50	8	ES	J+V+T						
4.50		PID	0.1ppm						
4.80	3	D							
5.00-5.45	4	SPT(c)	1/,1 N=1						
5.00	9	ES	J+V+T						
5.00		PID	0.1ppm						
5.01-5.50	4	B							
6.00	4	D							
6.00	10	ES	J+V+T						
6.00		PID	0.2ppm						
6.50-6.95	5	SPT(c)	1,1/1,1 N=2						
6.51-7.00	5	B							
7.00	11	ES	J+V+T						
7.00		PID	0.0ppm						
7.50	5	D					10.15	8.00	
8.00-8.45	6	SPT(c)	0,1/,1,1 N=2			MADE GROUND: Soft light reddish brown to dark greyish brown slightly sandy gravelly CLAY. Gravel is subrounded to subangular fine and coarse flint, coal, slate, brick, concrete and chalk.		(1.00)	
8.00	12	ES	J+V+T						
8.00		PID	0.1ppm						
8.01-8.50	6	B					9.15	9.00	

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
18/10/16	06:41		-		Dry
18/10/16	17:41	2.00	2.00	250	Dry
19/10/16	06:41	2.00	2.00	250	Dry
19/10/16	12:38	10.50	10.00	250	10.50
19/10/16	17:41	15.50	11.00	250	
20/10/16	06:40	15.50	11.00	250	
20/10/16	12:40	22.00	11.00	250	22.00
20/10/16	17:06	25.50	11.00	250	

Chiselling / Slow Progress

From	To	Duration (hh:mm)
1.30	2.00	06:00

General Remarks

1. 300mm concrete core to 500mm followed by hand dug inspection pit to 1.20m bgl.
2. Borehole progressed through machine excavated pit by JCB to 2.0m bgl due to presence of concrete from 1.30m to 2.0m bgl.
3. Clean drilling technques adopted. Bentonite seal created before reduction in casing size.
4. Borehole drilled in following diameters: 25.5m bgl in 250mm; 40m bgl in 200mm casing to 11.0m bgl in

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH18**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**18.10.16** End: **24.10.16**	**18.15**	**E:530968.1 N:182331.0**	**2** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
9.00	6	D				MADE GROUND: Soft dark brown to greyish black slightly sandy slightly gravelly SILT. Gravel is subangular fine Flint, brick and coal. With rare shell fragments.			
9.00	13	ES	J+V+T						
9.00		PID	0.1ppm						
9.50-9.95	7	SPT(c)	0,1/ N=0					(1.50)	
9.51-10.00	7	B					7.65	10.50	
10.50	7	D				Dark greenish brown silty slightly sandy fine to coarse GRAVEL. Gravel is subrounded to subangular fine to coarse flint. (HACKNEY GRAVEL)		(0.50)	
10.50	14	ES							
10.50		PID	0.0ppm				7.15	11.00	
10.70	8	D				Stiff high to very high extremely high strength dark greyish brown extremely closely spaced fissured silty CLAY. With occasional selenite. (LONDON CLAY FORMATION)			
11.01	9	D							
11.50	1	U	65 blows 100% recovery						
11.50	15	ES	J+V+T						
11.50		PID	0.0ppm						
12.00	10	D							
13.00	11	D						(4.20)	
13.50-13.95	8	SPT	5,5/6,7,8,8 N=29						
13.50	11	D							
14.50	12	D							
14.50	16	ES	J+V+T						
14.50		PID	0.0ppm						
15.00	2	U	75 blows 100% recovery				2.95	15.20	
15.50	13	D				Stiff to very stiff high strength light brown mottled light bluish grey fissured silty CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS)			
16.00	14	D							
17.50-17.94	9	SPT	7,8/10,12,15,13 for 65mm N=52*					(4.80)	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
20/10/16	18:06	25.50	25.50	200	
24/10/16	17:47	40.00	25.50	200	

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

250mm and 25.5m bgl in 200mm diameter.
5. Monitoring well installations: Pipe 1 - 50mm HDPE response zone between 7.5 and 11.5m bgl.
6. Borehole backfilled with 3mm shingle gravel filter between 7.5m to 11.5m bgl; sand filter from 7.0m to 7.5m bgl & bentonite seal/grouting between 0.3 and 1.3m bgl; 6.0m to 7.0m bgl; 11.5m to 13.50m bgl; 23.0m to 24.0m bgl with compacted backfill (clay/sand) between 1.3m to 6.0m bgl; 13.5m to 23.0m bgl and

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH18**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**18.10.16** End: **24.10.16**	**18.15**	**E:530968.1 N:182331.0**	**3** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
17.50	17	ES				Stiff to very stiff high strength light brown mottled light bluish grey fissured silty CLAY. (LAMBETH GROUP - UPPER MOTTLED BEDS) *(stratum copied from 15.20m from previous sheet)*			
17.50		PID	0.0ppm						
18.50	15	D							
19.00	3	U	75 blows 100% recovery						
19.50	16	D					-1.85	20.00	
20.00	18	ES	J			Very stiff very high strength light bluish grey fissured CLAY. (LAMBETH GROUP - LAMINATED BEDS)			
20.00		PID	0.0ppm						
20.01	17	D							
20.50-20.95	1O	SPT	7,8/10,12,14,14 for 70mm N=51*					(2.80)	
21.50	18	D		≈					
22.00	4	U	70 blows 100% recovery			. . . Below 22.0m bgl thickly laminated with partings of brown fine sand.			
22.50	19	D					-4.65	22.80	
23.00	20	D				Very stiff light bluish grey mottled dark orangish brown fissured silty CLAY. With rare nodular calcrete. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
23.50-23.91	11	SPT	9,9/12,15,15,8 for 30mm N=59*						
24.50	21	D						(4.40)	
25.00	19	ES							
25.00		PID	0.0ppm						
25.50	22	D							
26.00	23	D							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

24.0m bgl to base of borehole with flush cover installed at surface.
7. PID = Photo ionisation detector with 10.6eV bulb
8. Groundwater strike (medium flow) observed by driller at 10.5m bgl rising to 9.7m bgl after 20 mins and sealed out at 11.0m bgl.
9. Small rate of groundwater seepage observed by driller at 22.0m bgl; sealed out at 25.0m bgl.
10. 200L of water added to drill through the Thanet Sand.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH18**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**18.10.16** End: **24.10.16**	**18.15**	**E:530968.1 N:182331.0**	**4** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
							-9.05	27.20	
27.20	24	D				Very stiff high strength light orangish brown mottled bluish grey extremely closely spaced fissured silty CLAY. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
27.50	5	U	80 blows 100% recovery					(1.30)	
28.00	25	D					-10.35	28.50	
28.50	26	D				Very stiff dark brown sandy silty CLAY. Sand is fine. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
29.00-29.20	12	SPT	12,13/50 for 50mm N=300*					(1.50)	
							-11.85	30.00	
30.00	20	ES				Very stiff dark greenish grey mottled light reddish brown slightly sandy silty CLAY. Sand is fine to medium glauconitic. (LAMBETH GROUP - LOWER MOTTLED BEDS)			
30.00	27	D							
30.00		PID	0.0ppm					(1.00)	
30.50	6	U	90 blows 100% recovery						
							-12.85	31.00	
31.00	28	D				Very stiff greyish green sandy silty CLAY. Sand is fine to medium glauconitic with occasional subrounded fine to medium black pebbles. (LAMBETH GROUP - UPNOR FORMATION)			
31.50	29	D							
32.00-32.28	13	SPT	9,9/27,23 for 53mm N=117*					(2.50)	
33.00	30	D							
							-15.35	33.50	
33.50-33.75	14	SPT	12,13/35,15 for 25mm N=150*			Very dense dark grey silty slightly clayey fine SAND. Sand is predominantly fine to medium quartz. (THANET SAND FORMATION)			
34.50	31	D							
35.00-35.23	15	SPT	12,13/50 for 75mm N=200*						
35.00	21	ES							
35.00		PID	0.0ppm						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

11. 89.0mm Digital 3 arm weak rock self boring pressuremeter testing conducted at depths of 12.5m bgl; 16.8m bgl & 26.5m bgl.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

BOREHOLE LOG

Contract:	Client:	Borehole:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**BH18**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**18.10.16** End: **24.10.16**	**18.15**	**E:530968.1 N:182331.0**	**5** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
36.00	32	D				Very dense dark grey silty slightly clayey fine SAND. Sand is predominantly fine to medium quartz. (THANET SAND FORMATION) *(stratum copied from 33.50m from previous sheet)*		(5.50)	
36.50-36.71	16	SPT	10,11/50 for 60mm N=250*						
37.50	33	D							
38.00-38.18	17	SPT	15,10/50 for 75mm N=200*				-20.85	39.00	
39.00	34	D				Very dense dark greenish brown slightly clayey sandy GRAVEL. Sand is fine to coarse Quartz. Gravel is well rounded to subangular fine to coarse Flint with CHALK. (WHITE CHALK SUBGROUP)		(1.00)	
39.50-39.65	18	SPT	15,10/50 for 50mm N=300*				-21.85	40.00	
40.00	22	ES				Borehole completed at 40.0 m bgl.			
40.00	35	D							
40.00		PID	0.0ppm						

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 2000**	**Dave Hutson**	**JBarron**	ST

AGS

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **28.09.16**	**14.92**	**E:530977.9 N:182426.8**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.		(0.33)	
								14.59	0.33	
	0.35	ES1	ES				MADE GROUND: Light yellowish brown silty very gravelly fine to coarse SAND with occasional whole bricks. Gravel is fine to coarse subrounded flint with occasional brick fragments.			
	0.35		PID	0.1ppm						
	0.50	ES2	ES							
	0.50		PID	0.1ppm					(0.77)	
	1.00	ES3	ES					13.82	1.10	
	1.00		PID	0.1ppm			Refused at 1.1m.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete coring to 0.33m followed by an inspection pit hand dug to 1.1m depth.
2. Checks for buried ferrous objects carried out during excavation by specialist unexploded ordnance (UXO) officer using magnetometer.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 1.0m depth on completion. Response zone 0.5m to 1.0m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS02**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **28.09.16**	**14.53**	**E:531011.7 N:182467.9**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	14.31	0.22	
	0.25 0.25	ES1	ES PID	0.1ppm			MADE GROUND: Light brown to dark brown slightly silty gravelly fine to coarse SAND with rare coarse sized concrete. Gravel is fine to coarse subrounded to subangular flint with frequent brick fragments concrete and coal.		(1.18)	
	0.80 0.80	ES2	ES PID	0.1ppm				13.13	1.40	
	1.30 1.30	ES3	ES PID	0.1ppm			Stiff bluish grey silty CLAY with orange brown staining and possible selenite crystals. (LONDON CLAY FORMATION)	12.73	(0.40) 1.80	
	1.90 1.90	ES4	ES PID	0.1ppm			Stiff firm in places bluish grey extremely closely spaced thinly laminated silty CLAY with possible selenite crystals. (LONDON CLAY FORMATION)			
	2.60 2.60	ES5	ES PID	0.1ppm			. . . at 3.20m silt partings		(3.20)	
	3.40 3.40	ES6	ES PID	0.1ppm			. . . at 3.50m mudstone			
							. . . at 4.50m silt partings			
	4.60 4.60	ES7	ES PID	0.1ppm				9.53	5.00	
							Terminated at 5.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.22m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 5m depth.
3. No groundwater encountered.
4. On completion, borehole backfilled with arisings.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**29.09.16** End: **29.09.16**	**14.70**	**E:531019.9 N:182460.7**	**1** of **1**

Progress	Samples / Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	13.80	(0.90) 0.90	
							Cored to 0.90m refusal moved location.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete coring to 0.9m, borehole refused and moved to alternative location.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS03A**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **30.09.16**	**---**	**---**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.		0.23	
	0.25 0.25	ES1	ES PID	 0.1ppm			MADE GROUND: Light brown silty very gravelly fine to coarse SAND with rare cobble sized concrete and whole bricks. Gravel is fine to coarse subrounded to subangular flint with occasional brick fragments and concrete.		(1.27)	
	0.50 0.50	ES2	ES PID	 0.1ppm						
	1.20 1.20	ES3	ES PID	 0.1ppm					1.50	
	1.80 1.80	ES4	ES PID	 0.1ppm			Stiff firm in places extremely closely spaced thinly laminated silty CLAY with possible selenite crystals. (LONDON CLAY FORMATION) . . . becoming stiff from 2.00m.		(2.50)	
	2.50 2.50	ES5	ES PID	 0.1ppm						
	3.80 3.80	ES6	ES PID	 0.1ppm					4.00	
							Terminated at 4.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.23 followed by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 1.5m depth on completion. Response zone 0.5m to 1.0m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**27.09.16** End: **28.09.16**	**14.60**	**E:531020.3 N:182452.8**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	14.39	0.21	
	0.25 0.25	ES1	ES PID	0.1ppm			MADE GROUND: Light brown silty gravelly fine to coarse SAND. Gravel is fine to coarse subangular to subrounded flint with occasional cobble sized concrete and brick with occasional concrete brick coal clinker and ceramics.		(1.24)	
	0.50 0.50	ES2	ES PID	0.1ppm						
	1.00 1.00	ES3	ES PID	0.1ppm				13.15	1.45	
	1.40 1.40	ES4	ES PID	0.1ppm			Stiff firm in places bluish grey silty CLAY with orange brown staining.	12.95	1.65	
	1.80 1.80	ES5	ES PID	0.1ppm			Stiff firm in places bluish grey closely spaced finely cemented silty CLAY with occasional shell fragments and occasional silt partings. (LONDON CLAY FORMATION)		(3.35)	
	2.50 2.50	ES6	ES PID	0.1ppm						
	3.50 3.50	ES7	ES PID	0.1ppm						
	4.50 4.50	ES8	ES PID	0.1ppm				9.60	5.00	
							Terminated at 5.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.2m followed by inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 5m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 1.5m depth on completion. Response zone 1.0m to 1.5m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS05**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**27.09.16** End: **28.09.16**	**14.55**	**E:531023.9 N:182441.7**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.25 0.25	ES1	ES PID	 0.1ppm			MADE GROUND: Concrete hard standing.	14.32	0.23	
	0.70 0.70	ES2	ES PID	 0.1ppm			MADE GROUND: Light brown slightly silty very gravelly fine to coarse SAND with rare cobble sized concrete and whole bricks. Gravel is fine to coarse subangular to rounded flint with occasional brick fragments, concrete and clinker.		(1.07)	
	1.20 1.20	ES3	ES PID	 0.1ppm				13.25	1.30	
	1.50 1.50 1.60 1.60	ES4 ES5 	ES PID ES PID	 0.1ppm 0.1ppm			Stiff firm in places bluish grey slightly silty slightly sandy CLAY and with orange brown staining with randomly orientated fissuring with possible selenite crystals. (LONDON CLAY FORMATION)		(0.60)	
	2.70 2.70	ES6	ES PID	 0.1ppm			Stiff bluish grey extremely closely spaced thinly laminated silty CLAY with possible selenite crystals and rare shell fragment. (LONDON CLAY FORMATION)	12.65	1.90	
	3.50 3.50	ES7	ES PID	 0.1ppm					(2.10)	
								10.55	4.00	
							Terminated at 4.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.23m followed by an Inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 2m depth on completion. Response zone 0.5m to 2m. Borehole backfilled with arisings from 2.0m to 4.0m

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS06**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **30.09.16**	**14.69**	**E:531035.6 N:182442.2**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	14.48	0.21	
	0.25 0.25	ES1	ES PID	 0.1ppm			MADE GROUND: Light brown slightly silty sandy GRAVEL. Gravel is fine to coarse subrounded to subangular flint with rare brick fragments.		(1.29)	
	0.90 0.90	ES2	ES PID	 0.1ppm						
	1.40 1.40	ES3	ES PID	 0.1ppm				13.19	1.50	
	1.80 1.80	ES4	ES PID	 0.1ppm			Soft to firm bluish grey silty CLAY with possible selenite crystals. (LONDON CLAY FORMATION)		(0.60)	
								12.59	2.10	
	2.50 2.50	ES5	ES PID	 0.1ppm			Stiff bluish grey extremely spaced thinly laminated silty CLAY. (LONDON CLAY FORMATION)		(1.90)	
	3.50 3.50	ES6	ES PID	 0.1ppm				10.69	4.00	
							Terminated at 4.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.21m followed on by Inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 1.5m depth on completion. Response zone 1.0m to 1.5m. Borehole backfilled with arisings from 1.5m to 4.0m

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS07**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **28.09.16**	**14.71**	**E:531039.8 N:182443.9**	**1** of **1**

Progress	Samples / Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	14.46	0.25	
	0.30 0.30 0.50 0.50	ES1 ES2 	ES PID ES PID	 0.1ppm 0.1ppm			MADE GROUND: Dark brown silty very gravelly fine to coarse SAND with occasional cobble sized concrete and whole bricks. Gravel is fine to coarse subrounded to angular flint with occasional brick, concrete and coal.	13.61	(0.85) 1.10	
							Terminated at 1.1m.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.25m Inspection pit hand dug to 1.1m depth.
2. Borehole refused at 1.1m due to concrete obstruction approximately 0.4m thick.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS07A**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**27.09.16** End: **28.09.16**	**---**	**---**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.		0.26	
	0.30 0.30	ES1	ES PID	 0.1ppm			MADE GROUND: Light brown slightly silty very gravelly fine to coarse SAND with occasional cobble sized concrete and whole bricks. Gravel is fine to coarse subrounded to subangular flint with occasional bricks, hard concrete, tile, coal and possible bituminous material.		(0.84)	
	0.60 0.60	ES2	ES PID	 0.1ppm					1.10	
	1.00 1.00	ES3	ES PID	 0.1ppm			MADE GROUND: Light brown slightly silty sandy GRAVEL. Gravel is fine to coarse subangular to rounded flint with occasional brick fragments and concrete.		(0.50)	
	1.50 1.50	ES4	ES PID	 0.1ppm					1.60	
	1.80 1.80	ES5	ES PID	 0.1ppm			Stiff firm in places bluish grey extremely closely spaced thinly laminated silty CLAY with possible selenite crystals and occasional shell fragments. (LONDON CLAY FORMATION)		(2.40)	
	2.60 2.60	ES6	ES PID	 0.1ppm						
	3.80 3.80	ES7	ES PID	 0.1ppm					4.00	
							Terminated at 4.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.26m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 1.5m depth on completion. Response zone 1m to 1.5m. Borehole backfilled with arisings from 1.5 to 4.0m

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS08**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**29.09.16** End: **29.09.16**	**14.71**	**E:531031.2 N:182436.3**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hardstanding.	14.51	0.20	
	0.25 0.25	ES1	ES PID	 0.1ppm			MADE GROUND: Light brown silty very gravelly fine to coarse SAND with occasional whole bricks. Gravel is fine to coarse subangular to rounded flint with occasional brick, concrete and Bituminous material.		(1.30)	
	0.60 0.60	ES2	ES PID	 0.1ppm						
	1.40 1.40	ES3	ES PID	 0.1ppm				13.21	1.50	
	1.70 1.70	ES4	ES PID	 0.1ppm			Stiff bluish grey slighty silty extremely closely spaced thinly laminated CLAY. (LONDON CLAY FORMATION)		(2.50)	
	2.60 2.60	ES5	ES PID	 0.1ppm						
	3.60 3.60	ES6	ES PID	 0.1ppm				10.71	4.00	
							Terminated at 4.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.2m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 2m depth on completion. Response zone 1m to 2m. Borehole backfilled with arisings from 2m to 4m

All dimensions in metres | Scale: **1:33**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS09**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**03.10.16** End: **03.10.16**	**14.85**	**E:530999.5 N:182383.2**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.15	ES1	ES				MADE GROUND: Bitimous hard standing.	14.75	0.10	
	0.15		PID	0.1ppm			MADE GROUND: Light brown silty very gravelly fine to coarse SAND with occasional whole bricks and cobble sized concrete. Gravel is fine to coarse subangular to rounded flint with frequent brick, mortar and concrete.			
	0.50	ES2	ES							
	0.50		PID	0.1ppm						
	1.00	ES3	ES							
	1.00		PID	0.1ppm					(2.40)	
	1.50	ES4	ES							
	1.50		PID	0.1ppm						
	2.00	ES5	ES							
	2.00		PID	0.1ppm				12.35	2.50	
	2.60	ES6	ES				MADE GROUND: Soft dark brown with greyish brown mottling slightly silty sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to rounded flint with occasional brick fragments, concrete, coal and ash.			
	2.60		PID	0.1ppm						
	3.00	ES7	ES							
	3.00		PID	0.1ppm					(1.60)	
	3.50	ES8	ES							
	3.50		PID	0.1ppm						
	4.00	ES9	ES					10.75	4.10	
	4.00		PID	0.1ppm			Greenish brown slightly silty very sandy GRAVEL. Gravel is fine to coarse subangular flint. (HACKNEY GRAVEL)	10.65	4.20	
	4.30	ES10	ES							
	4.30		PID	0.1ppm			Firm orange brown with bluish grey mottling slightly silty slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded flint. (HACKNEY GRAVEL)		(0.80)	
	4.70	ES11	ES					9.85	5.00	

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.1m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 4m depth on completion. Response zone 1m to 4m. Borehole backfilled with arisings from 4m to 5m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS10**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**28.09.16** End: **28.09.16**	**14.53**	**E:530990.8 N:182353.6**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.15 0.15	1	ES PID	 0.1ppm			MADE GROUND: Bituminous hard standing.	14.43	0.10	
							MADE GROUND: Dark brown to black slightly silty very gravelly fine to coarse SAND. Gravel is fine to coarse subangular to subrounded flint with occasional brick fragments, concrete, ceramics and coal.	14.28	0.25	
	0.50 0.50	1	ES PID	 0.1ppm			MADE GROUND: Light brown slightly silty very gravelly fine to coarse SAND with rare cobble sized concrete. Gravel is fine to coarse subrounded to subangular flint with occasional brick fragments and concrete.		(1.25)	
	1.40 1.40	1	ES PID	 0.1ppm			Refused at 1.5mbgl.	13.03	1.50	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.1m followed on by an inspection pit hand dug to 1.2m depth.
2. Borehole refused at 1.5m
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 1.5m depth on completion. Response zone 1m to 1.5m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS11**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**03.10.16** End: **03.10.16**	**14.83**	**E:530978.5 N:182390.5**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.15	ES1	ES				MADE GROUND: Bitimous hard standing.	14.60	0.23	
	0.15		PID	0.1ppm			MADE GROUND: Light brown slightly silty gravelly fine to coarse SAND with occasional whole bricks. Gravel is fine to coarse subangular to rounded flint with occasional brick fragments and concrete.		(0.97)	
	0.25	ES2	ES							
	0.25		PID	0.1ppm						
	0.90	ES3	ES					13.63	1.20	
	0.90		PID	0.1ppm			MADE GROUND: Light brown slightly silty sandy GRAVEL with occasional pockets of soft CLAY. Gravel is fine to coarse subrounded to angular flint with occasional brick fragments and concrete.		(0.90)	
	1.50	ES4	ES							
	1.50		PID	0.1ppm						
	2.00	ES5	ES					12.73	2.10	
	2.00		PID	0.1ppm			MADE GROUND: Soft dark brown to black very sandy slightly gravelly CLAY with rare roots. Gravel is fine to coarse subrounded to angular flint with occasional brick fragments, coal, concrete and mortar.		(0.90)	
	2.50	ES6	ES							
	2.50		PID	0.1ppm						
	3.00	ES7	ES					11.83	3.00	
	3.00		PID	0.1ppm			MADE GROUND: Light brown slightly silty sandy GRAVEL. Gravel is fine to coarse rounded to subangular flint with occasional bricks and concrete.		(0.40)	
	3.50	ES8	ES					11.43	3.40	
	3.50		PID	0.1ppm			MADE GROUND: Soft dark brown to black silty slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to angular flint with occasional brick, concrete and mortar.		(1.10)	
	4.00	ES9	ES							
	4.00		PID	0.1ppm						
	4.50	ES10	ES					10.33	4.50	
	4.50		PID	0.1ppm			MADE GROUND: Dark brown to black slightly sandy slightly gravelly SILT. Gravel is fine to coarse subangular flint with brick, glass and coal.		(0.50)	
	4.90	ES11	ES					9.83	5.00	
	4.90		PID	0.1ppm			Terminated at 5.00m.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.23m followed on by an inspection pit hand dug to 0.9, concrete cored from 0.9m to 1.2m
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 5m depth on completion. Response zone 1m to 5m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS12**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**28.09.16** End: **28.09.16**	**14.94**	**E:530955.0 N:182402.5**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Bituminous hard standing.		(0.33)	
								14.61	0.33	
	0.35	ES1	ES				MADE GROUND: Dark brown slightly silty very gravelly fine to coarse SAND. Gravel is fine to medium subangular flint with occasional brick fragments and concrete.	14.44	0.50	
	0.35		PID	0.1ppm						
							MADE GROUND: Light brown silty gravelly fine to coarse SAND with rare cobble sized concrete. Gravel is fine to coarse subangular to rounded flint, brick, concrete and clinker.		(1.20)	
	1.00	ES2	ES							
	1.00		PID	0.1ppm						
	1.50	ES3	ES					13.24	1.70	
	1.50		PID	0.1ppm						
							MADE GROUND: Dark brown to black clayey slightly silty slightly gravelly fine to medium SAND. Gravel is fine subangular flint with occasional brick fragments, concrete, coal and chalk.	12.94	2.00	
	2.00	ES4	ES							
	2.00		PID	0.1ppm					(0.40)	
							MADE GROUND: Light brown silty gravelly fine to medium SAND. Gravel is fine to medium subrounded to angular flint with occasional brick fragments concrete and coal.	12.54	2.40	
	2.40	ES5	ES							
	2.40		PID	0.1ppm						
							MADE GROUND: Soft dark brown slightly silty sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to rounded flint with occasional brick fragments, concrete, coal, slate.			
	2.90	ES6	ES							
	2.90		PID	0.1ppm						
	3.20	ES7	ES						(1.90)	
	3.20		PID	0.1ppm						
	3.80	ES8	ES							
	3.80		PID	0.1ppm				10.64	4.30	
	4.30	ES9	ES				Dark brown to black silty fine SAND with occasional pockets of silt. (ALLUVIUM)			
	4.30		PID	0.1ppm					(0.70)	
	4.70	ES10	ES							
	4.70		PID	0.1ppm				9.94	5.00	
							Terminated at 5.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.33m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 4m depth on completion. Response zone 1m to 4m. Borehole backfilled with arisings from 4m to 5m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS19**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**10.10.16** End: **10.10.16**	**14.74**	**E:531020.2 N:182326.9**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	14.34	(0.40) 0.40	
	0.45	ES1	ES				MADE GROUND: Orange brown slightly silty gravelly fine to coarse SAND. Gravel is fine to coarse subrounded flint with occasional brick and concrete.	14.14	0.60	
	0.90	ES2	ES				MADE GROUND: Dark brown very silty gravelly fine to medium SAND. Gravel is fine to coarse subangular flint with occasional brick fragments, concrete, and mortar with rare shell fragment.			
	1.50	ES3	ES						(2.00)	
	1.50		PID	0.2ppm						
	2.00	ES4	ES							
	2.00		PID	0.4ppm						
	2.50	ES5	ES					12.14	2.60	
	2.50		PID	0.2ppm			MADE GROUND: Black sandy sightly gravelly SILT. Gravel is subangular flint with rare brick fragments and mortar.			
	2.80	ES6	ES							
	2.80		PID	0.3ppm					(1.00)	
	3.40	ES7	ES					11.14	3.60	
	3.70	ES8	ES				Soft bluish grey silty slightly sandy slightly gravelly CLAY with slight organic odour. Gravel is fine to coarse subrounded flint. (ALLUVIUM)		(0.60)	
	3.70		PID	0.2ppm				10.54	4.20	
	4.50	ES9	ES				Firm soft in places orange brown with bluish grey mottling slightly sandy slightly gravelly CLAY with occasional relict roots. Gravel is fine subangular flint. (ALLUVIUM)		(0.80)	
								9.74	5.00	
							Terminated at 5.00m.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.4m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered, strata damp from 2.6m
4. 50mm diameter standpipe complete with flush protective cover installed to 3.5m depth on completion. Response zone 1m to 2.5m. Borehole backfilled with arisings from 3.5m to 5m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Archway Competitor**	**???**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS20**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **04.10.16** / **06.10.16**	**14.73**	**E:531027.8 N:182345.6**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	14.34	(0.39) 0.39	
	0.40 / 0.40	ES1	ES / PID	0.1ppm			MADE GROUND: Orange brown slightly silty slightly gravelly fine to coarse SAND. Gravel is fine to medium subangular flint.	14.18	0.55	
	0.70 / 0.70	ES2	ES / PID	0.1ppm			MADE GROUND: Light brown slightly silty gravelly fine to coarse SAND with occasional pockets of soft clay. Gravel is fine to coarse subangular to rounded flint with occasional brick and concrete.	13.88	0.85	
	1.00 / 1.00	ES3	ES / PID	3.0ppm			MADE GROUND: Light brown slightly sandy GRAVEL. Gravel is fine to coarse subangular flint with frequent concrete.	13.78	0.95	
	1.50 / 1.50	ES4	ES / PID	2.3ppm			MADE GROUND: Reddish brown silty slightly sandy GRAVEL. Gravel is fine to coarse subangular flint with frequent brick.	13.73	1.00	
	2.00 / 2.00	ES5	ES / PID	2.1ppm			MADE GROUND: Light brown reddish brown grey slightly silty sandy GRAVEL. Gravel is fine to coarse subangular to rounded flint with occasional brick, concrete and ash.		(1.40)	
	2.30 / 2.30	ES6	ES / PID	0.8ppm				12.33	2.40	
	2.70 / 2.70	ES7	ES / PID	0.1ppm			Firm orange brown sandy CLAY with possible selenite crystals and occasional sand lenses. (LONDON CLAY FORMATION)			
	3.50 / 3.50	ES8	ES / PID	0.1ppm					(2.60)	
	4.80 / 4.80	ES9	ES / PID	0.1ppm				9.73	5.00	
							Terminated at 5.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.39m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 3.5m depth on completion. Response zone 1m to 4m. Borehole backfilled with arisings from 4m to 5m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Archway Competitor**	**Cowan**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS21**

Contract Ref:	Start: **05.10.16** End: **06.10.16**	Ground Level:	National Grid Co-ordinate:	Sheet:
28549		**14.73**	**E:531038.0 N:182354.8**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	14.33	(0.40) 0.40	
	0.40		PID	0.1ppm			MADE GROUND: Orange brown slightly silty sandy GRAVEL. Gravel is fine to coarse subrounded to subangular flint.	13.98	(0.35) 0.75	
	0.45	ES1	ES							
	0.75	ES2	ES				MADE GROUND: Firm light greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to angular flint with brick fragments and glass.	13.93	0.80	
	0.75		PID	0.1ppm				13.73	1.00	
	1.00	ES3	ES				MADE GROUND: Greyish brown slightly silty sandy GRAVEL with brick and concrete.	13.43	1.30	
	1.00		PID	0.6ppm						
	1.25	ES4	ES				MADE GROUND: Light brown slightly silty gravelly SAND. Gravel is fine to coarse subangular flint with occasional brick and concrete.			
	1.25		PID	0.4ppm						
	1.80	ES5	ES				MADE GROUND: Firm soft in places orange brown with bluish grey mottling silty slightly sandy CLAY with possible selenite crystals. (LONDON CLAY FORMATION)		(2.45)	
	1.80		PID	0.1ppm						
	2.70	ES6	ES					10.98	3.75	
	2.70		PID	0.1ppm						
	3.90	ES7	ES				Firm bluish grey extremely closely spaced thinly laminated slightly silty CLAY with possible selenite crystals and rare shell fragments. (LONDON CLAY FORMATION)	10.73	4.00	
	3.90		PID	0.1ppm			Terminated at 4.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.40m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 4m depth on completion. Response zone 2m to 4m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Archway Competitor**	**Cowan**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS22**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**07.10.16** End: **07.10.16**	**14.74**	**E:531067.1 N:182370.7**	**1** of **1**

Progress	Samples / Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hardstanding.	14.37	(0.37) 0.37	
							MADE GROUND: Gravel sub base.	14.32	0.42	
	0.50 0.50	ES1	ES PID	0.1ppm			Soft to firm dark greyish brown slightly silty CLAY with possible selenite crystals. (LONDON CLAY FORMATION)	13.74	(0.58) 1.00	
	1.00 1.00	ES2	ES PID	0.1ppm			Firm dark greyish brown silty CLAY with randomly orientated fissuring and rare mudstone and possible selenite crystals. (LONDON CLAY FORMATION)			
	1.50 1.50	ES3	ES PID	0.1ppm				12.64	(1.10) 2.10	
	2.50 2.50	ES4	ES PID	0.1ppm			Stiff dark greyish brown silty extremely closely spaced thinly laminated with randomly orientated fissuring slightly silty slightly gravelly CLAY with possible selenite crystals. Gravel is subrounded mudstone lithorlics and rare shell fragments. (LONDON CLAY FORMATION)			
	3.50 3.50	ES5	ES PID	0.1ppm				10.74	(1.90) 4.00	
							Terminated at 4.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.37m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. On completion, borehole backfilled with arisings.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Archway Competitor**	**Cowan**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS23**

Contract Ref:	Start: **07.10.16**	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **07.10.16**	**14.72**	**E:531079.6 N:182401.4**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	14.42	0.30	
	0.30 0.30	ES1	ES PID	 0.4ppm			MADE GROUND: Light to dark brown slightly silty sandy GRAVEL with occasional pockets of clay. Gravel is fine to coarse subrounded to subangular flint with occasional brick, concrete, mortar, ash and coal.		(0.60)	
	0.50 0.50	ES2	ES PID	 0.2ppm				13.82	0.90	
	1.00 1.00	ES3	ES PID	 0.2ppm			MADE GROUND: Reddish brown slightly silty sandy GRAVEL. Gravel is fine to coarse subrounded to subangular flint with frequent brick and concrete.		(0.50)	
	1.30 1.30	ES4	ES PID	 0.1ppm				13.32	1.40	
	1.70 1.70	ES5	ES PID	 0.1ppm			Firm greyish brown slightly silty CLAY with possible selenite crystals. (LONDON CLAY FORMATION)		(0.60)	
								12.72	2.00	
	2.50 2.50	ES6	ES PID	 0.1ppm			Stiff greyish brown slightly silty CLAY with possible selenite crystals. (LONDON CLAY FORMATION)		(2.00)	
	3.40 3.40	ES7	ES PID	 0.1ppm				10.72	4.00	
							Terminated at 4.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.9m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered, perched water encountered within the Made Ground.
4. 50mm diameter standpipe complete with flush protective cover installed to 1.5m depth on completion. Response zone 1m to 2.5m. Borehole backfilled with arisings from 2.5m to 4m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Archway Competitor**	**Cowan**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS24**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**07.10.16** End: **07.10.16**	**14.72**	**E:531091.7 N:182414.8**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	14.32	(0.40) 0.40	
	0.50 0.50	ES1	ES PID	0.1ppm			MADE GROUND: Light brown clayey slightly silty sandy GRAVEL with rare cobble sized concrete. Gravel is fine to coarse subangular to rounded flint with occasional brick, concrete and ash.	14.17	0.55	
	0.80 0.80	ES2	ES PID	0.1ppm			Firm to stiff greyish brown extremely closely spaced thinly laminated slightly silty CLAY with possible selenite crystals and rare shell fragments. (LONDON CLAY FORMATION)		(3.45)	
	1.50 1.50	ES3	ES PID	0.1ppm						
	2.50 2.50	ES4	ES PID	0.1ppm						
	3.50 3.50	ES5	ES PID	0.1ppm				10.72	4.00	
							Terminated at 4.00m.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.4m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered, slight seepage at 3.0
4. 50mm diameter standpipe complete with flush protective cover installed to 1m depth on completion. Response zone 0.5m to 1.0m. Borehole backfilled with arisings from 1.0m to 4m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Archway Competitor**	**Cowan**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS25**

Contract Ref:	Start: **04.10.16** End: **07.10.16**	Ground Level:	National Grid Co-ordinate:	Sheet:
28549		**14.52**	**E:531014.9 N:182441.7**	**1** of **1**

Progress	Samples / Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hardstanding.	14.32	0.20	
	0.30 0.30	ES1	ES PID	0.1ppm			MADE GROUND: Dark brown slightly silty gravelly fine to coarse SAND. Gravel is fine to coarse subangular to rounded flint with occasional brick, concrete, coal and mortar with cobble sized bricks.		(0.65)	
	0.80 0.80	ES2	ES PID	0.1ppm			Terminated at 0.85m.	13.67	0.85	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.2m followed on by an inspection pit hand dug to 0.85m depth.
2. Borehole refused at 0.85m

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**Cowan**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS26**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**28.09.16** End: **28.09.16**	**14.47**	**E:531035.4 N:182395.3**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.25 0.25	ES1	ES PID	0.1ppm			MADE GROUND: Concrete hard standing.	14.27	0.20	
							MADE GROUND: Light brown silty gravelly fine to coarse SAND with rare whole brick. Gravel is fine to coarse subangular flint with occasional brick, concrete, ceramic mortar.		(1.30)	
	0.85 0.85	ES2	ES PID	0.1ppm				12.97	1.50	
	1.40 1.40	ES3	ES PID	0.1ppm			Firm stiff in places light brown slightly silty slightly sandy CLAY with orange brown and bluish grey mottling and possible selenite crystals. (LONDON CLAY FORMATION)		(1.50)	
	1.80 1.80	ES4	ES PID	0.1ppm				11.47	3.00	
	2.70 2.70	ES5	ES PID	0.1ppm			Stiff bluish grey extremely closely spaced thinly laminated silty CLAY. (LONDON CLAY FORMATION)		(1.00)	
	3.40 3.40	ES6	ES PID	0.1ppm				10.47	4.00	
							Terminated at 4.00m.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.2m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 1.5m depth on completion. Response zone 1m to 1.5m. Borehole backfilled with arisings from 1.5m to 4m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS27**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**29.09.16** End: **29.09.16**	**14.58**	**E:531013.3 N:182375.5**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	14.46	0.12	
	0.15 0.15	ES1	ES PID	0.1ppm			MADE GROUND: Light brown silty very gravelly fine to coarse SAND with occasional cobble sized concrete. Gravel is fine to coarse subangular to rounded flint with occasional brick fragments and concrete.			
	0.80 0.80	ES2	ES PID	0.1ppm					(1.48)	
	1.40 1.40	ES3	ES PID	0.1ppm				12.98	1.60	
	1.80 1.80	ES4	ES PID	0.1ppm			MADE GROUND: Soft dark brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint with occasional brick and concrete.		(0.40)	
	2.10 2.10	ES5	ES PID	0.1ppm			Orange brown slightly silty SAND and GRAVEL. (HACKNEY GRAVEL)	12.58	2.00	
									(0.50)	
	2.90 2.90	ES6	ES PID	0.1ppm			Firm stiff in places orange brown slightly silty slightly sandy CLAY with bluish grey mottling and occasional relict roots and possible gypsum crystals. (LONDON CLAY FORMATION)	12.08	2.50	
									(1.50)	
	3.50 3.50	ES7	ES PID	0.1ppm						
								10.58	4.00	
							Terminated at 4.00m.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.12m followed on by an inspection pit hand dug to 1.2m depth.
2. Down borehole checks for buried ferrous objects carried out during drilling by specialist unexploded ordnance (UXO) officer using magnetometer at regular intervals to 4m depth.
3. No groundwater encountered.
4. 50mm diameter standpipe complete with flush protective cover installed to 2m depth on completion. Response zone 1m to 2m. Borehole backfilled with arisings from 2m to 4m.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Dando Terrier**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS28**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**29.09.16** End: **29.09.16**	**14.51**	**E:531003.7 N:182368.2**	**1** of **1**

Progress	Samples / Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Bituminous hardstanding.	14.32	0.19	
	0.20 0.20	ES1	ES PID	0.1ppm			MADE GROUND: Light brown slightly silty gravelly fine to coarse SAND. Gravel is fine to coarse subangular to rounded flint with frequent concrete, brick fragments and coal.		(1.01)	
	1.00 1.00	ES2	ES PID	0.1ppm				13.31	1.20	
							Refused at 1.20m.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.19m followed on by an inspection pit hand dug to 1.2m depth.
2. Borehole refused at 1.2m due to concrete obstruction

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Dando Terrier**	**KDS**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS29**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**07.10.16** End: **07.10.16**	**14.51**	**E:531021.2 N:182445.7**	**1** of **1**

Progress	Samples / Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	14.28	0.23	
	0.25 0.25	ES1	ES PID	0.1ppm			MADE GROUND: Light brown to black very sandy gravelly CLAY. Gravel is fine to coarse subangular flint with occasional brick, concrete and bituminous material.	13.66	(0.62) 0.85	
	0.80 0.80	ES2	ES PID	0.1ppm			Refused at 0.5m due to concrete obstruction.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.23m followed on by an inspection pit hand dug to 0.85m depth.
2. Borehole refused at 0.85m due to concrete obstruction

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Archway Competitor**	**COWAN**	**JTownsend**	ST

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**WS30**

Contract Ref:	Start: **07.10.16** End: **07.10.16**	Ground Level:	National Grid Co-ordinate:	Sheet:
28549		**14.65**	**E:531026.1 N:182451.0**	**1** of **1**

Progress	Samples / Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							MADE GROUND: Concrete hard standing.	14.42	0.23	
	0.25 0.25	ES1	ES PID	0.1ppm			MADE GROUND: Light brown clayey slightly silty very gravelly fine to coarse SAND. Gravel is fine to coarse subangular to rounded flint with occasional brick, concrete and mortar.	13.75	(0.67) 0.90	
	0.85 0.85	ES2	ES PID	0.1ppm			Refused at 0.90m due to concrete obstruction.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Concrete cored to 0.23m followed on by an inspection pit hand dug to 0.9m depth.
2. Borehole refused at 0.9m due to concrete obstruction

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Archway Competitor**	**COWAN**	**JTownsend**	ST

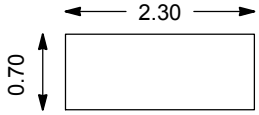
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**TP11**

Contract Ref:	Start: **04.10.16**	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	End: **04.10.16**	**14.92**	**E:530976.8 N:182368.4**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.10	ES1	ES				MADE GROUND: Bituminous hardstanding.	14.77	0.15	
0.10		PID	0.2ppm			MADE GROUND: Orangish brown black bituminous silty gravelly SAND with low cobble content. Sand is fine to coarse. Gravel is fine to coarse subrounded to angular flint, bricks, ash and clinker. Cobbles of concrete and brick.	14.47	0.45	
0.30	ES2	ES				MADE GROUND: Clayey gravelly SAND with moderate cobble content. Sand is fine to coarse. Gravel is fine to coarse subrounded to angular flint bricks, tile, ash and clinker. Cobbles of concrete bricks and whole bricks.		(2.85)	
0.30		PID	0.1ppm						
0.50	ES3	ES							
0.50		PID	0.1ppm						
1.00	ES4	ES							
1.00		PID	0.1ppm						
1.50	ES5	ES							
1.50		PID	0.1ppm						
2.00	ES6	ES							
2.00		PID	0.1ppm						
2.50	ES7	ES							
2.50		PID	0.1ppm						
3.00	ES8	ES							
3.00		PID	0.1ppm				11.62	3.30	
3.30	ES9	ES				Terminated at 3.30m.			
3.30		PID	0.1ppm						

Plan (Not to Scale)



General Remarks

1. Checks for buried ferrous objects carried out during excavation by specialist unexploded ordnance (UXO) officer using magnetometer.
2. Trial pit remained dry during excavation.
3. On completion, trial pit backfilled with arisings.
4. Concrete slab encountered at 0.4m
5. At 0.8m brick wall encountered

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**JTownsend**	ST

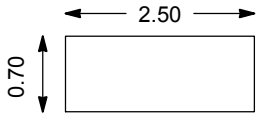
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**TP12**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**07.10.16** End: **07.10.16**	**14.12**	**E:530993.4 N:182353.3**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Bituminous hardstanding.	13.97	0.15	
0.30	ES1	ES				MADE GROUND: Dark brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is subrounded to angular fine to coarse brick, flint, concrete, metal with frequent ash and clinker.			
0.30		PID	0.1ppm					(0.65)	
0.50	ES2	ES							
0.50		PID	0.1ppm				13.32	0.80	
						MADE GROUND: Dark brown clayey gravelly SAND with occasional ash, clinker and medium to high cobble content. Sand is fine to coarse. Gravel is fine to coarse subrounded to angular flint bricks and metal. Cobbles are subrounded to angular brick, concrete and a mix of mortar and brick.			
1.00	ES3	ES							
1.00		PID	0.2ppm						
1.50	ES4	ES							
1.50		PID	0.1ppm						
2.00	ES5	ES						(2.60)	
2.00		PID	0.2ppm						
2.50	ES6	ES							
2.50		PID	0.1ppm						
3.00	ES7	ES							
3.00		PID	0.3ppm				10.72	3.40	
						Dark grey black slightly sandy SILT with strong organic odour. Sand is fine to coarse with clay inclusions. (ALLUVIUM)	10.62	3.50	
3.50	ES8	ES				Terminated at 3.50m.			
3.50		PID	0.4ppm						

Plan (Not to Scale)



General Remarks

1. Checks for buried ferrous objects carried out during excavation by specialist unexploded ordnance (UXO) officer using magnetometer.
2. Trial pit remained dry during excavation.
3. On completion, trial pit backfilled with arisings.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**JSmith**	ST

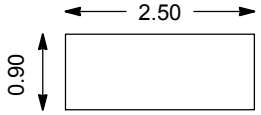
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**TP13**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**07.10.16** End: **07.10.16**	**14.56**	**E:531030.2 N:182402.6**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Reinforced concrete hardstanding.	14.31	0.25	
0.30	ES1	ES				MADE GROUND: Dark brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subrounded to angular flint brick and concrete.	14.26	0.30	
0.30		PID	0.1ppm						
0.50	ES2	ES				MADE GROUND: Footings made from concrete and brick works recovered as dark brown clayey gravelly SAND with high cobble content and frequent ash and clinker. Sand is fine to coarse. Gravel is fine to coarse subrounded to angular flint, brick and concrete. Cobbles are subrounded to subangular concrete and bricks.		(0.90)	
0.50		PID	0.1ppm						
1.00	ES3	ES					13.36	1.20	
1.00		PID	0.1ppm						
						Dark brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse rounded to angular flint. (HACKNEY GRAVEL)	13.16	1.40	
1.50	ES4	ES				Firm to stiff dark grey CLAY. (LONDON CLAY FORMATION)		(0.60)	
1.50		PID	0.1ppm				12.56	2.00	
2.00	ES5	ES				Stiff slightly sandy CLAY with occasional orange brown weathering. Sand is fine to medium. (LONDON CLAY FORMATION)			
2.00		PID	0.1ppm						
2.50	ES6	ES						(1.30)	
2.50		PID	0.1ppm						
3.00	ES7	ES					11.26	3.30	
3.00		PID	0.1ppm						
3.30	ES8	ES				Terminated at 3.30m.			
3.30		PID	0.1ppm						

Plan (Not to Scale)



General Remarks

1. Checks for buried ferrous objects carried out during excavation by specialist unexploded ordnance (UXO) officer using magnetometer.
2. Trial pit remained dry during excavation, seepage at 1.2m
3. On completion, trial pit backfilled with arisings.
4. Concrete and brick obstructions encountered at 0.7m

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**JSmith**	ST

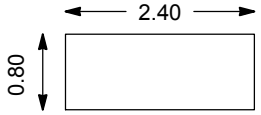
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**TP14**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**06.10.16** End: **06.10.16**	**14.45**	**E:531039.6 N:182409.2**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Reinforced concrete hardstanding.	14.15	0.30	
						MADE GROUND: Dark brown clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is subrounded to angular flint brick and mudstone.	14.05	0.40	
0.50	ES1	ES							
0.50		PID	0.1ppm			MADE GROUND: Brick and concrete mix hardstanding recovered as dark brown slightly clayey gravelly SAND with medium cobble content. Sand is fine to coarse. Gravel is subrounded to angular flint brick concrete. Cobbles are subrounded to subangular bricks and concrete mortar.		(0.80)	
1.00	ES2	ES							
1.00		PID	0.2ppm				13.25	1.20	
1.30	ES3	ES				Dark brown slightly clayey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular flint. (HACKNEY GRAVEL)	13.05	1.40	
1.30		PID	0.1ppm						
1.50	ES4	ES							
1.50		PID	0.1ppm			Soft dark grey slightly sandy CLAY. Sand is fine to coarse firm in places. (LONDON CLAY FORMATION)		(0.60)	
							12.45	2.00	
2.00	ES5	ES				Terminated at 2.00m.			
2.00		PID	0.1ppm						

Plan (Not to Scale)



General Remarks

1. Checks for buried ferrous objects carried out during excavation by specialist unexploded ordnance (UXO) officer using magnetometer.
2. On completion, trial pit backfilled with arisings.
3. Brick and concrete obstructions at 0.53m.
4. Trial pit terminated due to rising water and collapse

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**JTownsend**	ST

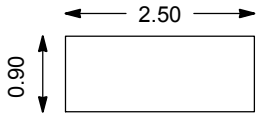
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**TP15**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**11.10.16** End: **11.10.16**	**14.49**	**E:531052.3 N:182432.3**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Reinforced concrete hardstanding.	14.24	0.25	
0.50	ES1	ES				MADE GROUND: Dark brown slightly clayey sandy GRAVEL/gravelly SAND with occasional ash and clinker. Sand is fine to coarse. Gravel is fine to coarse subrounded to angular flint.	13.94	0.55	
0.50		PID	0.1ppm			MADE GROUND: Brick and concrete obstruction.		(0.85)	
1.00	ES2	ES					13.09	1.40	
1.00		PID	0.1ppm						
1.45	ES3	ES				MADE GROUND: Dark brown slightly clayey very gravelly SAND with strong hydrocarbon odour. Sand is fine to coarse. Gravel is fine to coarse subrounded to angular flint brick and concrete.	12.99	1.50	
1.45		PID	0.1ppm				12.84	1.65	
1.60	ES4	ES				Soft to firm dark grey slightly silty CLAY with potential selenite crystals. (LONDON CLAY FORMATION)			
1.60		PID	0.1ppm						

Plan (Not to Scale)



General Remarks

1. Checks for buried ferrous objects carried out during excavation by specialist unexploded ordnance (UXO) officer using magnetometer.
2. On completion, trial pit backfilled with arisings.
3. Seepage at 1.4m.
4. Brick and concrete hardstanding at 0.55m

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**JTownsend**	ST

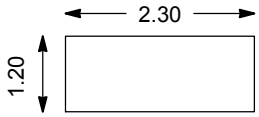
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**TP16**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**10.09.16** End: **10.09.16**	**14.81**	**E:530992.9 N:182421.4**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Bituminous hardstanding.	14.66	0.15	
						MADE GROUND: Concrete hardstanding.	14.51	0.30	
0.50		PID	0.1ppm			MADE GROUND: Mix of bricks, concrete and mortar recovered as light brown slightly clayey gravelly SAND with frequent ash and clinker and medium cobble content. Sand is fine to coarse. Gravel is subrounded to angular fine to coarse of flint, brick and concrete. Cobbles are subrounded to angular bricks and concrete.		(3.20)	
1.00		PID	0.1ppm						
1.50		PID	0.1ppm						
2.00		PID	0.1ppm						
2.50		PID	0.1ppm						
3.00		PID	0.1ppm						
3.50		PID	0.1ppm				11.31	3.50	
						Terminated at 3.50m.			

Plan (Not to Scale)



General Remarks

1. Checks for buried ferrous objects carried out during excavation by specialist unexploded ordnance (UXO) officer using magnetometer.
2. Seepage at 3.5m.
3. On completion, trial pit backfilled with arisings.
4. Concrete slab encountered at 1.1m

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**JTownsend**	ST

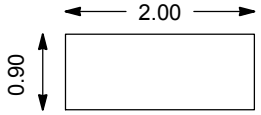
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**TP17**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**17.10.16** End: **17.10.16**	**14.59**	**E:531051.5 N:182423.4**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Reinforced concrete hardstanding.	14.29	0.30	
						MADE GROUND: Dark brown gravelly SAND with low cobble content. Sand is fine to coarse. Gravel is fine to coarse subrounded to angular flint bricks and concrete with occasional ash and clinker. Cobbles are subangular bricks.	14.09	0.50	
0.50 0.50	ES1	ES PID	0.1ppm			MADE GROUND: Brick and concrete obstruction.		(0.70)	
1.00 1.00	ES2	ES PID	0.1ppm				13.39	1.20	
						MADE GROUND: Mixed concrete and bricks and dark brown slightly silty very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse subrounded to angular flint and brick.		(0.50)	
1.50 1.50	ES3	ES PID	0.1ppm				12.89	1.70	
						Stiff to very stiff dark grey silty CLAY. (LONDON CLAY FORMATION)			
2.00 2.00	ES4	ES PID	0.1ppm						
2.50 2.50	ES5	ES PID	0.1ppm					(1.80)	
3.00 3.00	ES6	ES PID	0.1ppm						
							11.09	3.50	
3.50 3.50	ES7	ES PID	0.1ppm			Terminated at 3.5m.			

Plan (Not to Scale)



General Remarks

1. Checks for buried ferrous objects carried out during excavation by specialist unexploded ordnance (UXO) officer using magnetometer.
2. Trial pit remained dry during excavation.
3. On completion, trial pit backfilled with arisings.

All dimensions in metres | Scale: **1:31**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**JTownsend**	ST

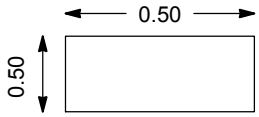
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**HP01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**26.09.16** End: **26.09.16**	**19.02**	**E:531002.2 N:182500.1**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20 0.20	ES1	ES PID	0.1ppm			MADE GROUND: Dark brown slightly silty gravelly fine to coarse SAND with occasional roots. Gravel is fine to coarse subangular to subrounded with occasional bricks, tile and ceramics.		(0.60)	
0.50 0.50	ES2	ES PID	0.1ppm			. . . at 0.50m concrete obstruction	18.42	0.60	
1.00 1.00	ES3	ES PID	0.1ppm			MADE GROUND: Light brown very silty gravelly fine to coarse SAND with occasional coarse gravel concrete. Gravel is fine to coarse subangular flint with occasional brick, concrete, bituminous material, slate, plastic and metal.	17.82	(0.60) 1.20	

Plan (Not to Scale)



General Remarks

1. Moved slightly to the south due to work.
2. No groundwater encountered.
3. Backfilled upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Hand dug	**Hand tools**	**JTownsend**	ST

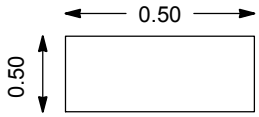
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**HP02**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**26.09.16** End: **26.09.16**	**18.63**	**E:530994.9 N:182476.2**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Brick gravel sub base.	18.53	0.10	
0.15 0.15	ES1	ES PID	0.1ppm			MADE GROUND: Light brown silty gravelly fine to coarse SAND with occasional cobble sized concrete and whole bricks. Gravel is fine to coarse subangular flint with occasional brick fragments and concrete.	17.73	(0.80) 0.90	
0.90 0.90	ES2	ES PID	0.1ppm			Terminated due to concrete obstruction at 0.90m.			

Plan (Not to Scale)



General Remarks

1. No groundwater encountered.
2. Backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Hand dug	**Hand tools**	**JTownsend**	ST

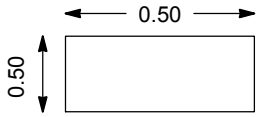
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**HP03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**26.09.16** End: **26.09.16**	**18.53**	**E:530983.0 N:182475.2**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Brick gravel sub base.	18.43	0.10	
0.15 0.15	ES1	ES PID	0.1ppm			MADE GROUND: Light to dark brown slightly silty gravelly fine to coarse SAND with rare cobble sized concrete. Gravel is fine to coarse subangular to rounded flint with frequent brick fragments, concrete and plastic.		(0.80)	
0.80 0.80	ES2	ES PID	0.1ppm				17.63	0.90	
						Terminated at 0.90m.			

Plan (Not to Scale)



General Remarks

1. No groundwater encountered.
2. Backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Hand dug	**Hand tools**	**JTownsend**	ST

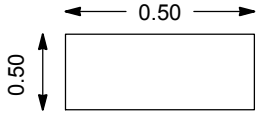
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**HP04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**26.09.16** End: **26.09.16**	**18.43**	**E:530956.7 N:182450.4**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Yellow brick over fine to coarse SAND (sub base).	18.33	0.10	
0.15 0.15	ES1	ES PID	0.1ppm			MADE GROUND: Light brown silty gravelly fine to coarse SAND. Gravel is fine to coarse subangular flint with occasional brick, concrete and metal and occasional cobble sized concrete fragments.		(0.80)	
0.50 0.50	ES2	ES PID	0.1ppm				17.53	0.90	
1.00 1.00	ES3	ES PID	0.1ppm			MADE GROUND: Light brown grey clayey very gravelly fine to coarse SAND with rare cobble sized concrete and brick. Gravel is fine to coarse subangular flint with frequent brick fragments and concrete.	17.23	(0.30) 1.20	
						Terminated at 1.20m.			

Plan (Not to Scale)



General Remarks

1. No groundwater encountered.
2. Backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Hand dug	**Hand tools**	**JTownsend**	ST

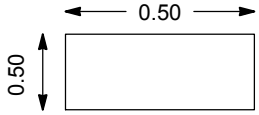
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**HP05**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**26.09.16** End: **26.09.16**	**18.81**	**E:530931.2 N:182421.1**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.15 0.15	ES1	ES PID	0.1ppm			MADE GROUND: Vegetation over dark brown very silty gravelly fine to medium SAND with frequent roots. Gravel is fine to medium subangular flint with rare brick fragments and concrete.	18.61	0.20	
0.50 0.50	ES2	ES PID	0.1ppm			MADE GROUND: Light brown to grey very silty gravelly fine to medium SAND with rare cobble sized concrete. Gravel is fine to coarse subrounded to subangular flint with occasional brick fragments and concrete.	18.01	(0.60) 0.80	
1.00 1.00	ES3	ES PID	0.1ppm			MADE GROUND: Dark brown to black silty gravelly fine to medium SAND. Gravel is fine to medium subangular to subrounded flint with occasional brick fragments, concrete, chalk and coal.	17.61	(0.40) 1.20	
						Terminated at 1.20m.			

Plan (Not to Scale)



General Remarks

1. No groundwater encountered.
2. Backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Hand dug	**Hand tools**	**JTownsend**	ST

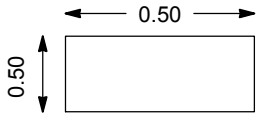
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**HP06**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**26.09.16** End: **26.09.16**	**18.72**	**E:530930.3 N:182407.2**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20 0.20	ES1	ES PID	0.1ppm			MADE GROUND: Grass over silty gravelly fine to coarse SAND with occasional roots. Gravel is fine to coarse subangular to rounded flint with occasional brick fragments, concrete, chalk and bituminous material.	18.32	(0.40) 0.40	
0.50 0.50	ES2	ES PID	0.1ppm			MADE GROUND: Light brown silty gravelly fine to coarse SAND with rare cobble sized concrete. Gravel is fine to coarse subangular to subrounded flint with occasional brick fragments, concrete and slate.	17.92	(0.40) 0.80	
1.00 1.00	ES3	ES PID	0.1ppm			MADE GROUND: Dark brown to black slightly silty gravelly fine to coarse SAND. Gravel is fine to medium subangular flint with frequent brick, concrete and coal fragments.	17.52	(0.40) 1.20	
						Terminated at 1.20m.			

Plan (Not to Scale)



General Remarks

1. No groundwater encountered.
2. Backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Hand dug	**Hand tools**	**JTownsend**	ST

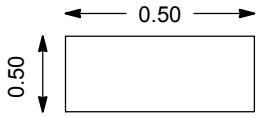
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Mount Pleasant Sorting Office	**Royal Mail Group Limited**	**HP07**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
28549	**27.09.16** End: **27.09.16**	**18.80**	**E:530938.1 N:182394.8**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.15	D1	D				MADE GROUND: Dark brown silty gravelly fine to coarse SAND with occasional roots. Gravel is fine to coarse subangular flint with occasional brick fragments, concrete and chalk.	18.60	0.20	
0.15		PID	0.1ppm						
						MADE GROUND: Light brown very silty gravelly fine to medium SAND with rare cobble sized concrete. Gravel is fine to coarse subangular to subrounded flint with occasional brick fragments.		(0.50)	
0.50	D2	D					18.10	0.70	
0.50		PID	0.1ppm						
						MADE GROUND: Dark brown slightly silty gravelly fine to coarse SAND with rare cobble sized concrete. Gravel is fine to coarse subrounded to subangular flint with occasional brick fragments, concrete, chalk and coal.		(0.50)	
1.00	D3	D					17.60	1.20	
1.00		PID	0.1ppm						

Plan (Not to Scale)



General Remarks

1. No groundwater encountered.
2. Backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Hand dug	**Hand tools**	**JTownsend**	ST

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH01	1.00				3,3	150	4,1,1,1		3,3/4,1,1,1	EQU004	22/12/2016	61.88	7	
									N=7					
	2.20				2,2	150	3,2,3,3		2,2/3,2,3,3	EQU004	22/12/2016	61.88	11	
									N=11					
	3.00				1,1	150	1,3,2,3		1,1/1,3,2,3	EQU004	22/12/2016	61.88	9	
									N=9					
	5.00				2,2	150	2,3,3,3		2,2/2,3,3,3	EQU004	22/12/2016	61.88	11	
									N=11					
	8.00				1,2	150	2,4,5,5		1,2/2,4,5,5	EQU004	22/12/2016	61.88	17	
									N=16					
	9.50				3,3	150	3,4,5,7		3,3/3,4,5,7	EQU004	22/12/2016	61.88	20	
									N=19					
	12.90				6,6	150	6,6,6,6		6,6/6,6,6,6	EQU004	22/12/2016	61.88	25	
									N=24					
	17.10				6,5	150	7,9,9,13		6,5/7,9,9,13	EQU004	22/12/2016	61.88	39	
									N=38					
	20.00				8,9	150	10,12,12,15		8,9/10,12,12,15	EQU004	22/12/2016	61.88	51	
									N=49					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
2. **Reported blows are for 75mm penetration unless indicated "+".**
3. **Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.**
4. **Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.**
5. **Entries in the water depth column reflects the measured water depth at time of test.**

N_{60} = (Measured hammer energy ratio / 60) x N value

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By		Date	Contract Ref:
	**CBAKER**	**19.01.17**	**28549**
Contract: **Mount Pleasant Sorting Office**			Page: **1** of **28**

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH01	21.50				6,10	150	9,11,15,15+	288	6,10/9,11,15,15	EQU004	22/12/2016	61.88	54	
									for 63mm					
									N=52*					
	23.50				17,8	85	31,19+	95	17,8/31,19	EQU004	22/12/2016	61.88	163	
									for 20mm					
									N=158*					
BH03	1.00				25	75	25,25	150	25/25,25	EQU004	22/12/2016	61.88	103	
									for 75mm					
									N=100*					
	2.00				1,1	150	1,2,2,3		1,1/1,2,2,3	EQU004	22/12/2016	61.88	8	
									N=8					
	4.00				1,1	150	3,4,5,5		1,1/3,4,5,5	EQU004	22/12/2016	61.88	18	
									N=17					
	5.70				4,4	150	4,6,6,7		4,4/4,6,6,7	EQU004	22/12/2016	61.88	24	
									N=23					
	7.20				4,4	150	6,7,7,9		4,4/6,7,7,9	EQU004	22/12/2016	61.88	30	
									N=29					
	9.70				5,6	150	6,7,10,10		5,6/6,7,10,10	EQU004	22/12/2016	61.88	34	

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
2. **Reported blows are for 75mm penetration unless indicated "+".**
3. **Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.**
4. **Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.**
5. **Entries in the water depth column reflects the measured water depth at time of test.**

N_{60} = (Measured hammer energy ratio / 60) x N value

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By		Date	Contract Ref:
	**CBAKER**	**19.01.17**	**28549**
Contract: **Mount Pleasant Sorting Office**			Page: **2** of **28**

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=33					
	11.20				6,8	150	8,9,10,11		6,8/8,9,10,11	EQU004	22/12/2016	61.88	39	
									N=38					
	12.70				10,9	150	10,10,14,15		10,9/10,10,14,15	EQU004	22/12/2016	61.88	51	
									N=49					
	14.20				5,5	150	5,8,9,10		5,5/5,8,9,10	EQU004	22/12/2016	61.88	33	
									N=32					
	15.70				6,8	150	8,10,11,13		6,8/8,10,11,13	EQU004	22/12/2016	61.88	43	
									N=42					
	17.20				5,10	150	10,10,11,14		5,10/10,10,11,14	EQU004	22/12/2016	61.88	46	
									N=45					
	18.50				10,15	150	15,13,15,7+	265	10,15/15,13,15,7	EQU004	22/12/2016	61.88	59	
									for 40mm					
									N=57*					
	20.00				11,14	150	20,22,8+	180	11,14/20,22,8	EQU004	22/12/2016	61.88	86	
									for 30mm					
									N=83*					
	21.50				8,7	150	11,13,12,14		8,7/11,13,12,14	EQU004	22/12/2016	61.88	52	

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

N_{60} = (Measured hammer energy ratio / 60) x N value

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By		Date	Contract Ref:
	**CBAKER**	**19.01.17**	**28549**
Contract: **Mount Pleasant Sorting Office**			Page: **3** of **28**

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=50					
	23.00				4,7	150	10,10,14,13		4,7/10,10,14,13	EQU004	22/12/2016	61.88	48	
									N=47					
	26.50				6,6	150	15,25,10+	160	6,6/15,25,10	EQU004	22/12/2016	61.88	97	
									for 10mm					
									N=94*					
	30.50				25	75	50+	50	25/50	EQU004	22/12/2016	61.88	309	
									for 50mm					
									N=300*					
BH04	3.00				1,1	150	1,0,1,0		1,1/1,1	AR1323	13/04/2016	72	2	SPT(c)
									N=2					
	4.00				1,0	150	0,0,1,0		1/,1	AR1323	13/04/2016	72	1	SPT(c)
									N=1					
	5.00				1,2	150	2,1,2,3		1,2/2,1,2,3	AR1323	13/04/2016	72	10	SPT(c)
									N=8					
	6.50				2,2	150	3,4,4,5		2,2/3,4,4,5	AR1323	13/04/2016	72	19	
									N=16					
	9.50				3,3	150	4,4,4,5		3,3/4,4,4,5	AR1323	13/04/2016	72	20	

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

N_{60} = (Measured hammer energy ratio / 60) x N value

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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=17					
	12.50				7,7	150	9,10,10,12		7,7/9,10,10,12	AR1323	13/04/2016	72	49	
									N=41					
	15.50				4,5	150	6,7,7,7		4,5/6,7,7,7	AR1323	13/04/2016	72	32	
									N=27					
	18.50				5,5	150	7,5,7,9		5,5/7,5,7,9	AR1323	13/04/2016	72	34	
									N=28					
	24.50				6,6	150	9,11,11,13		6,6/9,11,11,13	AR1323	13/04/2016	72	53	
									N=44					
	26.00				7,8	150	11,12,14,13+	295	7,8/11,12,14,13	AR1323	13/04/2016	72	61	
									for 70mm					
									N=51*					
	29.00				7,7	150	11,13,14,12+	278	7,7/11,13,14,12	AR1323	13/04/2016	72	65	
									for 53mm					
									N=54*					
	32.00				25	75	35,15+	100	25/35,15	AR1323	13/04/2016	72	180	
									for 25mm					
									N=150*					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
2. **Reported blows are for 75mm penetration unless indicated "+".**
3. **Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.**
4. **Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.**
5. **Entries in the water depth column reflects the measured water depth at time of test.**

N_{60} = (Measured hammer energy ratio / 60) x N value

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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH04	35.00				25	75	50	75	25/50	AR1323	13/04/2016	72	240	
									for 75mm					
									N=200*					
	36.50				25	75	50+	50	25/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					
	38.00				25	75	50+	70	25/50	AR1323	13/04/2016	72	257	
									for 70mm					
									N=214*					
	39.50				25	75	50+	50	25/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					
BH05	3.50				5,6	150	5,5,5,5		5,6/5,5,5,5	JB6	24/06/2016	54	18	
									N=20					
	5.50				2,2	150	3,4,4,5		2,2/3,4,4,5	JB6	24/06/2016	54	14	
									N=16					
	8.50				2,3	150	3,3,4,5		2,3/3,3,4,5	JB6	24/06/2016	54	14	
									N=15					

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

N_{60} = (Measured hammer energy ratio / 60) x N value

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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH05	11.50				3,4	150	4,5,5,6		3,4/4,5,5,6	JB6	24/06/2016	54	18	
									N=20					
	13.00				7,8	150	10,10,12,15		7,8/10,10,12,15	JB6	24/06/2016	54	42	
									N=47					
	16.00				7,8	150	8,10,13,13		7,8/8,10,13,13	JB6	24/06/2016	54	40	
									N=44					
	19.00				3,5	150	7,7,8,10		3,5/7,7,8,10	JB6	24/06/2016	54	29	
									N=32					
	22.00				8,10	150	10,12,15,13+	281	8,10/10,12,15,13	JB6	24/06/2016	54	48	
									for 56mm					
									N=53*					
	23.50				7,7	150	8,10,15,15		7,7/8,10,15,15	JB6	24/06/2016	54	43	
									N=48					
	25.00				8,10	150	16,16,18+	220	8,10/16,16,18	JB6	24/06/2016	54	61	
									for 70mm					
									N=68*					
	26.50				5,5	150	10,10,11,13		5,5/10,10,11,13	JB6	24/06/2016	54	40	
									N=44					

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH05	28.00				10,15	150	21,22,7+	160	10,15/21,22,7	JB6	24/06/2016	54	85	
									for 10mm					
									N=94*					
	29.50				12,13	105	25,25+	125	12,13/25,25	JB6	24/06/2016	54	108	SPT(c)
									for 50mm					
									N=120*					
	31.00				10,15	138	25,25+	135	10,15/25,25	JB6	24/06/2016	54	100	SPT(c)
									for 60mm					
									N=111*					
	33.00				25	45	50+	60	25/50	JB6	24/06/2016	54	225	SPT(c)
									for 60mm					
									N=250*					
	34.00				15,10	100	50	75	15,10/50	JB6	24/06/2016	54	180	SPT(c)
									for 75mm					
									N=200*					
	35.00				25	50	50+	60	25/50	JB6	24/06/2016	54	225	SPT(c)
									for 60mm					
									N=250*					

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
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4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

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Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH05	36.00				25	10	50+	12	25/50	JB6	24/06/2016	54	1125	SPT(c)
									for 12mm					
									N=1250*					
	37.00				17,8	105	25,25+	135	17,8/25,25	JB6	24/06/2016	54	100	SPT(c)
									for 60mm					
									N=111*					
	38.00				22,3	86	24,26+	120	22,3/24,26	JB6	24/06/2016	54	112	SPT(c)
									for 45mm					
									N=125*					
	39.00				25	12	50+	17	25/50	JB6	24/06/2016	54	794	SPT(c)
									for 17mm					
									N=882*					
BH06	3.00				1,2	150	1,2,2,2		1,2/1,2,2,2	AR1323	13/04/2016	72	8	SPT(c)
									N=7					
	4.00				1,1	150	1,0,1,1		1,1/1,1,1	AR1323	13/04/2016	72	4	SPT(c)
									N=3					
	5.00				1,1	150	1,1,2,3		1,1/1,1,2,3	AR1323	13/04/2016	72	8	SPT(c)
									N=7					

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH06	8.00				2,3	150	3,2,3,3		2,3/3,2,3,3	AR1323	13/04/2016	72	13	
									N=11					
	11.50				3,3	150	4,5,4,6		3,3/4,5,4,6	AR1323	13/04/2016	72	23	
									N=19					
	15.00				4,5	150	5,4,5,6		4,5/5,4,5,6	AR1323	13/04/2016	72	24	
									N=20					
	18.00				5,5	150	7,8,9,10		5,5/7,8,9,10	AR1323	13/04/2016	72	41	
									N=34					
	24.00				5,6	150	7,6,7,9		5,6/7,6,7,9	AR1323	13/04/2016	72	35	
									N=29					
	28.50				8,10	150	11,12,15,12+	285	8,10/11,12,15,12	AR1323	13/04/2016	72	64	
									for 60mm					
									N=53*					
	29.00				15,10	100	50+	50	15,10/50	AR1323	13/04/2016	72	360	SPT(c)
									for 50mm					
									N=300*					
	30.00				25	50	50	75	25/50	AR1323	13/04/2016	72	240	
									for 75mm					

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
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Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=200*					
	31.50				15,10	100	50+	50	15,10/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					
	33.00				25	75	50	75	25/50	AR1323	13/04/2016	72	240	
									for 75mm					
									N=200*					
	34.50				25	75	50+	50	25/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					
	36.00				15,10	100	50	75	15,10/50	AR1323	13/04/2016	72	240	SPT(c)
									for 75mm					
									N=200*					
	37.50				25	75	50	75	25/50	AR1323	13/04/2016	72	240	SPT(c)
									for 75mm					
									N=200*					
	39.50				15,10	110	50+	70	15,10/50	AR1323	13/04/2016	72	257	SPT(c)
									for 70mm					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
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4. **Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.**
5. **Entries in the water depth column reflects the measured water depth at time of test.**

N_{60} = (Measured hammer energy ratio / 60) x N value

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Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=214*					
BH07	1.20				3,4	150	4,5,4,6		3,4/4,5,4,6	AR1323	13/04/2016	72	23	SPT(c)
									N=19					
	2.00				3,3	150	5,4,5,6		3,3/5,4,5,6	AR1323	13/04/2016	72	24	SPT(c)
									N=20					
	3.00				5,5	150	6,7,9,10		5,5/6,7,9,10	AR1323	13/04/2016	72	38	SPT(c)
									N=32					
	4.00				1,2	150	2,1,2,3		1,2/2,1,2,3	AR1323	13/04/2016	72	10	SPT(c)
									N=8					
	5.00				0,1	150	0,0,1,0		0,1/,1	AR1323	13/04/2016	72	1	SPT(c)
									N=1					
	6.50				3,3	150	4,5,5,6		3,3/4,5,5,6	AR1323	13/04/2016	72	24	
									N=20					
	9.50				3,3	150	4,5,5,5		3,3/4,5,5,5	AR1323	13/04/2016	72	23	
									N=19					
BH08	1.40				3,3	150	4,5,5,4		3,3/4,5,5,4	AR1323	13/04/2016	72	22	SPT(c)
									N=18					
	2.00				1,1	150	1,0,1,1		1,1/1,1,1	AR1323	13/04/2016	72	4	SPT(c)

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
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Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=3					
	3.00				1,1	150	1,1,0,1		1,1/1,1,1	AR1323	13/04/2016	72	4	SPT(c)
									N=3					
	4.00				1,2	150	2,1,2,4		1,2/2,1,2,4	AR1323	13/04/2016	72	11	SPT(c)
									N=9					
	5.00				1,1	150	1,0,0,1		1,1/1,1	AR1323	13/04/2016	72	2	SPT(c)
									N=2					
	6.50				1,1	150	1,1,0,0		1,1/1,1	AR1323	13/04/2016	72	2	SPT(c)
									N=2					
	8.00				0,1	150	0,0,1,0		0,1/,1	AR1323	13/04/2016	72	1	SPT(c)
									N=1					
	9.50				4,4	150	6,7,7,7		4,4/6,7,7,7	AR1323	13/04/2016	72	32	SPT(c)
									N=27					
	11.00				1,2	150	2,1,2,1		1,2/2,1,2,1	AR1323	13/04/2016	72	7	
									N=6					
	14.00				3,4	150	4,6,6,7		3,4/4,6,6,7	AR1323	13/04/2016	72	28	SPT(c)
									N=23					
	15.50				4,5	150	6,5,6,7		4,5/6,5,6,7	AR1323	13/04/2016	72	29	SPT(c)

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
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Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=24					
	17.00				2,2	150	5,6,7,7		2,2/5,6,7,7	AR1323	13/04/2016	72	30	SPT(c)
									N=25					
	18.50				5,5	150	7,7,7,9		5,5/7,7,7,9	AR1323	13/04/2016	72	36	SPT(c)
									N=30					
	20.00				6,5	150	7,9,10,12		6,5/7,9,10,12	AR1323	13/04/2016	72	46	
									N=38					
	23.00				6,7	150	8,9,9,11		6,7/8,9,9,11	AR1323	13/04/2016	72	44	
									N=37					
	26.00				7,7	150	10,10,12,13		7,7/10,10,12,13	AR1323	13/04/2016	72	54	
									N=45					
	29.00				7,8	150	11,12,15,12+	285	7,8/11,12,15,12	AR1323	13/04/2016	72	64	
									for 60mm					
									N=53*					
	32.00				6,6	150	8,10,10,14		6,6/8,10,10,14	AR1323	13/04/2016	72	50	
									N=42					
	35.00				12,13	150	20,20,10+	170	12,13/20,20,10	AR1323	13/04/2016	72	106	
									for 20mm					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
2. **Reported blows are for 75mm penetration unless indicated "+".**
3. **Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.**
4. **Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.**
5. **Entries in the water depth column reflects the measured water depth at time of test.**

N_{60} = (Measured hammer energy ratio / 60) x N value

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Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=88*					
	36.50				10,11	150	50	75	10,11/50	AR1323	13/04/2016	72	240	
									for 75mm					
									N=200*					
	38.00				25	75	50+	50	25/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					
	39.50				15,10	100	50	75	15,10/50	AR1323	13/04/2016	72	240	
									for 75mm					
									N=200*					
BH09	1.20				2,2	150	2,3,3,4		2,2/2,3,3,4	AR1323	13/04/2016	72	14	SPT(c)
									N=12					
	2.00				1,1	150	1,0,1,1		1,1/1,1,1	AR1323	13/04/2016	72	4	SPT(c)
									N=3					
	3.00				1,1	150	1,0,0,1		1,1/1,1	AR1323	13/04/2016	72	2	SPT(c)
									N=2					
	4.00				1,1	150	1,1,2,1		1,1/1,1,2,1	AR1323	13/04/2016	72	6	SPT(c)
									N=5					

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH09	5.00				1,0	150	0,0,0,1		1/,1	AR1323	13/04/2016	72	1	SPT(c)
									N=1					
	6.50				6,6	150	7,10,12,12		6,6/7,10,12,12	AR1323	13/04/2016	72	49	SPT(c)
									N=41					
	8.00				2,3	150	3,4,5,4		2,3/3,4,5,4	AR1323	13/04/2016	72	19	SPT(c)
									N=16					
	9.50				3,4	150	4,5,7,8		3,4/4,5,7,8	AR1323	13/04/2016	72	29	SPT(c)
									N=24					
	11.00				3,3	150	4,5,5,5		3,3/4,5,5,5	AR1323	13/04/2016	72	23	SPT(c)
									N=19					
	12.50				3,3	150	4,5,6,4		3,3/4,5,6,4	AR1323	13/04/2016	72	23	SPT(c)
									N=19					
	14.00				3,4	150	5,6,7,7		3,4/5,6,7,7	AR1323	13/04/2016	72	30	SPT(c)
									N=25					
	15.50				4,5	150	6,5,6,7		4,5/6,5,6,7	AR1323	13/04/2016	72	29	SPT(c)
									N=24					
	17.00				5,5	150	6,7,7,8		5,5/6,7,7,8	AR1323	13/04/2016	72	34	SPT(c)
									N=28					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH09	18.50				4,5	150	5,7,8,10		4,5/5,7,8,10	AR1323	13/04/2016	72	36	SPT(c)
									N=30					
	20.00				4,5	150	5,4,5,6		4,5/5,4,5,6	AR1323	13/04/2016	72	24	SPT(c)
									N=20					
	21.50				4,5	150	5,5,6,16		4,5/5,5,6,16	AR1323	13/04/2016	72	38	
									N=32					
	24.50				5,5	150	7,9,9,8		5,5/7,9,9,8	AR1323	13/04/2016	72	40	
									N=33					
	27.50				7,8	150	10,19,21+	208	7,8/10,19,21	AR1323	13/04/2016	72	60	
									N:50 for 208mm					
	29.00				10,10	150	17,24,9+	170	10,10/17,24,9	AR1323	13/04/2016	72	60	
									N:50 for 170mm					
	30.50				10,15	150	30,20+	125	10,15/30,20	AR1323	13/04/2016	72	60	
									N:50 for 125mm					
	32.00				10,11	150	17,24,9+	170	10,11/17,24,9	AR1323	13/04/2016	72	60	
									N:50 for 170mm					
	33.50				7,8	150	9,11,11,12		7,8/9,11,11,12	AR1323	13/04/2016	72	52	SPT(c)
									N=43					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
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Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH09	35.00				10,15	100	50+	70	10,15/50	AR1323	13/04/2016	72	257	
									for 70mm					
									N=214*					
	36.50				25	50	35,15+	100	25/35,15	AR1323	13/04/2016	72	60	
									N:50 for 100mm					
	38.00				25	50	50+	50	25/50	AR1323	13/04/2016	72	60	
									N:50 for 50mm					
	39.50				25	50	50	75	25/50	AR1323	13/04/2016	72	60	
									N:50 for 75mm					
BH10	1.20				3,3	150	4,4,5,5		3,3/4,4,5,5	AR1323	13/04/2016	72	22	SPT(c)
									N=18					
	2.01				1,0	150	0,0,0,0		1/	AR1323	13/04/2016	72	0	SPT(c)
									N=0					
	3.00				1,2	150	2,3,2,4		1,2/2,3,2,4	AR1323	13/04/2016	72	13	SPT(c)
									N=11					
	4.00				3,4	150	4,5,4,7		3,4/4,5,4,7	AR1323	13/04/2016	72	24	SPT(c)
									N=20					
	5.00				1,1	150	2,3,2,2		1,1/2,3,2,2	AR1323	13/04/2016	72	11	SPT(c)

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
2. **Reported blows are for 75mm penetration unless indicated "+".**
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Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=9					
	6.50				1,1	150	1,0,1,0		1,1/1,1	AR1323	13/04/2016	72	2	SPT(c)
									N=2					
	8.00				3,3	150	4,4,4,5		3,3/4,4,4,5	AR1323	13/04/2016	72	20	
									N=17					
	11.00				3,3	150	4,4,4,5		3,3/4,4,4,5	AR1323	13/04/2016	72	20	
									N=17					
	14.00				5,5	150	7,8,8,10		5,5/7,8,8,10	AR1323	13/04/2016	72	40	
									N=33					
	17.00				5,6	150	7,6,7,9		5,6/7,6,7,9	AR1323	13/04/2016	72	35	
									N=29					
	20.00				7,7	150	9,10,10,12		7,7/9,10,10,12	AR1323	13/04/2016	72	49	
									N=41					
	23.00				6,7	150	7,9,9,11		6,7/7,9,9,11	AR1323	13/04/2016	72	43	
									N=36					
	26.00				4,5	150	8,9,11,13		4,5/8,9,11,13	AR1323	13/04/2016	72	49	
									N=41					
	29.00				7,8	150	9,10,12,14		7,8/9,10,12,14	AR1323	13/04/2016	72	54	

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
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Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=45					
	30.50				7,8	150	11,12,15,12+	295	7,8/11,12,15,12	AR1323	13/04/2016	72	60	
									N:50 for 295mm					
	33.50				6,6	150	7,9,11,10		6,6/7,9,11,10	AR1323	13/04/2016	72	44	
									N=37					
	35.00				10,10	150	17,20,13+	183	10,10/17,20,13	AR1323	13/04/2016	72	60	
									N:50 for 183mm					
	36.50				12,13	150	50	75	12,13/50	AR1323	13/04/2016	72	60	
									N:50 for 75mm					
	38.00				10,13	150	28,22+	126	10,13/28,22	AR1323	13/04/2016	72	60	
									N:50 for 126mm					
	39.50				10,15	150	20,12,15,3+	240	10,15/20,12,15,3	AR1323	13/04/2016	72	60	
									N:50 for 240mm					
BH16	3.50				1,1	150	1,0,1,1		1,1/1,1,1	AR1323	13/04/2016	72	4	SPT(c)
									N=3					
	4.00				3,4	150	4,5,5,6		3,4/4,5,5,6	AR1323	13/04/2016	72	24	SPT(c)
									N=20					
	5.00				2,1	150	2,3,3,4		2,1/2,3,3,4	AR1323	13/04/2016	72	14	

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
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Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=12					
	8.00				2,2	150	3,4,4,5		2,2/3,4,4,5	AR1323	13/04/2016	72	19	
									N=16					
	11.00				3,3	150	4,5,5,5		3,3/4,5,5,5	AR1323	13/04/2016	72	23	
									N=19					
	14.00				3,4	150	7,5,7,8		3,4/7,5,7,8	AR1323	13/04/2016	72	32	
									N=27					
	17.00				6,6	150	8,9,9,10		6,6/8,9,9,10	AR1323	13/04/2016	72	43	
									N=36					
	20.00				6,6	150	7,7,8,9		6,6/7,7,8,9	AR1323	13/04/2016	72	37	
									N=31					
	21.50				6,6	150	8,8,10,10		6,6/8,8,10,10	AR1323	13/04/2016	72	43	
									N=36					
	24.50				10,10	150	26,24+	127	10,10/26,24	AR1323	13/04/2016	72	142	
									for 52mm					
									N=118*					
	27.50				12,13	150	25,25+	125	12,13/25,25	AR1323	13/04/2016	72	144	
									for 50mm					

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
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Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=120*					
	30.50				12,13	150	35,15+	90	12,13/35,15	AR1323	13/04/2016	72	200	
									for 15mm					
									N=167*					
	32.00				25	75	50+	50	25/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					
	33.50				25	75	50+	50	25/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					
	35.00				12,12	150	35,15+	100	12,12/35,15	AR1323	13/04/2016	72	180	
									for 25mm					
									N=150*					
	36.50				10,11	150	28,22+	122	10,11/28,22	AR1323	13/04/2016	72	148	
									for 47mm					
									N=123*					
	38.00				25	75	50+	50	25/50	AR1323	13/04/2016	72	360	
									for 50mm					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=300*					
	39.50				25	75	50+	50	25/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					
BH17	3.00				2,2	150	3,4,4,5		2,2/3,4,4,5	AR1323	13/04/2016	72	19	
									N=16					
	5.00				2,3	150	4,4,5,5		2,3/4,4,5,5	AR1323	13/04/2016	72	22	
									N=18					
	8.00				3,3	150	4,4,5,7		3,3/4,4,5,7	AR1323	13/04/2016	72	24	
									N=20					
	11.00				3,4	150	4,5,5,6		3,4/4,5,5,6	AR1323	13/04/2016	72	24	
									N=20					
	14.00				5,5	150	7,7,8,10		5,5/7,7,8,10	AR1323	13/04/2016	72	38	
									N=32					
	17.00				5,5	150	7,9,9,11		5,5/7,9,9,11	AR1323	13/04/2016	72	43	
									N=36					
	20.00				5,5	150	7,6,6,8		5,5/7,6,6,8	AR1323	13/04/2016	72	32	
									N=27					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH17	23.00				7,8	150	10,12,14,14+	286	7,8/10,12,14,14	AR1323	13/04/2016	72	62	
									for 61mm					
									N=52*					
	26.00				10,10	150	15,35	150	10,10/15,35	AR1323	13/04/2016	72	120	
									for 75mm					
									N=100*					
	29.00				25	75	50	75	25/50	AR1323	13/04/2016	72	240	SPT(c)
									for 75mm					
									N=200*					
	30.50				25	75	50+	50	25/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					
	32.00				15,10	100	50+	70	15,10/50	AR1323	13/04/2016	72	257	
									for 70mm					
									N=214*					
	33.50				25	50	50	75	25/50	AR1323	13/04/2016	72	240	
									for 75mm					
									N=200*					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
2. **Reported blows are for 75mm penetration unless indicated "+".**
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4. **Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.**
5. **Entries in the water depth column reflects the measured water depth at time of test.**

N_{60} = (Measured hammer energy ratio / 60) x N value

RSK Environment Ltd
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Hertfordshire
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Compiled By		Date	Contract Ref:
	**CBAKER**	**19.01.17**	**28549**

Contract: **Mount Pleasant Sorting Office**

AGS

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH17	35.00				15,10	100	50	75	15,10/50	AR1323	13/04/2016	72	240	
									for 75mm					
									N=200*					
	36.50				25	50	50+	50	25/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					
	38.00				25	50	50+	50	25/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					
	39.50				25	60	50+	60	25/50	AR1323	13/04/2016	72	300	
									for 60mm					
									N=250*					
BH18	2.00				3,4	150	5,6,7,6		3,4/5,6,7,6	AR1323	13/04/2016	72	29	SPT(c)
									N=24					
	3.00				1,2	150	2,2,1,2		1,2/2,2,1,2	AR1323	13/04/2016	72	8	SPT(c)
									N=7					
	4.00				1,1	150	1,0,1,0		1,1/1,1	AR1323	13/04/2016	72	2	SPT(c)
									N=2					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
2. **Reported blows are for 75mm penetration unless indicated "+".**
3. **Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.**
4. **Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.**
5. **Entries in the water depth column reflects the measured water depth at time of test.**

N_{60} = (Measured hammer energy ratio / 60) x N value

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Compiled By		Date	Contract Ref:
	**CBAKER**	**19.01.17**	**28549**
Contract: **Mount Pleasant Sorting Office**			Page: **25** of **28**

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH18	5.00				1,0	150	0,0,1,0		1/,1	AR1323	13/04/2016	72	1	SPT(c)
									N=1					
	6.50				1,1	150	1,0,1,0		1,1/1,1	AR1323	13/04/2016	72	2	SPT(c)
									N=2					
	8.00				0,1	150	0,1,0,1		0,1/,1,1	AR1323	13/04/2016	72	2	SPT(c)
									N=2					
	9.50				0,1	150	0,0,0,0		0,1/	AR1323	13/04/2016	72	0	SPT(c)
									N=0					
	13.50				5,5	150	6,7,8,8		5,5/6,7,8,8	AR1323	13/04/2016	72	35	
									N=29					
	17.50				7,8	150	10,12,15,13+	290	7,8/10,12,15,13	AR1323	13/04/2016	72	62	
									for 65mm					
									N=52*					
	20.50				7,8	150	10,12,14,14+	295	7,8/10,12,14,14	AR1323	13/04/2016	72	61	
									for 70mm					
									N=51*					
	23.50				9,9	150	12,15,15,8+	255	9,9/12,15,15,8	AR1323	13/04/2016	72	71	
									for 30mm					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
2. **Reported blows are for 75mm penetration unless indicated "+".**
3. **Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.**
4. **Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.**
5. **Entries in the water depth column reflects the measured water depth at time of test.**

N_{60} = (Measured hammer energy ratio / 60) x N value

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Compiled By		Date	Contract Ref:
	**CBAKER**	**19.01.17**	**28549**
Contract: **Mount Pleasant Sorting Office**			Page: **26** of **28**

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=59*					
	29.00				12,13	150	50+	50	12,13/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					
	32.00				9,9	150	27,23+	128	9,9/27,23	AR1323	13/04/2016	72	140	
									for 53mm					
									N=117*					
	33.50				12,13	150	35,15+	100	12,13/35,15	AR1323	13/04/2016	72	180	
									for 25mm					
									N=150*					
	35.00				12,13	150	50	75	12,13/50	AR1323	13/04/2016	72	240	
									for 75mm					
									N=200*					
	36.50				10,11	150	50+	60	10,11/50	AR1323	13/04/2016	72	300	
									for 60mm					
									N=250*					
	38.00				15,10	100	50	75	15,10/50	AR1323	13/04/2016	72	240	
									for 75mm					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
2. **Reported blows are for 75mm penetration unless indicated "+".**
3. **Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.**
4. **Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.**
5. **Entries in the water depth column reflects the measured water depth at time of test.**

N_{60} = (Measured hammer energy ratio / 60) x N value

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Hertfordshire
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Compiled By		Date	Contract Ref:
	**CBAKER**	**19.01.17**	**28549**
Contract: **Mount Pleasant Sorting Office**			Page: **27** of **28**

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
									N=200*					
	39.50				15,10	100	50+	50	15,10/50	AR1323	13/04/2016	72	360	
									for 50mm					
									N=300*					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
2. **Reported blows are for 75mm penetration unless indicated "+".**
3. **Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.**
4. **Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.**
5. **Entries in the water depth column reflects the measured water depth at time of test.**

N_{60} = (Measured hammer energy ratio / 60) x N value

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Compiled By		Date	Contract Ref:
	CBAKER	**19.01.17**	**28549**

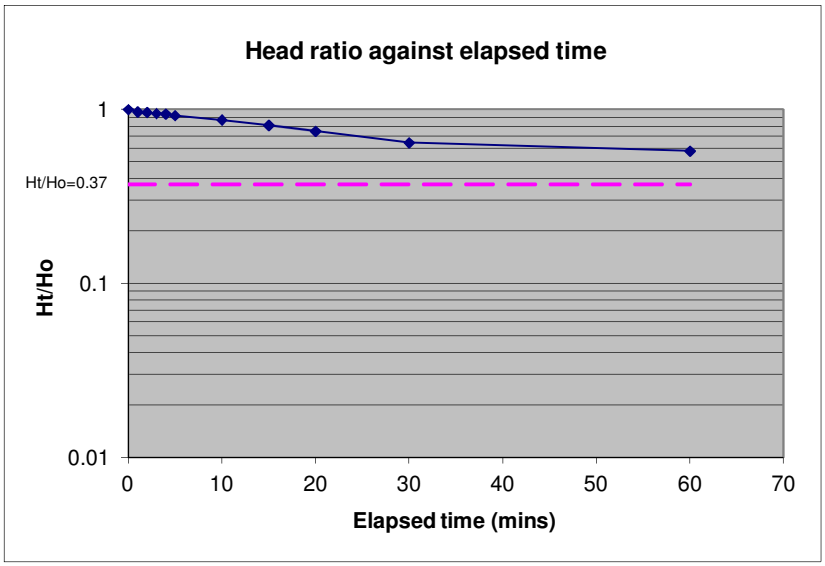
Contract: **Mount Pleasant Sorting Office**

Page: **28** of **28**

Project No: 28549
Date: 14-Dec-16
Site: Mount Pleasant

Variable Head Test In Monitoring Well: BH9
Type of test: Falling Head
Test number: 1

Time Elapsed (mins)	Depth at time t	Ht	Ht/Ho	Log Ht/Ho
0	0	-5.20	1	0
1	0.16	-5.04	0.969	-0.014
2	0.2	-5.00	0.962	-0.017
3	0.27	-4.93	0.948	-0.023
4	0.3	-4.90	0.942	-0.026
5	0.4	-4.80	0.923	-0.035
10	0.67	-4.53	0.871	-0.06
15	0.99	-4.21	0.81	-0.092
20	1.3	-3.90	0.75	-0.125
30	1.85	-3.35	0.644	-0.191
60	2.2	-3.00	0.577	-0.239
		-5.20	1	0
		-5.20	1	0
		-5.20	1	0
		-5.20	1	0
		-5.20	1	0
		-5.20	1	0
		-5.20	1	0
		-5.20	1	0
		-5.20	1	0
		-5.20	1	0



TEST PARAMETERS

Timelag calculated using slope of plot where:

T1 = 0.5 mins
T2 = 1.25 mins

Timelag (T), where Ht/Ho=0.37: 91.77 mins

Parameters	Calculated value	Comment on Result
Rest Water Level	5.20 m	
Ho=	-5.20 m	
Borehole Diameter (D)	0.25 m	
Shape Factor (F)	1.57	
Cross-sectional Area (A)	4.91E-02 m2	
Hydraulic Conductivity K=A/FT	= 5.7E-06 m/sec	

TEST CONDITIONS (at time of test)

Depth of borehole	7.50 m
Depth of casing	7.50 m

INTAKE FACTOR F

D (Diameter)	0.25 m
L*	0.01 m
L/D ratio=	4.0E-02

CROSS SECTIONAL AREA A

A assumed to use D for calculation in this test
A assumed to use well diameter for calculation in this test
Diameter of stand pipe (m)

Notes:

L* is assumed to be the length of the filter response zone. Where the response zone is not fully saturated prior to head test, then L is considered to represent the distance between the Rest Water Level and the base of the response zone. Where strata likely to exhibit marked differences in K exist then L may be further reduced to represent preferential flow via the more permeable stratum.

Where standpipes have a fully slotted section installed through the full extent of the filter, and/or where the change in water level in the pipe occurs fully within a slotted section, then the cross sectional area (A) is assumed to be the diameter of the borehole and the presence of the slotted standpipe is ignored. This is analogous to a test performed in a borehole.

Well or BH response zone extended in uniform soil	BS5930 case d : F=	1.57

Values of intake factors F as per BS5930, dependant upon test conditions correct equation and case description to be pasted in row above overwriting default

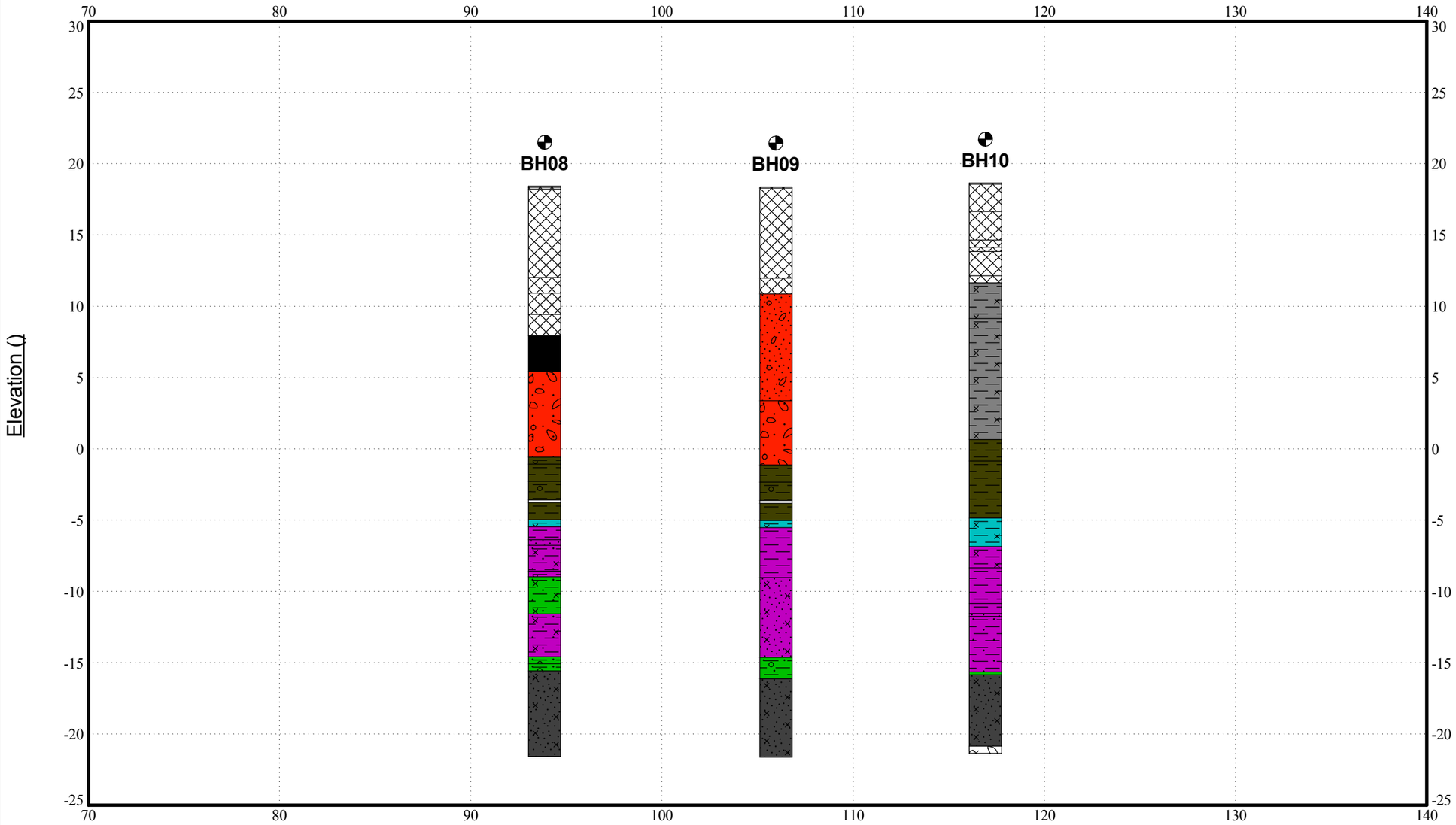
BS5930 Figure 7 used to determine F		Insert value directly next to F =
Soil flush with bottom at impervious boundary	BS5930 case a : F=	0.50
Soil flush with bottom in uniform soil	BS5930 case b : F=	0.69
Well or BH response zone extended at impervious boundary	BS5930 case c : F=	0.81
Well or BH response zone extended in uniform soil	BS5930 case d : F=	1.57
Soil in casing with base at impervious boundary	BS5930 case e : F=	0.60
Soil in casing with base in uniform soil	BS5930 case f : F=	0.83

Cross-sectional Area (A)

Calculation of cross sectional area A when D = diameter	4.91E-02
Calculation of cross sectional area A using pipe diameter	0.00E+00

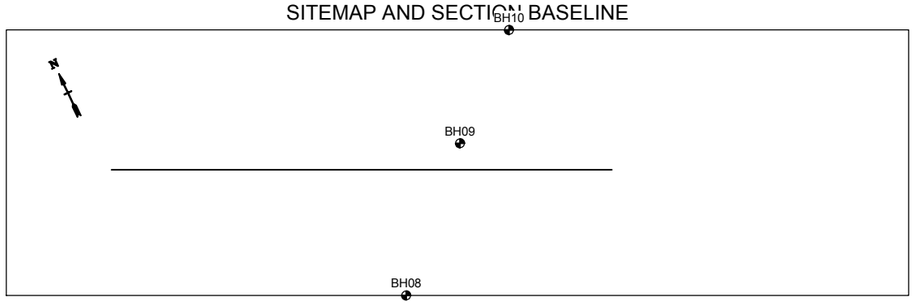
APPENDIX C
CROSS SECTIONS

SUBSURFACE SECTION DIAGRAM



Distance along the baseline (m)

SITEMAP AND SECTION BASELINE



MATERIAL LEGENDS

- CLAY
- Gravelly CLAY
- Gravelly SAND
- MADE GROUND
- Mudstone
- SAND
- Sandy CLAY
- Sandy silty CLAY
- Sandy GRAVEL
- Gravelly sandy CLAY
- Silty CLAY
- Silty GRAVEL
- Silty SAND

HOLE TYPE MARKER LEGENDS:

◓ = CP Boreholes

GEOLOGY COLUMN COLOUR CODES:

- Alluvium
- Hackney Gravel
- London Clay Formation
- Lambeth Group - Upper Mottled Beds
- Lambeth Group - Laminated Beds
- Lambeth Group - Lower Mottled Beds
- Lambeth Group - Upnor Formation
- Thanet Sand Formation
- White Chalk Subgroup

REV.	DATE	DESCRIPTION	BY	CHD.	APR.

Dimensions	Scale
m	Scale X = 1:241 Scale Y = 1:324

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

CLIENT:
Royal Mail Group Limited

PROJECT:
Mount Pleasant Sorting Office

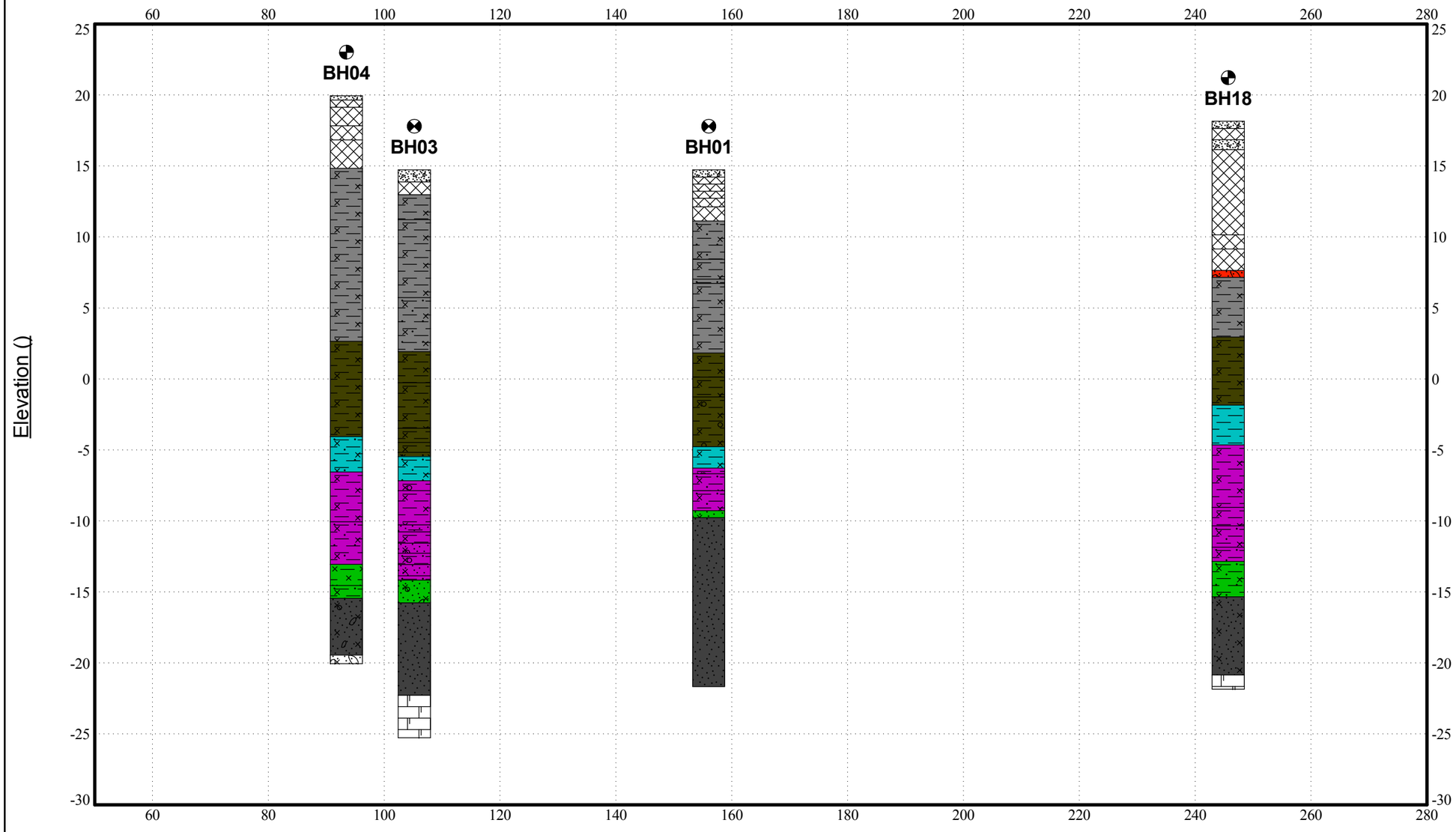
TITLE:
Calthorpe Site - Section 1

CONTRACT REF:	DRAWING REF:
28549	**of**

DRAWING STATUS:	FIGURE

DRAWING TRACK CODE: GINT_LIBRARY_V8_06.GLB : STANDARD : A3 : LANDSCAPE : ELEV : 28549_MOUNT PLEASANT.GPJ : 11/01/17 14:14 : CB1 :

SUBSURFACE SECTION DIAGRAM



Distance along the baseline (m)

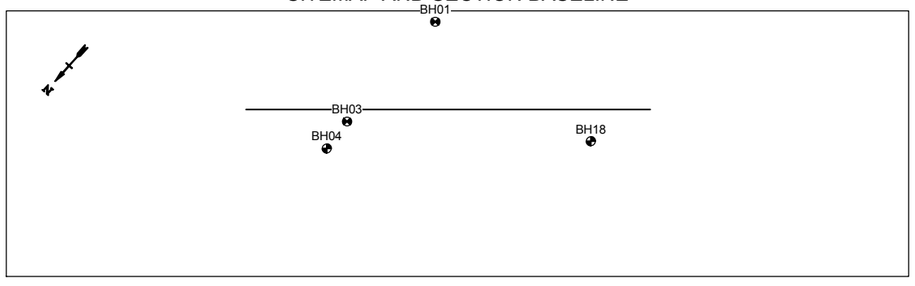
HOLE TYPE MARKER LEGENDS:

= CP Boreholes
= Rotary Boreholes

GEOLOGY COLUMN COLOUR CODES:

- Lambeth Group - Lower Mottled Beds - Sand Channel
- Hackney Gravel
- London Clay Formation
- Lambeth Group - Upper Mottled Beds
- Lambeth Group - Laminated Beds
- Lambeth Group - Lower Mottled Beds
- Lambeth Group - Upnor Formation
- Thanet Sand Formation
- White Chalk Subgroup

SITEMAP AND SECTION BASELINE



MATERIAL LEGENDS

CLAY	Clayey SAND	Gravelly silty CLAY	MADE GROUND
SAND	Sandy silty CLAY	Silty sandy CLAY	Sandy gravelly silty CLAY
Sandy clayey SILT	Clayey SILT	Silty CLAY	Gravelly silty SAND
Silty gravelly SAND	Silty SAND	Silty sandy GRAVEL	CONCRETE
CHALK			

REV.	DATE	DESCRIPTION	BY	CHD.	APR.

Dimensions	Scale
m	Scale X = 1:793 Scale Y = 1:324

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

CLIENT: **Royal Mail Group Limited**

PROJECT: **Mount Pleasant Sorting Office**

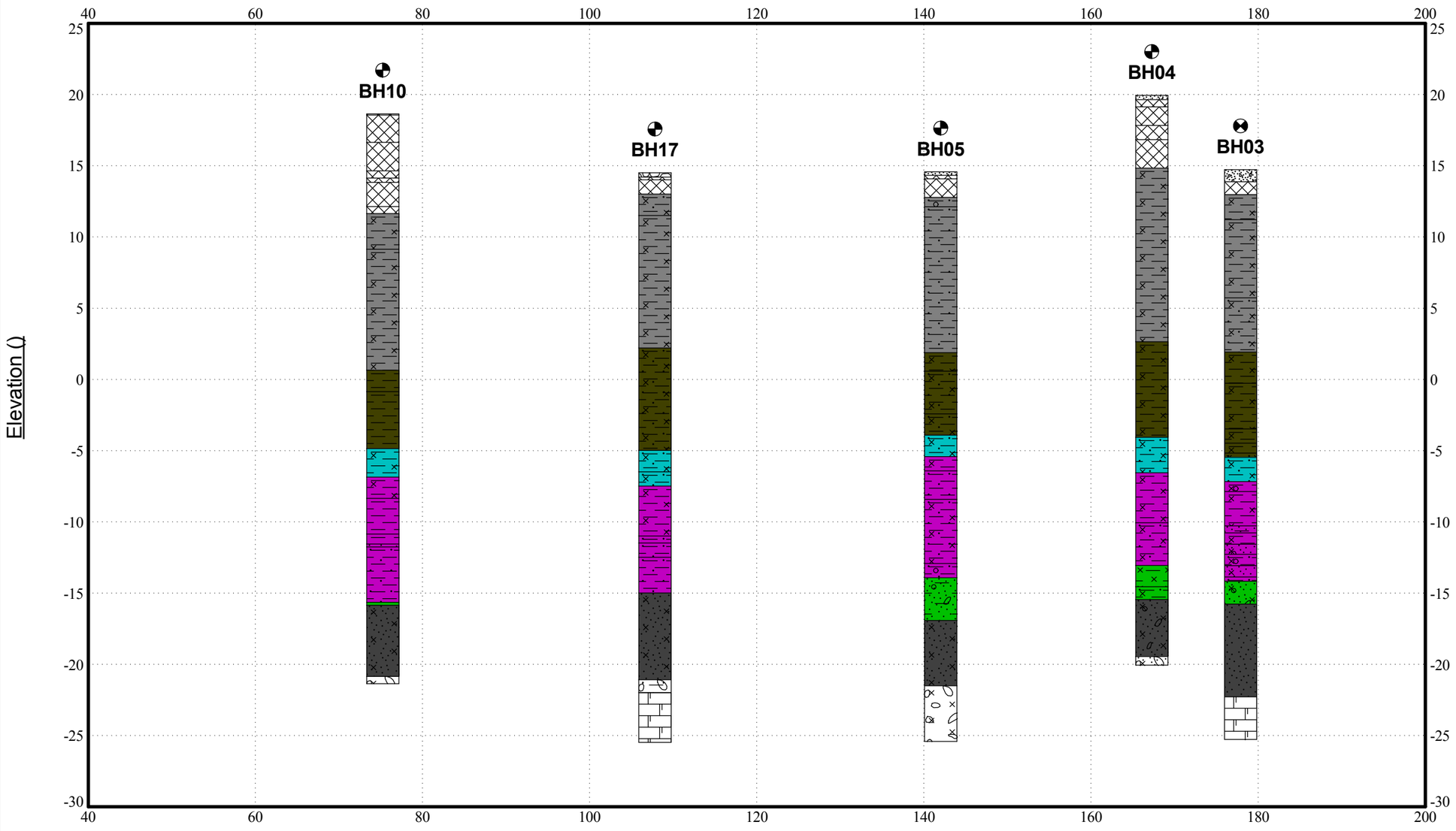
TITLE: **Calthorpe Site - Section 2**

CONTRACT REF:	DRAWING REF:
28549	of

DRAWING STATUS:	FIGURE

DRAWING TRACK CODE: GINT_LIBRARY_V8_06.GLB : STANDARD : A3 : LANDSCAPE : ELEV : 28549_MOUNT PLEASANT.GPJ : 11/01/17 14:37 : CB1 :

SUBSURFACE SECTION DIAGRAM



Distance along the baseline (m)

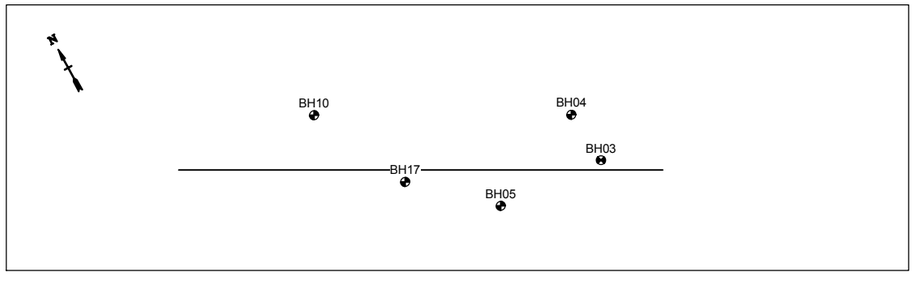
HOLE TYPE MARKER LEGENDS:

= CP Boreholes
= Rotary Boreholes

GEOLOGY COLUMN COLOUR CODES:

- Lambeth Group - Lower Mottled Beds - Sand Channel
- London Clay Formation
- Lambeth Group - Upper Mottled Beds
- Lambeth Group - Laminated Beds
- Lambeth Group - Lower Mottled Beds
- Lambeth Group - Upnor Formation
- Thanet Sand Formation
- White Chalk Subgroup

SITEMAP AND SECTION BASELINE



MATERIAL LEGENDS

CLAY	Gravelly clayey SAND	Concrete	Clayey SAND
Sandy clayey GRAVEL	Gravelly CLAY	Gravelly silty CLAY	MADE GROUND
SAND	Sandy CLAY	Sandy silty CLAY	Silty sandy CLAY
Sandy gravelly CLAY	Sandy gravelly silty CLAY	Sandy clayey SILT	Clayey SILT
Silty CLAY	Silty GRAVEL	Gravelly silty SAND	Silty gravelly SAND

REV.	DATE	DESCRIPTION	BY	CHD.	APR.

Dimensions	Scale
m	Scale X = 1:552 Scale Y = 1:324

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

CLIENT: **Royal Mail Group Limited**

PROJECT: **Mount Pleasant Sorting Office**

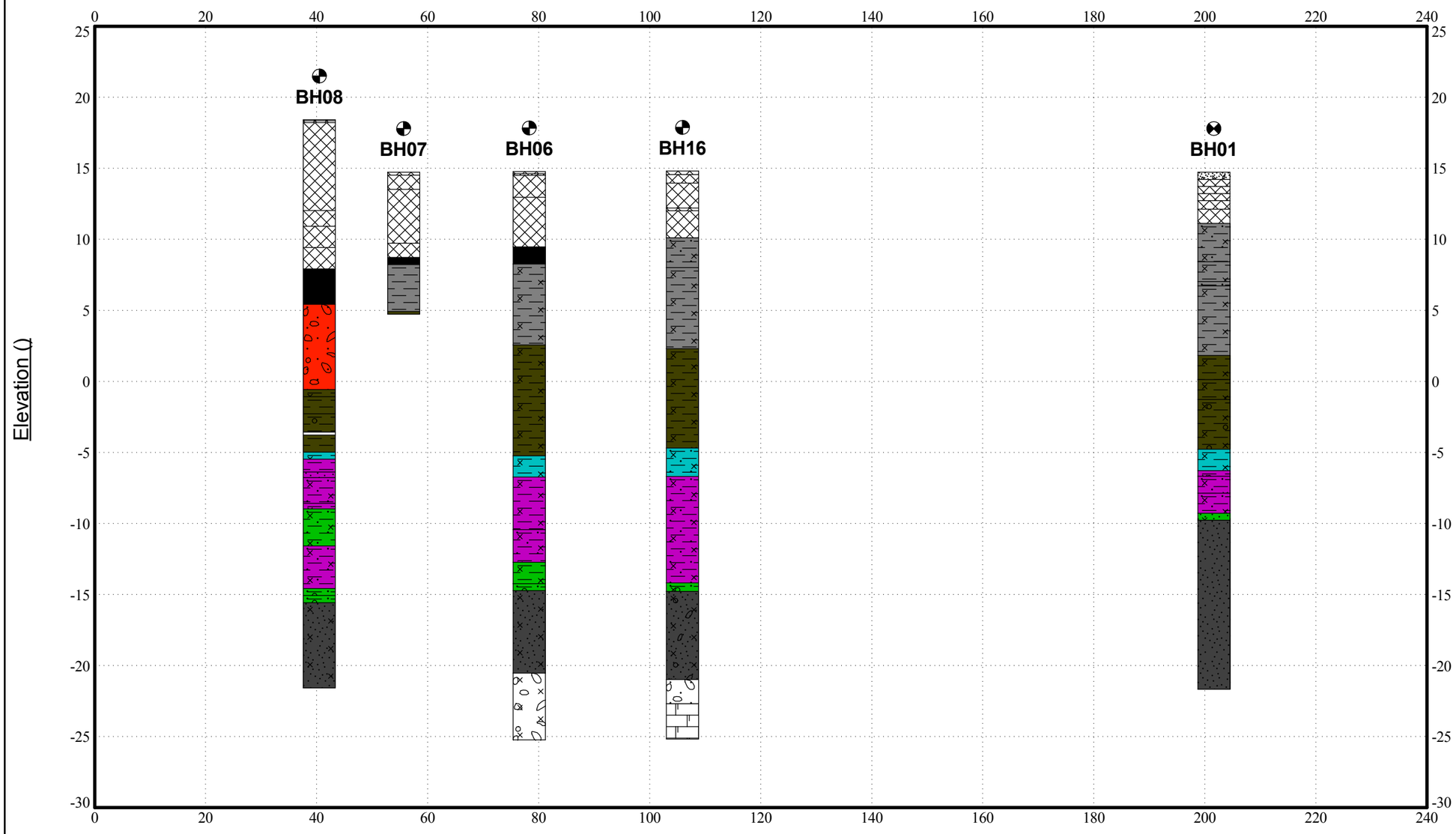
TITLE: **Calthorpe Site - Section 3**

CONTRACT REF:	DRAWING REF:
28549	of

DRAWING STATUS:	FIGURE

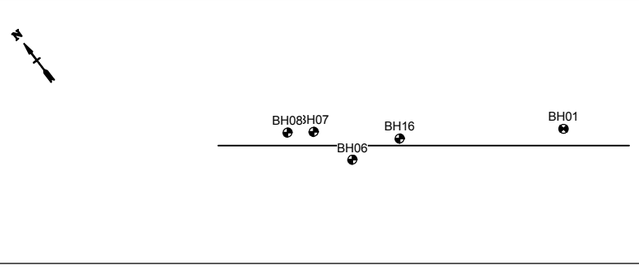
DRAWING TRACK CODE: GINT_LIBRARY_V8_06.GLB : STANDARD : A3 : LANDSCAPE : ELEV : 28549_MOUNT PLEASANT.GPJ : 11/01/17 14:48 : CB1 :

SUBSURFACE SECTION DIAGRAM



Distance along the baseline (m)

SITEMAP AND SECTION BASELINE



MATERIAL LEGENDS

- CLAY
- MADE GROUND
- Silty sandy CLAY
- Silty CLAY
- CONCRETE
- Chalk
- Mudstone
- Sandy GRAVEL
- Silty GRAVEL
- Gravelly CLAY
- SAND
- Gravelly sandy CLAY
- Silty gravelly SAND
- Gravelly silty CLAY
- Sandy silty CLAY
- Sandy gravelly silty CLAY
- Silty SAND

HOLE TYPE MARKER LEGENDS:

= CP Boreholes
= Rotary Boreholes

GEOLOGY COLUMN COLOUR CODES:

- Alluvium
- Hackney Gravel
- London Clay Formation
- Lambeth Group - Upper Mottled Beds
- Lambeth Group - Laminated Beds
- Lambeth Group - Lower Mottled Beds
- Lambeth Group - Upnor Formation
- Thanet Sand Formation
- White Chalk Subgroup

REV.	DATE	DESCRIPTION	BY	CHD.	APR.

Dimensions	Scale
m	Scale X = 1:828 Scale Y = 1:324

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

CLIENT:
Royal Mail Group Limited

PROJECT:
Mount Pleasant Sorting Office

TITLE:
Calthorpe Site - Section 4

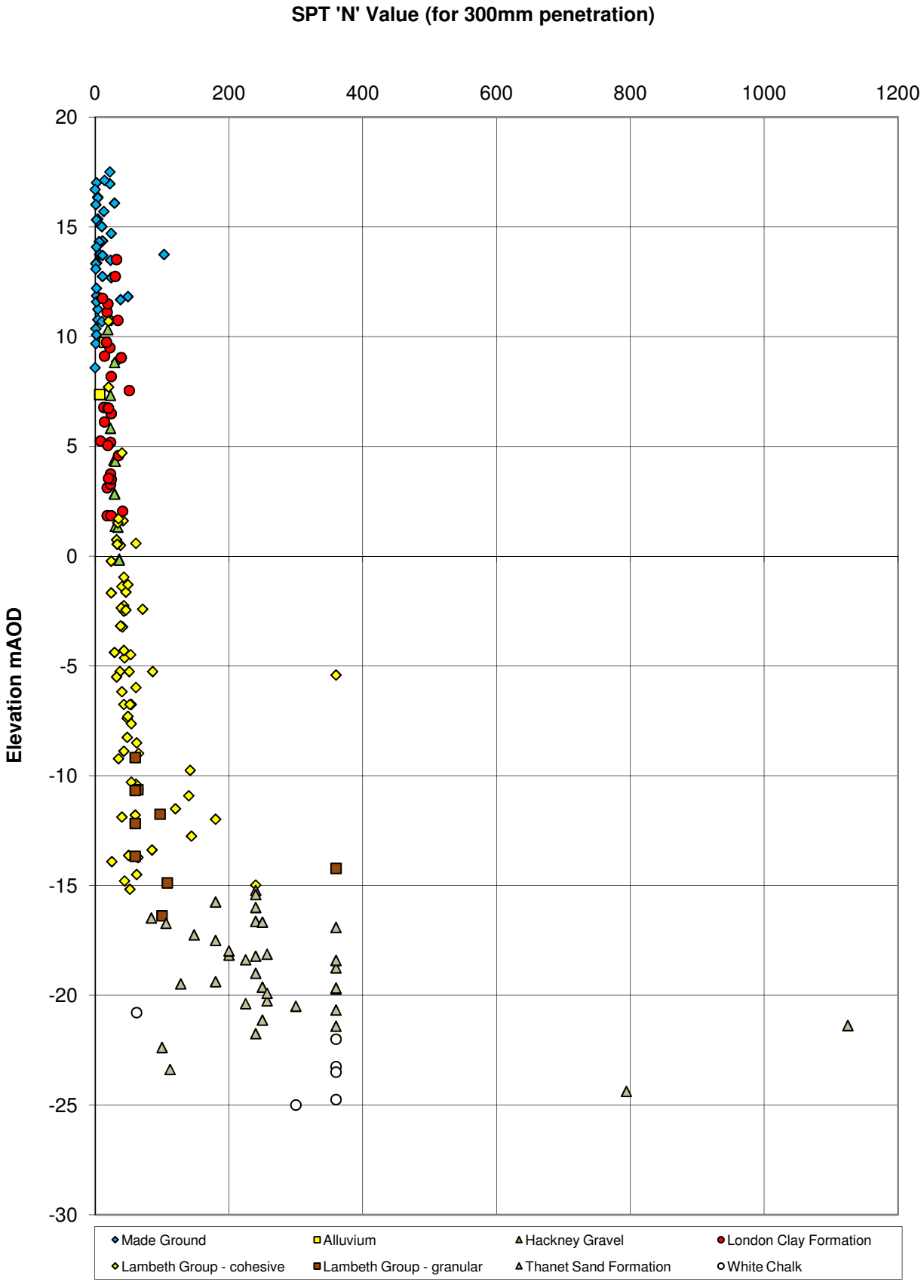
CONTRACT REF:	DRAWING REF:
28549	of

DRAWING STATUS:	FIGURE

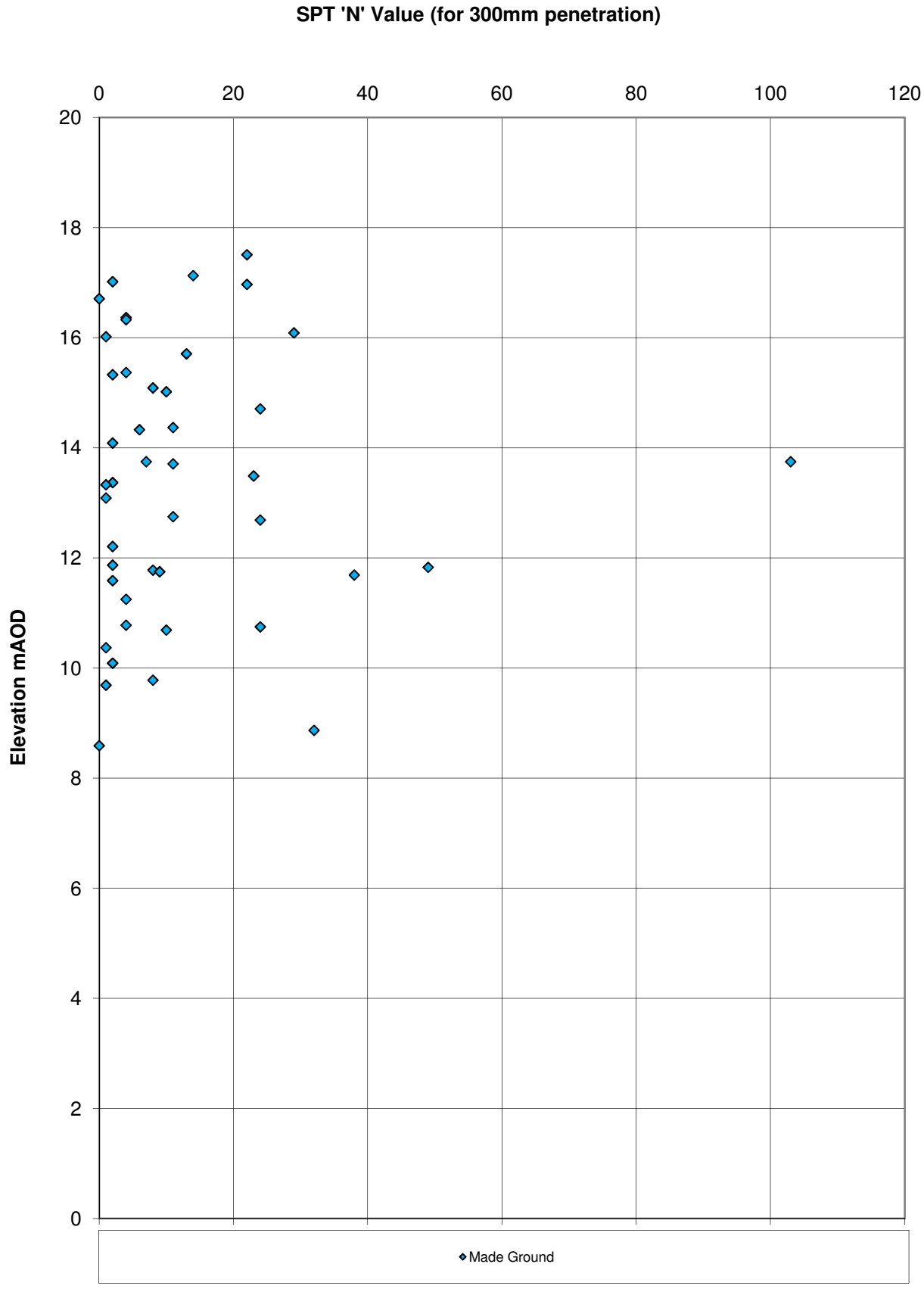
DRAWING TRACK CODE: GINT_LIBRARY_V8_06.GLB : STANDARD : A3 : LANDSCAPE : ELEV : 28549_MOUNT PLEASANT.GPJ : 11/01/17 14:59 : CB1 :

APPENDIX D
CHARACTERISTIC VALUES

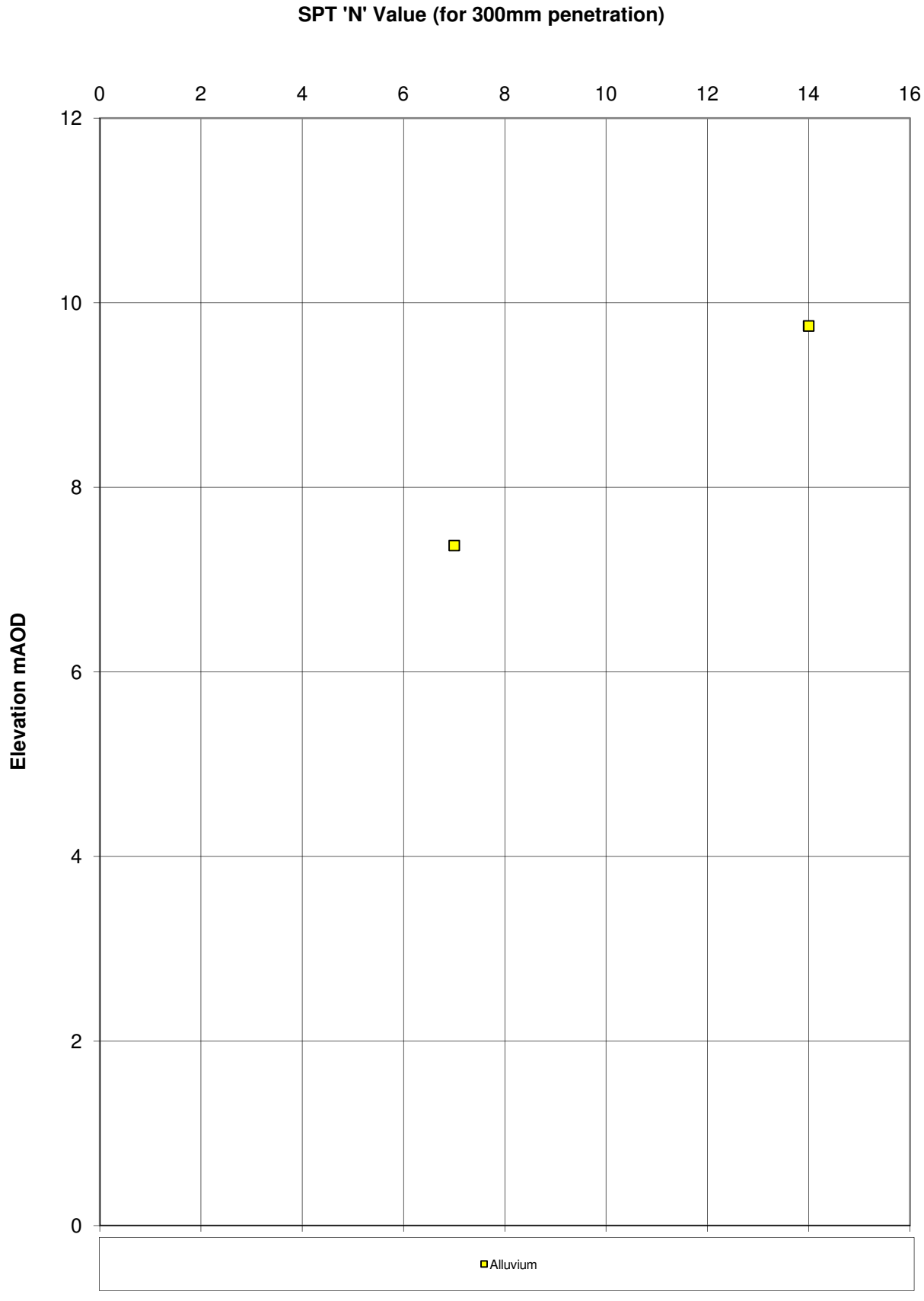
RSK	SPT 'N_{60}' VALUES vs ELEVATION CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Appendix	D.1



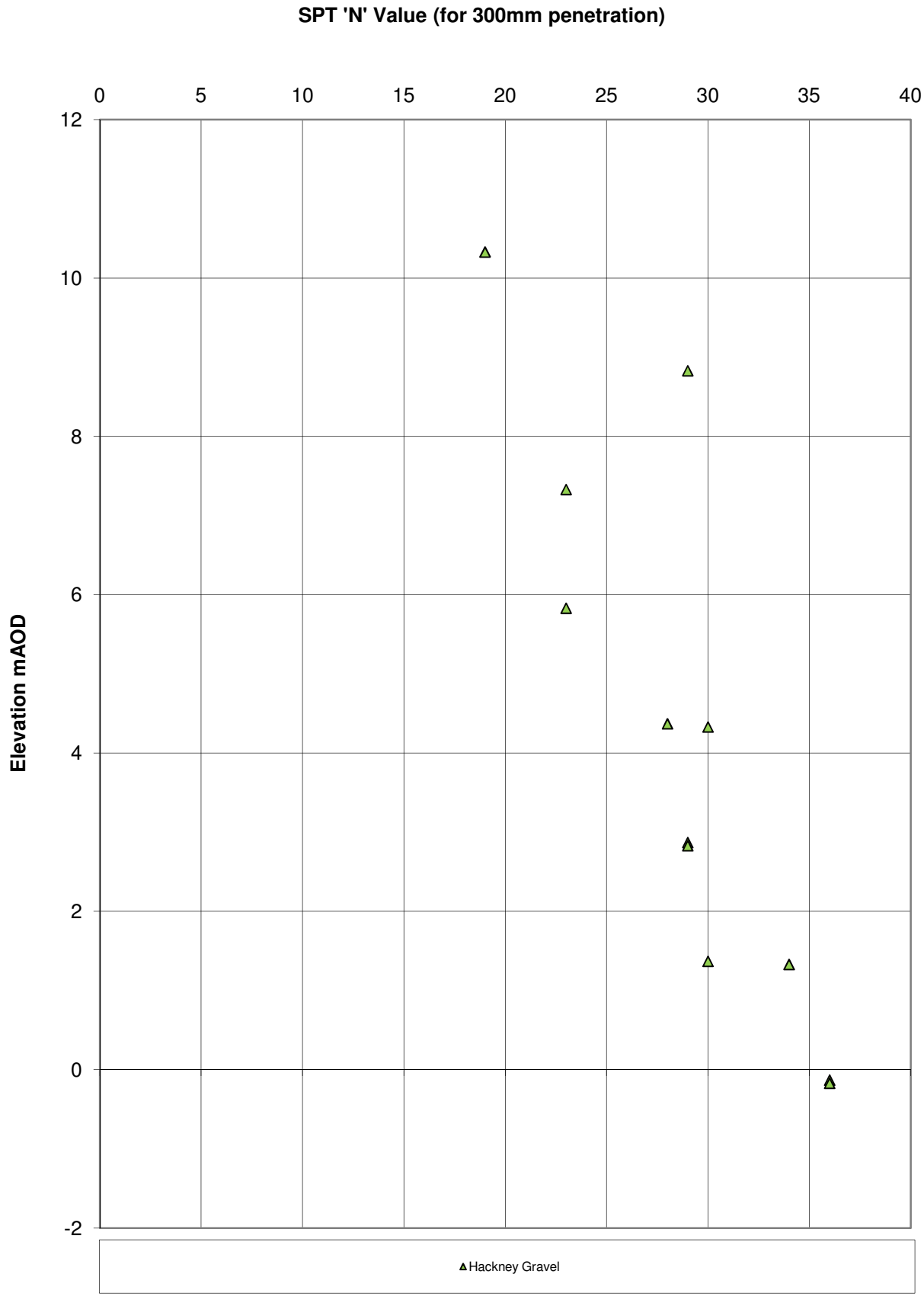
RSK	SPT 'N_{60}' VALUES vs ELEVATION (MADE GROUND) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Appendix	D.2



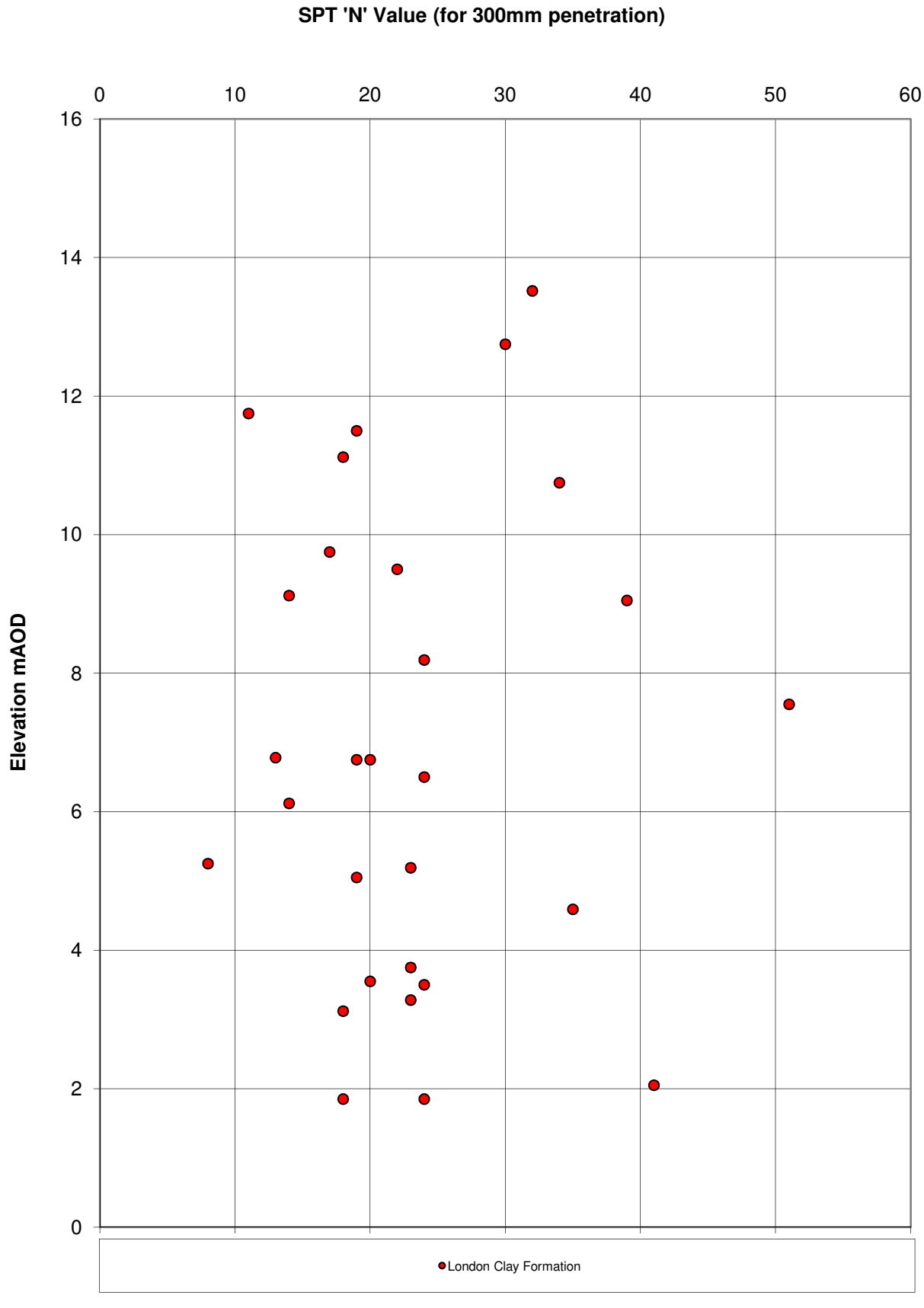
RSK	SPT 'N_{60}' VALUES vs ELEVATION (ALLUVIUM) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Appendix	D.3



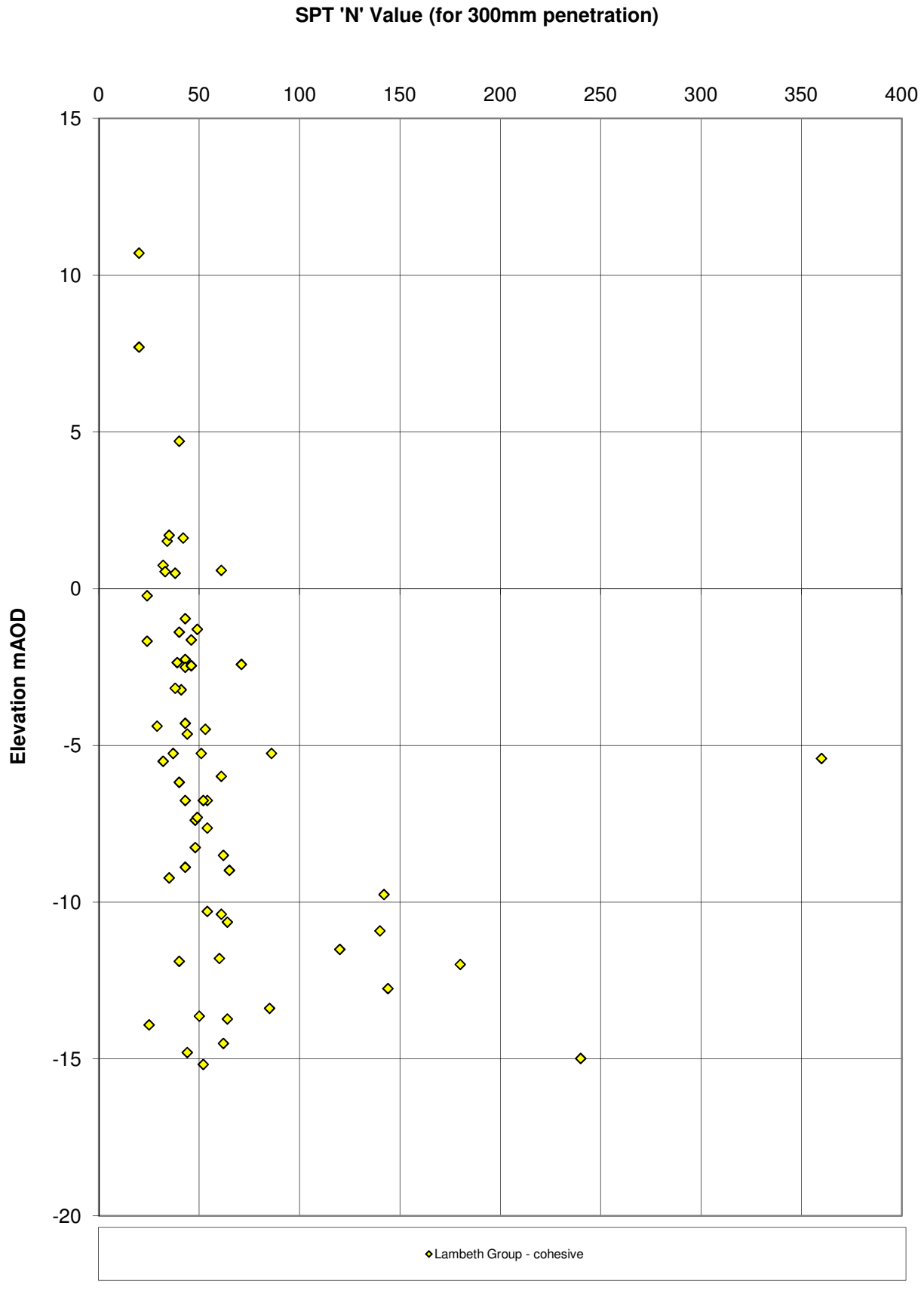
RSK	SPT 'N_{60}' VALUES vs ELEVATION (HACKNEY GRAVEL) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Appendix	D.4



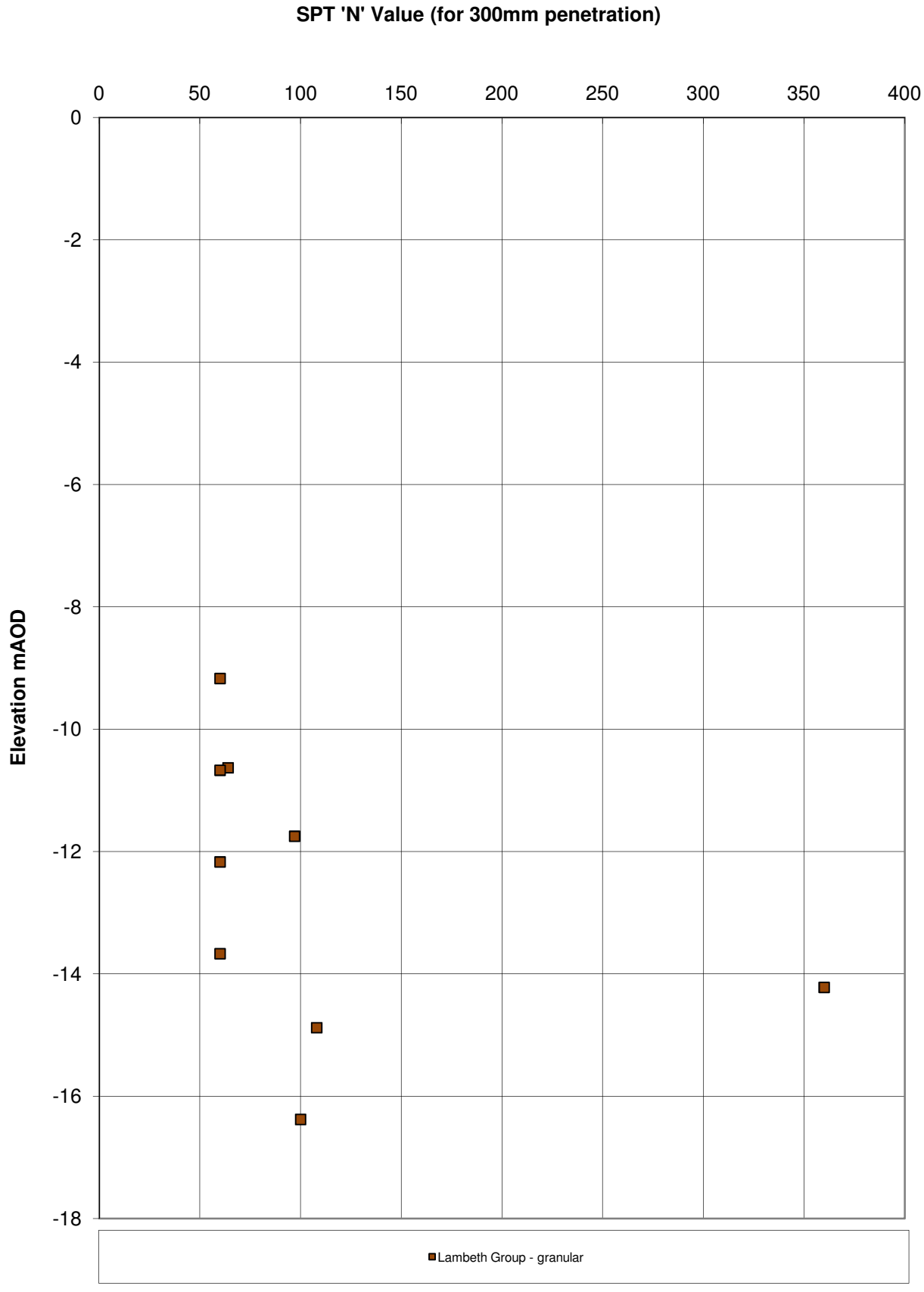
	SPT 'N_{60}' VALUES vs ELEVATION (LONDON CLAY FORMATION) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Appendix	D.5



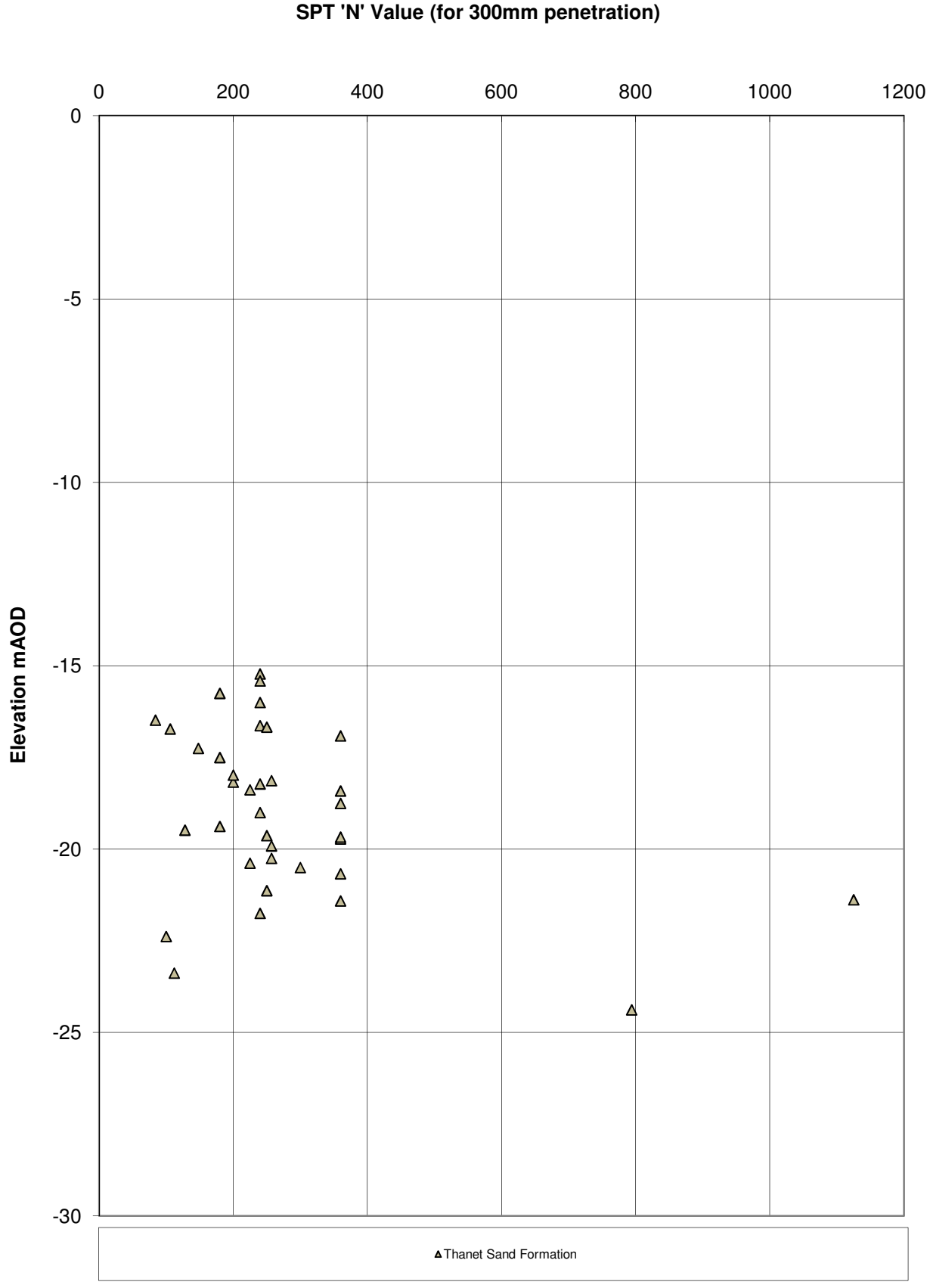
RSK	SPT 'N_{60}' VALUES vs ELEVATION (LAMBETH GROUP - COHESIVE) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Appendix	D.6



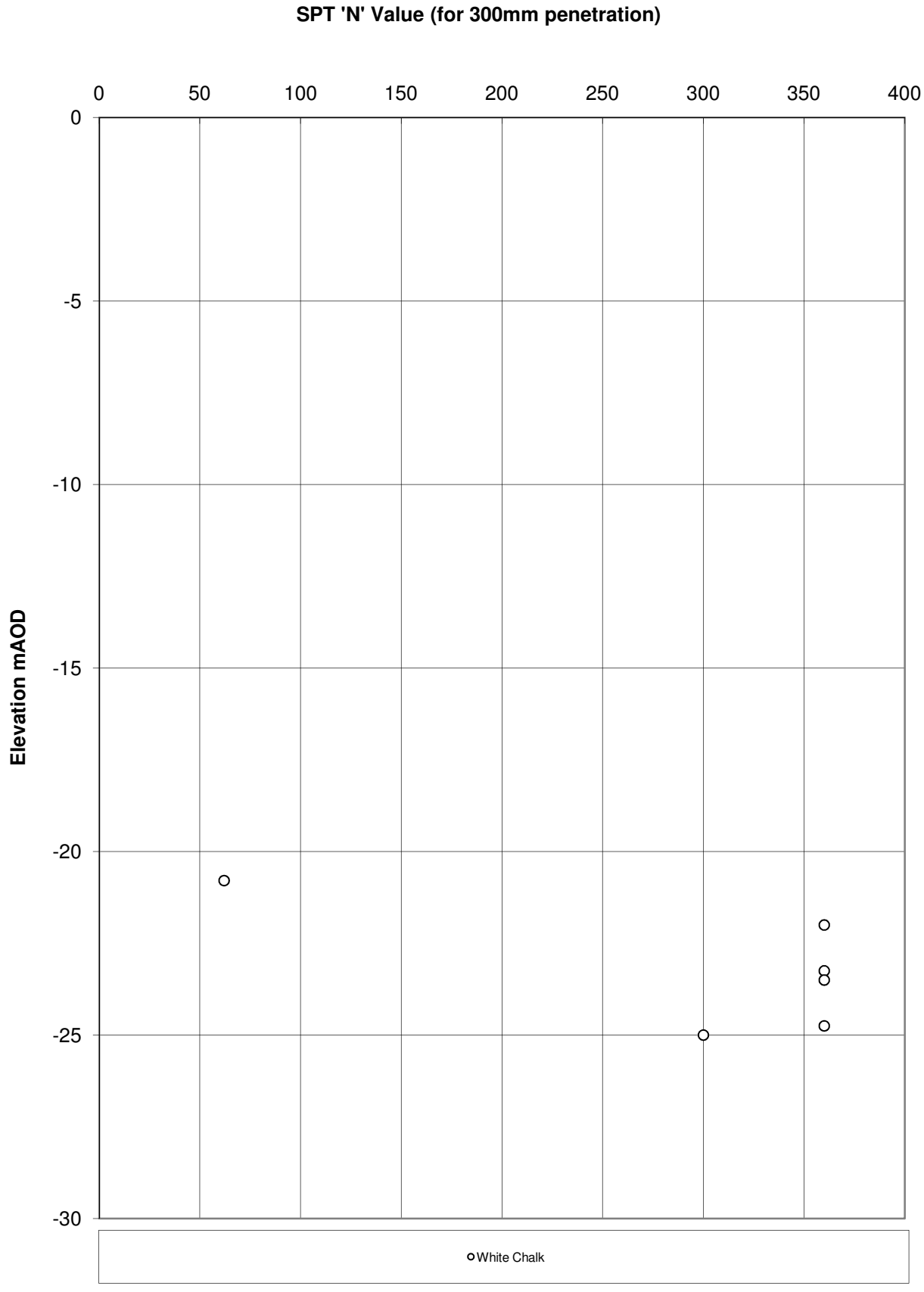
RSK	SPT 'N_{60}' VALUES vs ELEVATION (LAMBETH GROUP - GRANULAR)		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Appendix	D.7



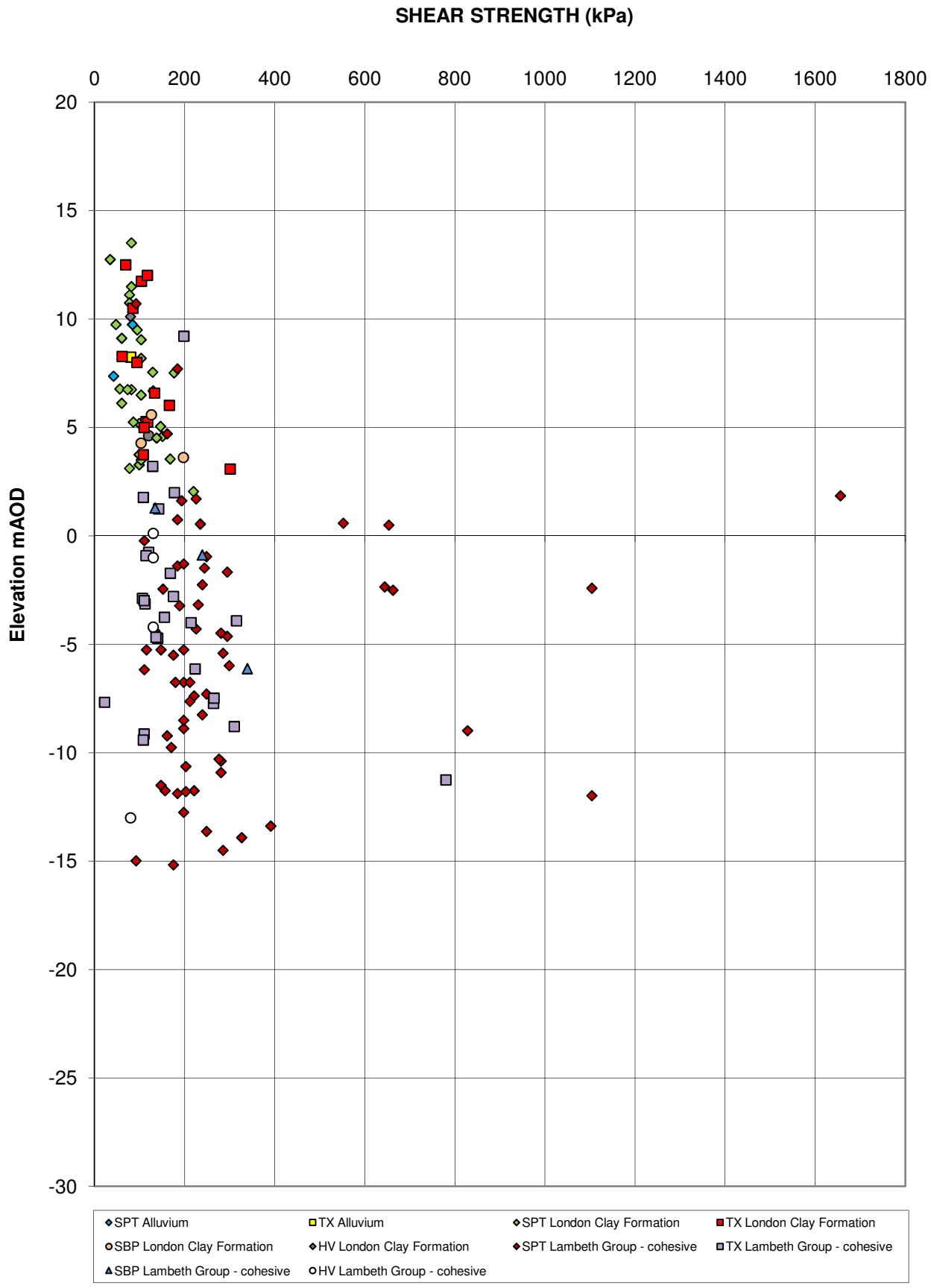
	SPT 'N_{60}' VALUES vs ELEVATION (THANET SAND FORMATION) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Appendix	D.8



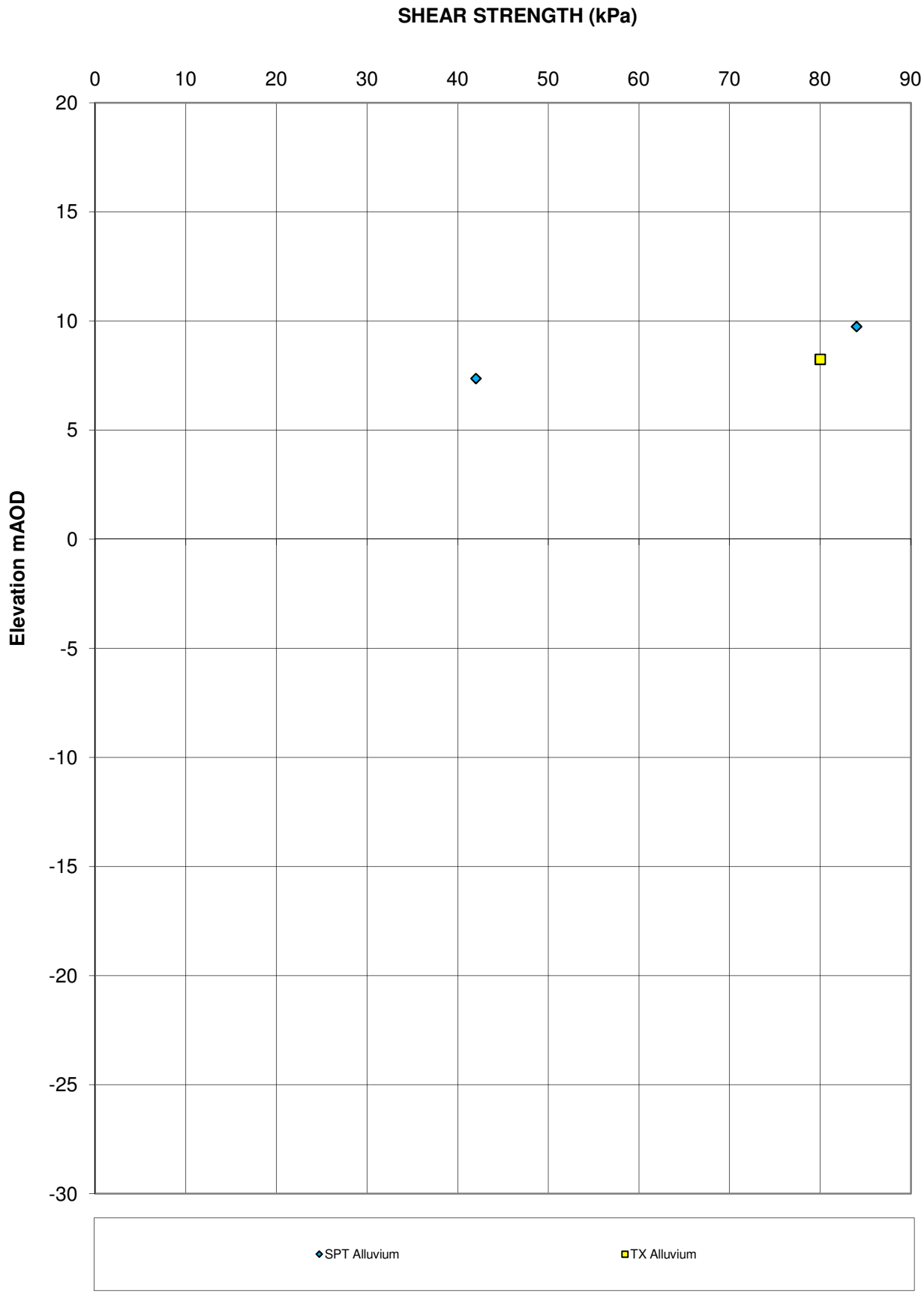
RSK	SPT 'N_{60}' VALUES vs ELEVATION (WHITE CHALK) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Appendix	D.9



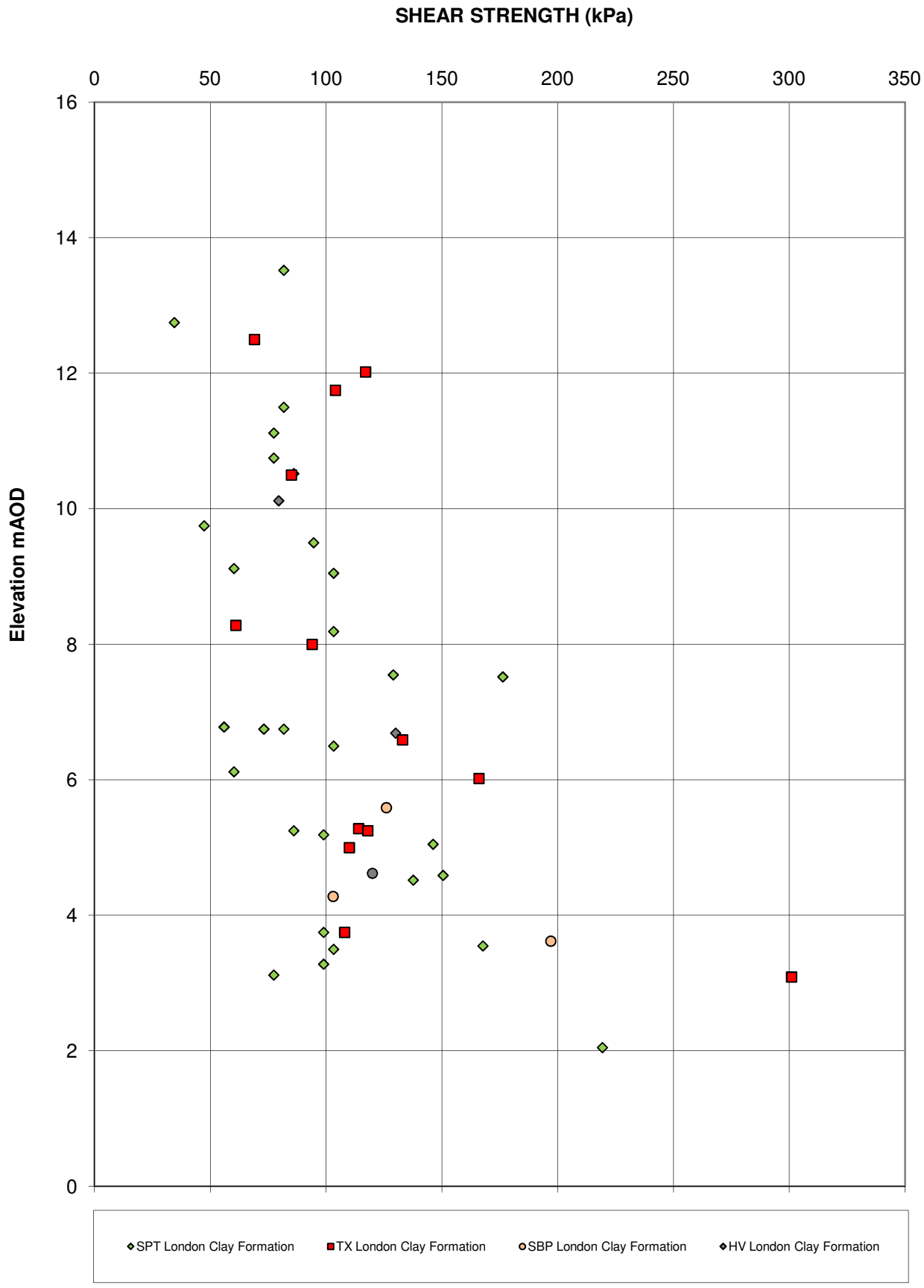
RSK	SHEAR STRENGTH vs ELEVATION CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:** **Figure:**	28549 D.10



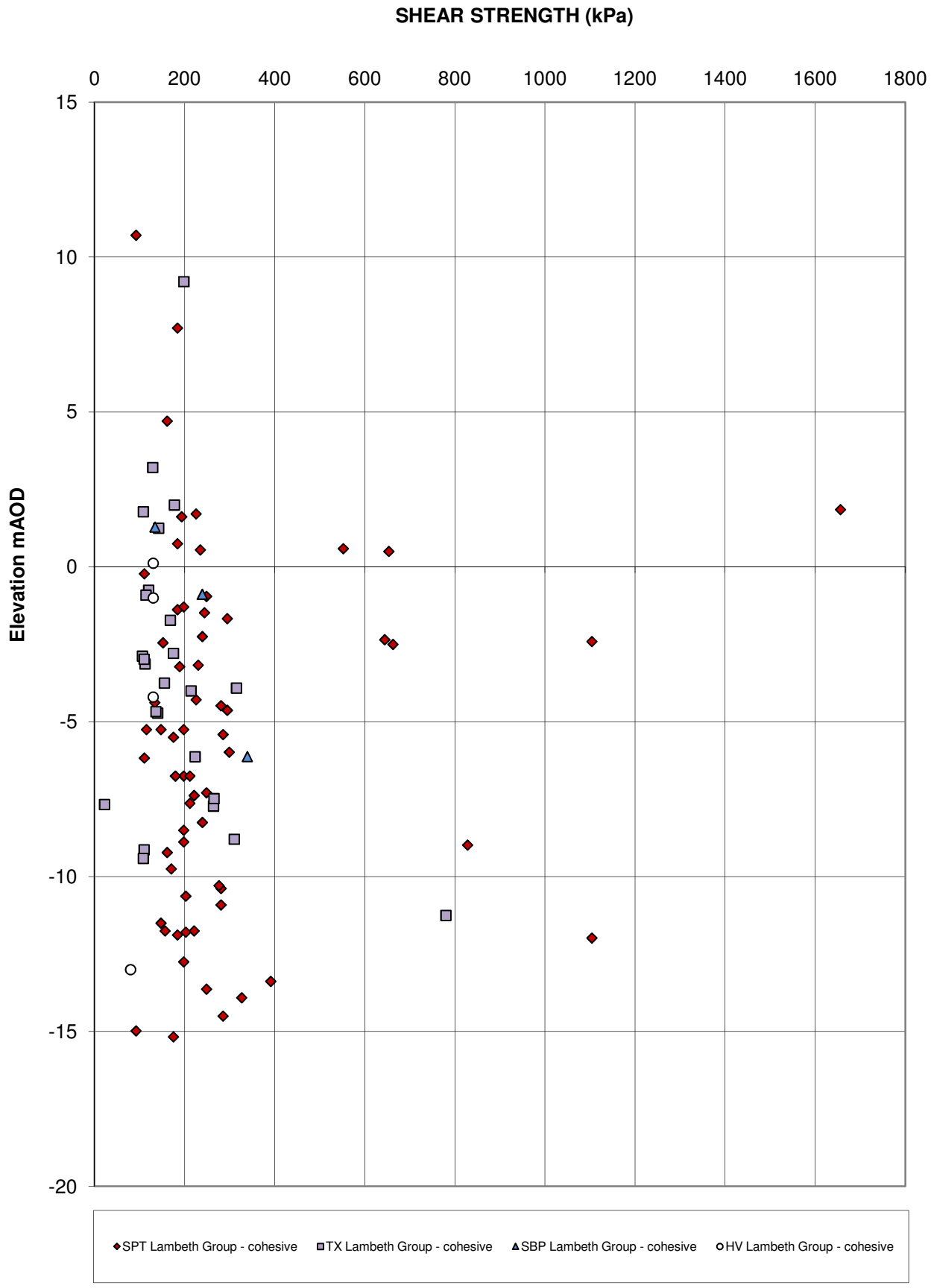
RSK	SHEAR STRENGTH vs ELEVATION (ALLUVIUM) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Figure:	D.11



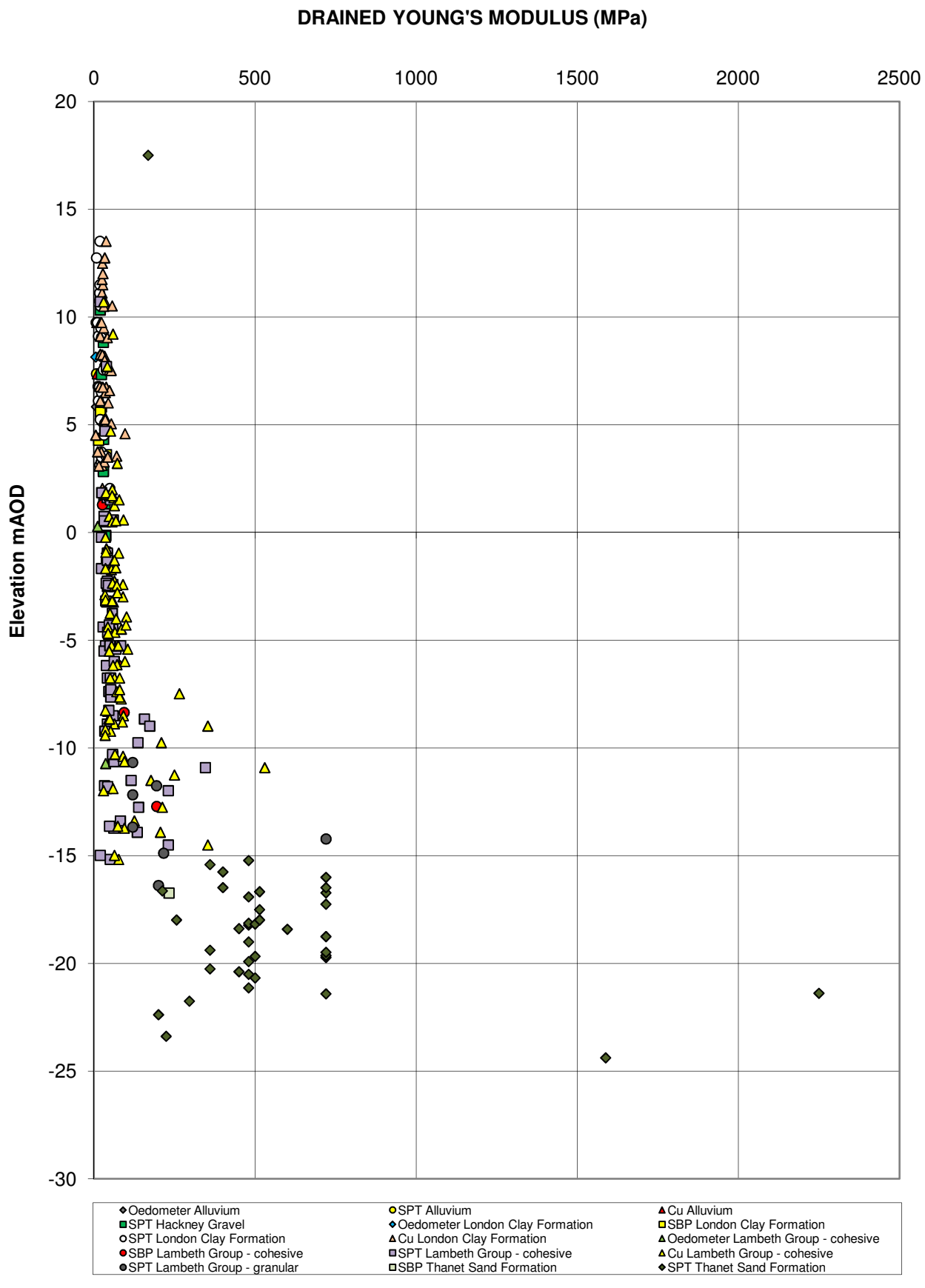
RSK	SHEAR STRENGTH vs ELEVATION (LONDON CLAY FORMATION) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Figure:	D.12



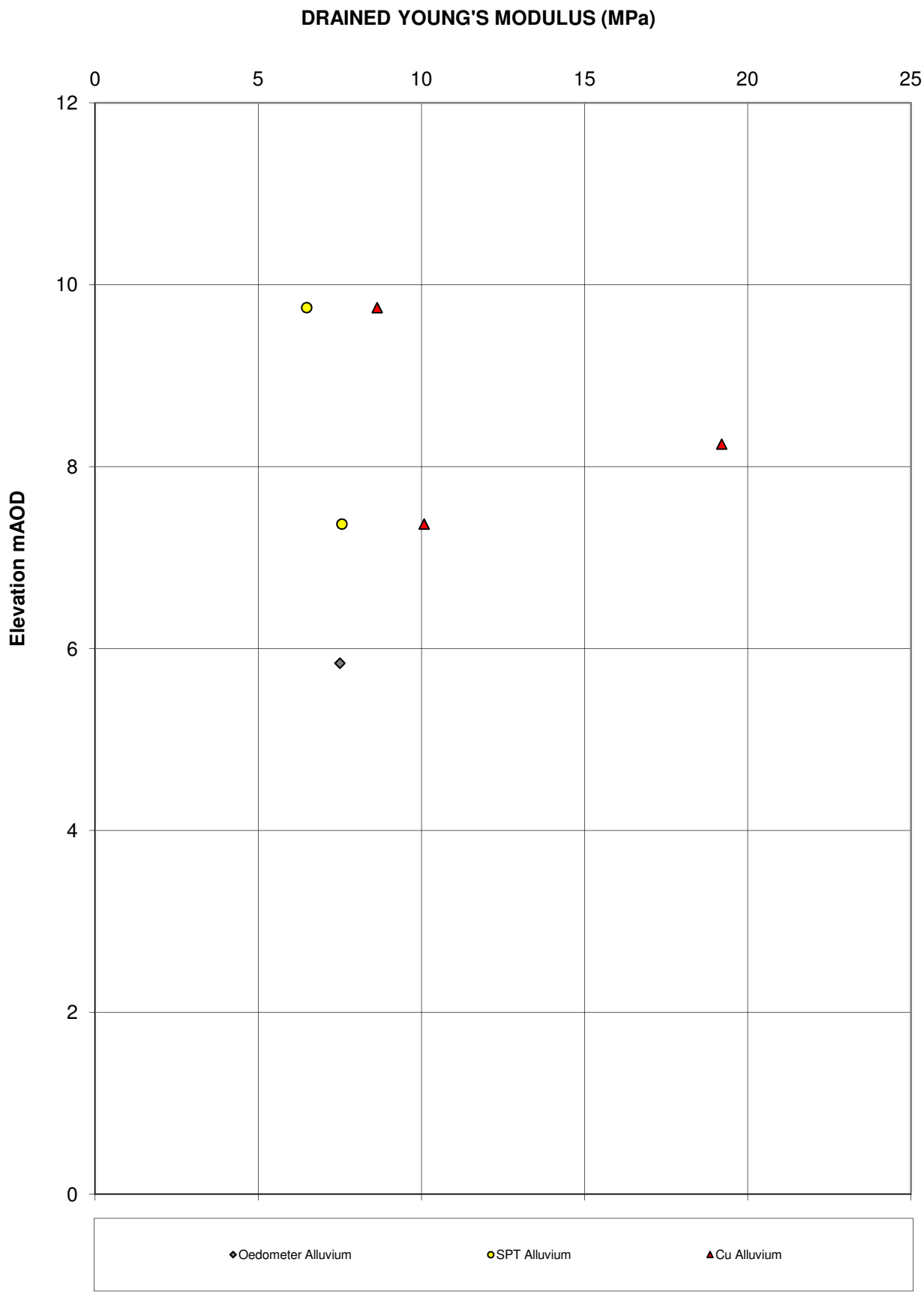
RSK	SHEAR STRENGTH vs ELEVATION (LAMBETH GROUP - COHESIVE) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Figure:	D.13



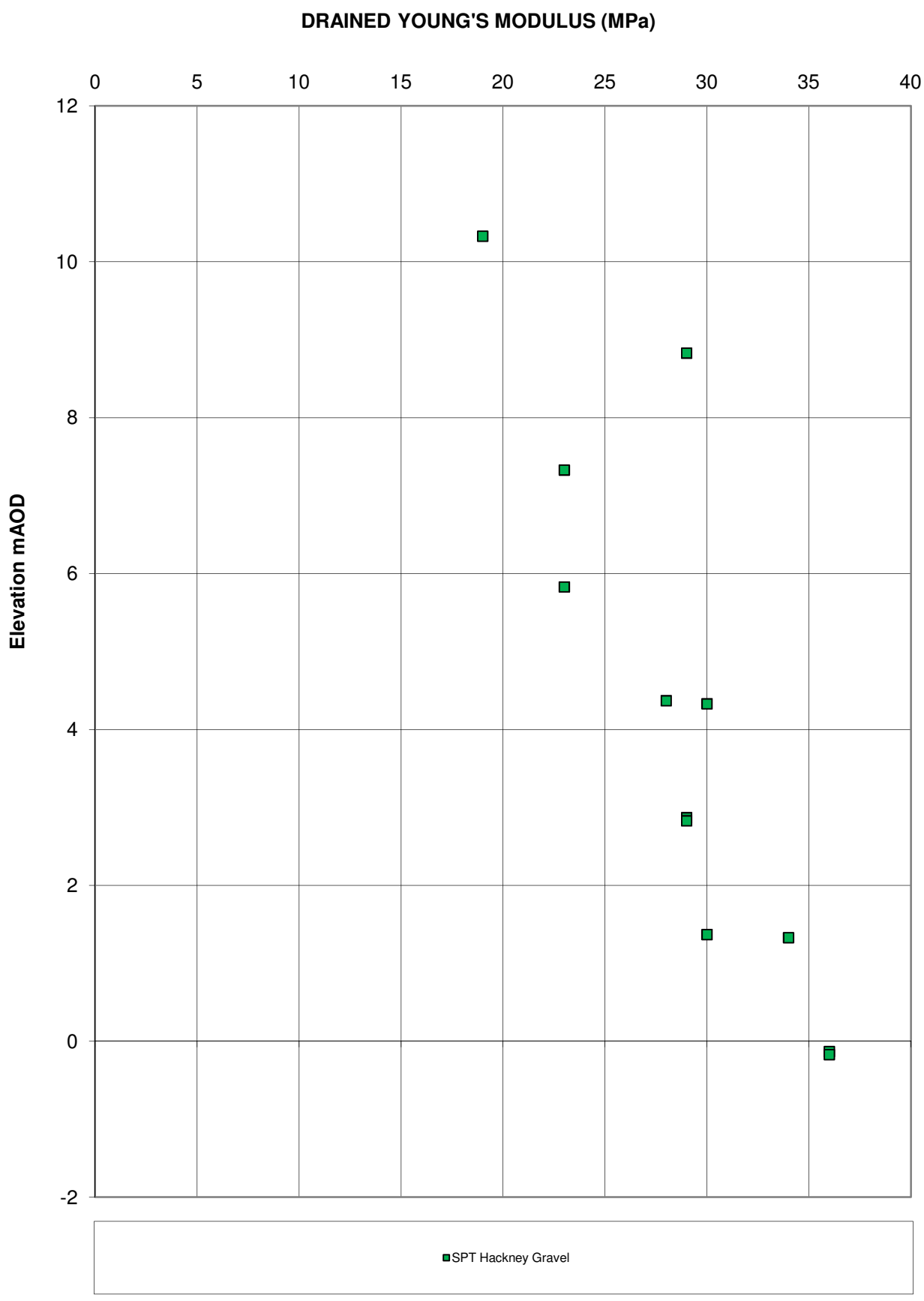
RSK	DRAINED YOUNG'S MODULUS vs ELEVATION CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:** **Figure:**	28549 D.14



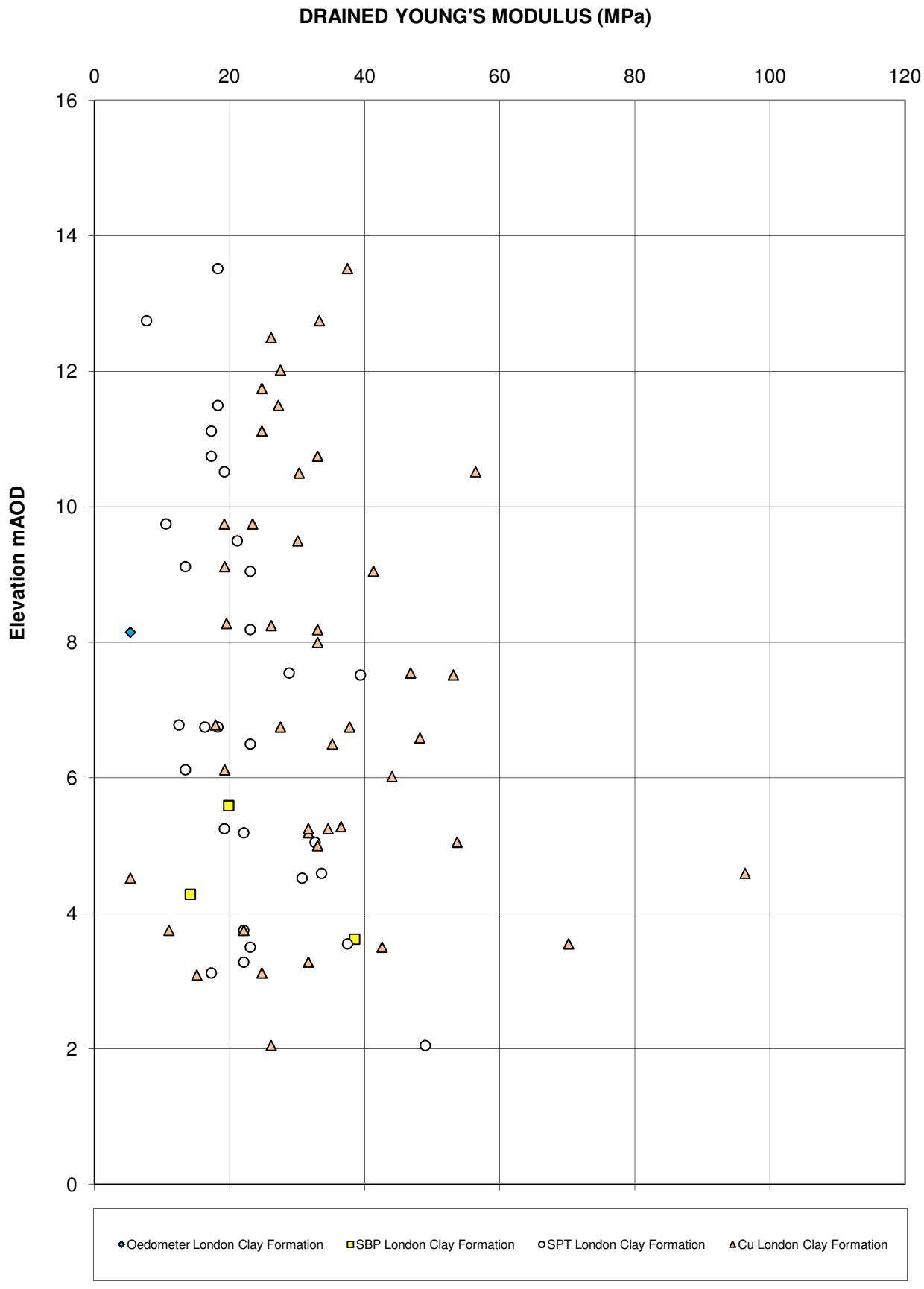
RSK	DRAINED YOUNG'S MODULUS vs ELEVATION (ALLUVIUM) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Figure:	D.15



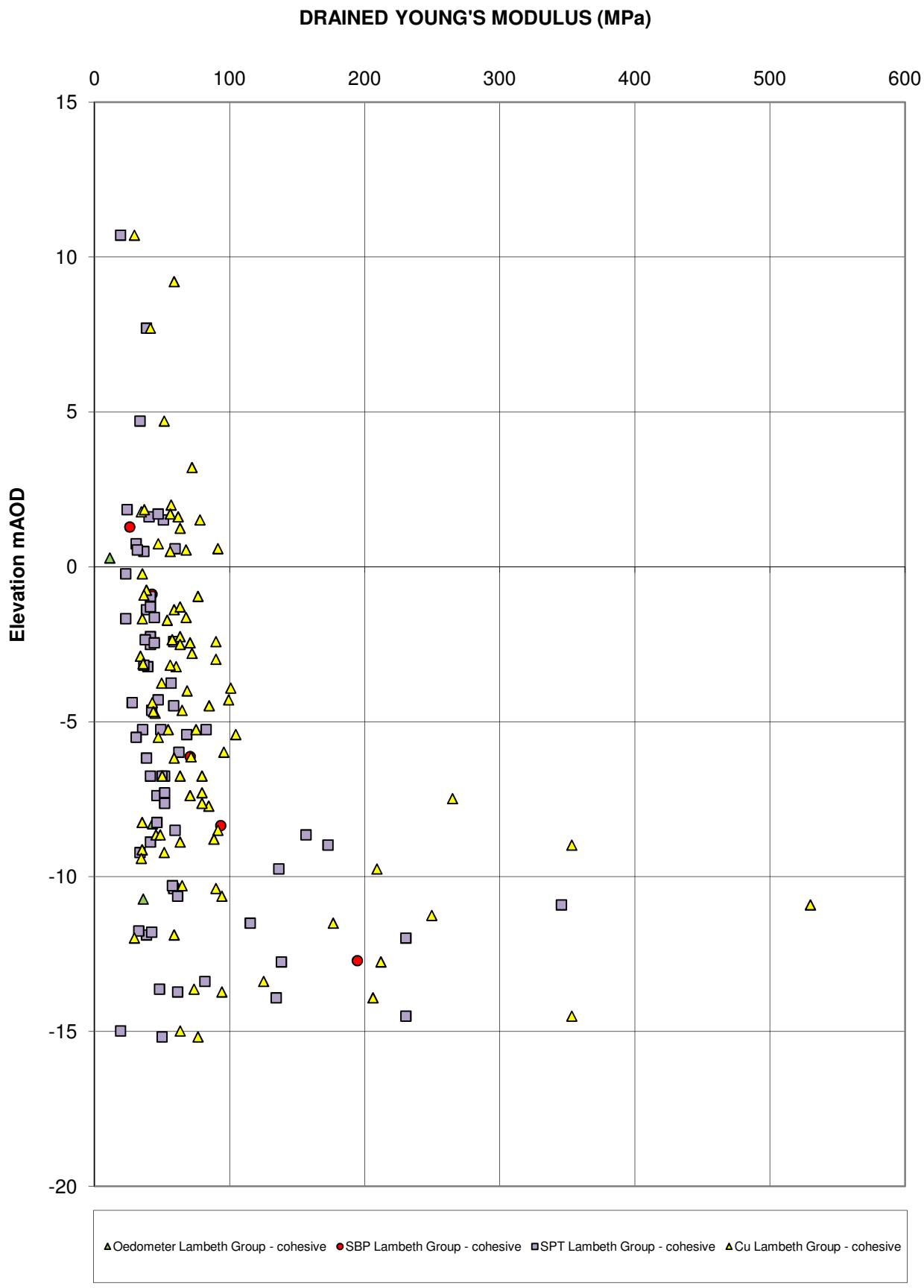
	DRAINED YOUNG'S MODULUS vs ELEVATION (HACKNEY GRAVEL) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Figure:	D.16



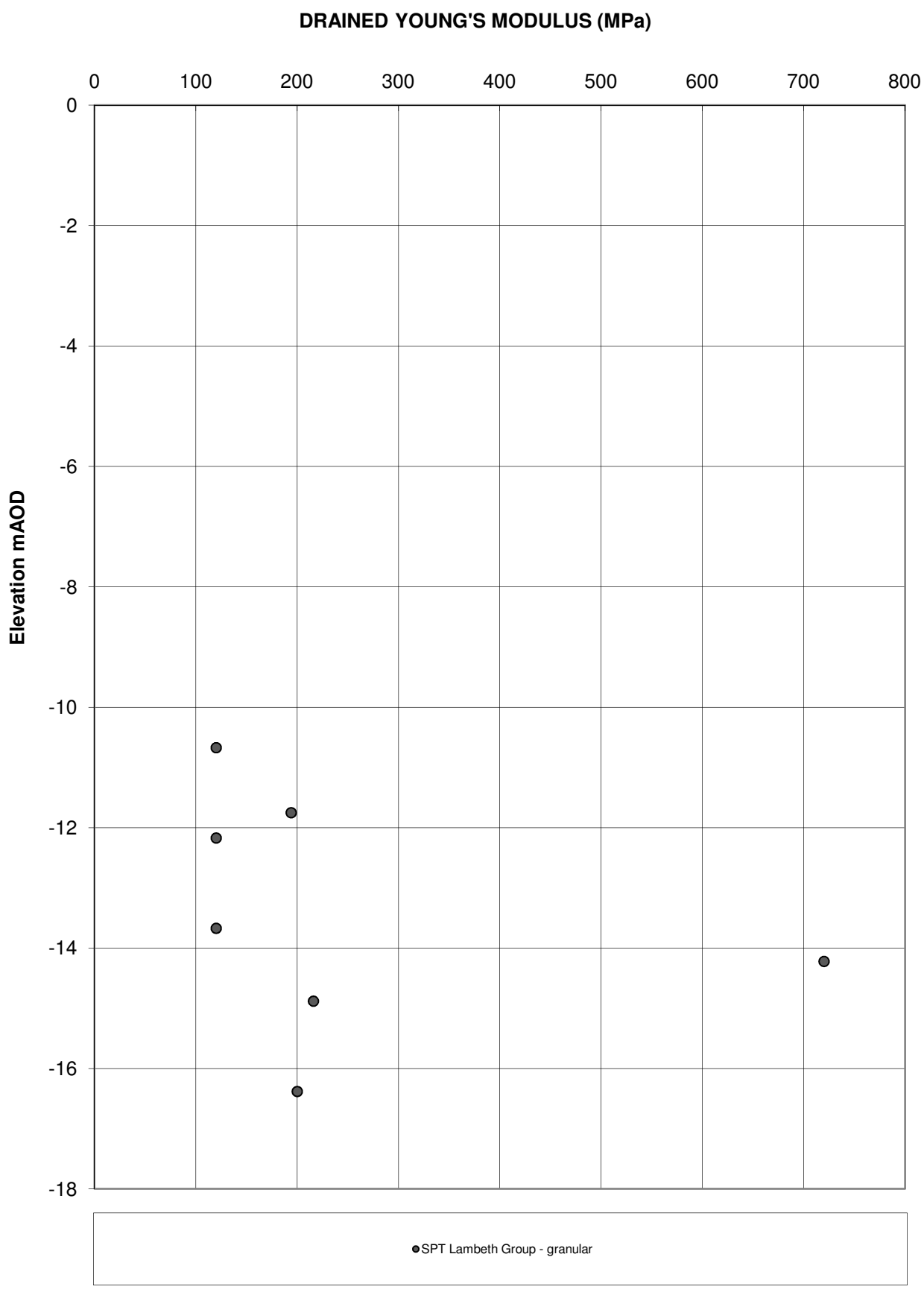
	DRAINED YOUNG'S MODULUS vs ELEVATION (LONDON CLAY FORMATION) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Figure:	D.17



RSK	DRAINED YOUNG'S MODULUS vs ELEVATION (LAMBETH GROUP - COHESIVE) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Figure:	D.18



	DRAINED YOUNG'S MODULUS vs ELEVATION (LAMBETH GROUP - GRANULAR) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Figure:	D.19



RSK	DRAINED YOUNG'S MODULUS vs ELEVATION (THANET SAND FORMATION) CALTHORPE SITE		
Site: Royal Mail Mount Pleasant Sorting Ofiice	**Client:** Royal Mail Group Limited	**Job Number:**	28549
		Figure:	D.20