KEY GS

Geological & Geotechnical Consultants

28 Kylemore Road, London NW6 2PT

Basement Impact Assessment

(April 2017)

Prepared for Cobstar Ltd

Geological & Geotechnical Consultants

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Cobstar Ltd

28 Kylemore Road, London NW6 2PT

Basement Impact Assessment

(April 2017)

Prepared by:

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Report Distribution List

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CONTENTS

IMPACT SUMMARY

The assessment findings are summarised as follows:

Potential Impact		Risk
1.	Impacts to ground water flows and related flooding	Low
2.	Impacts to ground stability	Low
3.	Impacts to surface water flows and related flooding	Low
4.	**Overall risk posed by the proposed development**	**Low**

Summary

Based on the site specific data reviewed, it is considered that the proposed basement development, lowering of the existing basement floor and construction of a lightwell will not cause significant impacts to the groundwater regime, ground stability and surface water.

The proposed lightwell will not increase the impermeable surface area of the site, with this area currently being hardstanding. The limited increase in depth of the basement should not impact on the groundwater regime, which was not encountered at this depth by the site investigation.

Given the ground conditions, and the limited deepening of the existing basement (0.33m) and the limited depth of the proposed lightwell (2m) it is considered that it should be possible to undertake the works with minimal impact on the property, adjoining properties or the public highway. With any damage to the adjoining properties falling into Category 0 of the Damage Categories after Burland 1995, with the degree of severity being negligible, which in relation to damage to the buildings would equate to fine cracks which are easily treated in normal decoration.

This assessment is based upon the assumption that the proposed works (permanent and temporary) will be designed by a suitably qualified and experienced Structural Engineer.

1.0 INTRODUCTION

Key GeoSolutions Ltd (KGS) have been commissioned by Cobstar Ltd to undertake a basement impact assessment in relation to a proposed development at 28 Kylemore Road, London NW6 2PT.

1.1 Proposed Development

The property is a mid-terrace two-storey house with a basement, constructed in the late 19th Century. It is proposed to lower the floor level of the existing basement by a maximum of 0.33m, construct a lightwell to the front of the property and to extend the lower ground / garden floor to the rear. The topography of the site is such that the rear extension will be wholly above ground.

1.2 Scope of Work

The aim of the work is to assess if the proposed basement can be constructed without having a detrimental impact on the surroundings with respect to land stability and in particular to assess whether the development will affect the stability of neighbouring properties.

1.3 Qualifications

This assessment has been undertaken by Brian Duthie and Howard Clarke. Brian holds a BEng in Engineering Geology and Geotechnics, is a chartered geologist and Fellow of the Geological Society with 28 years' experience in geotechnical engineering and is a UK Registered Ground Engineering Adviser. Howard holds a BEng in Civil Engineering, is a chartered engineer and Member of the Institution of Civil Engineers and Member of the Institute of Structural Engineers with 12 years' experience in civil engineering. Both assessors satisfy the qualification requirements given in the Camden Planning Guidance 4.

1.4 Limitations

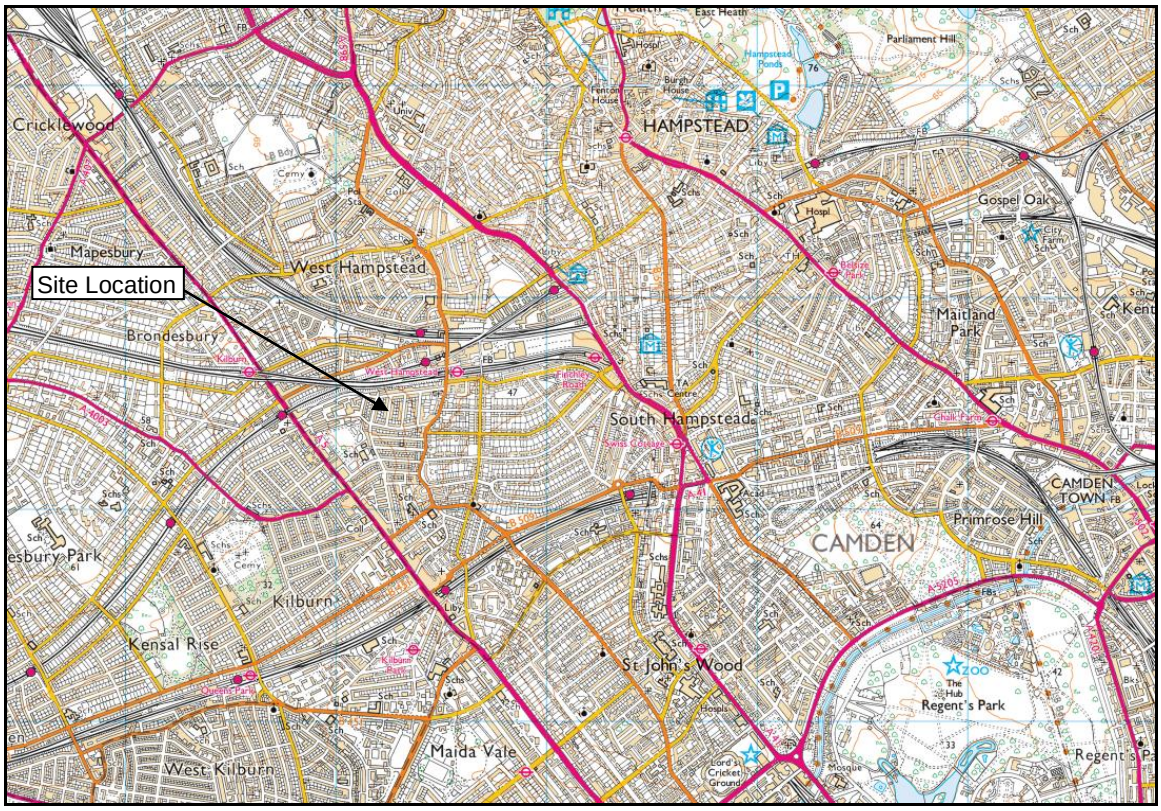
The conclusions and recommendations made in this report are limited to those that can be made on the basis of the research carried out. The results of the research should be viewed in the context of the work that has been carried out and no liability can be accepted for matters outside the stated scope of the research. The assessment does not constitute a detailed structural design for the basement structure, as would be required to allow construction to take place.

This report has been prepared for the information, benefit and use of Cobstar Ltd only and any liability of Key GeoSolutions Ltd to any third party, whether in contract or in tort, is specifically

excluded. Any third party finding themselves in possession of this report may not rely upon it without first obtaining the written authority of Key GeoSolutions Ltd.

2.0 SITE DESCRIPTION

The site is 28 Kylemore Road, West Hampstead in the London Borough of Camden, post code NW6 2PT and located at National Grid Reference 525230mE, 184480mN. The site is approximately rectangular in plan, being 5m by 29m with the long axis running approximately east south-east to west north-west.



The general topography of the area falls gently (approximate gradient of 1 vertical in 40 horizontal) from Parliament Hill 3km to the north-east towards the course of the hidden River Westbourne to the south-west. The property is a mid-terrace two-storey house with a basement, which was constructed in the late 19th Century, prior to this the land was agricultural land.

The proposed development to the basement is shown on The Design Works drawings 170130/01 to 05. It is proposed to lower the floor level of the existing basement by a maximum of 0.33m in order to increase the headroom, construct a lightwell to the font of the property and to extend the lower ground / garden floor to the rear. The topography of the site is such that the rear extension will be wholly above ground. The dimensions of the proposed lightwell are 3.13m wide across the house and 2.49m out from the front wall of the house. The rear extension will be 3.0m out from the rear of the property and 4.17m across.

3.0 PROJECT SCREENING

Following the guidance given in the London Borough of Camden document CPG4 'Basements and lightwells' (2015) it is required to identify the potential impacts of the proposed scheme. The flowcharts given in Figures 3, 4 and 5 of CPG4 assists with understanding the potential impacts that a basement may have.

GROUNDWATER (Figure 3, CPG4 (Camden Council, 2015))			
Impact question	**Answer**	**Justification**	**Reference**
1a) Is the site located directly above an aquifer?	**No**	The site is location on the London Clay Formation, which is classified as Unproductive Strata.	BGS, 2017
1b) Will the proposed basement extend beneath the water table surface?	**No**	Boreholes drilled at the site did not encounter groundwater, no groundwater is encountered by the existing basement.	Borehole logs
2) Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	**Yes**	The course of the hidden River Westbourne lies approximately 70m to the west, running along the line of Lowfield Road. Trial pits excavated through the floor of the existing basement, in order to determine depth of existing footings, did not encounter groundwater and there have been no known historical problems regarding water ingress in the existing basement.	Fig 2 of Ove Arup document, 2010
3) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**No**	The area of the lightwell is currently covered in hard surfacing.	Drawings of proposed development
4) As part of the site drainage, will more surface water than at present be discharged to the ground?	**No**	There will be no increase of water transfer from surface to ground as a result of this development. Due to the underlying geology there are no plans for the installation of a soakaway.	Drawings of proposed development

5) Is the lowest point of the proposed excavation close to, or lower than, the mean water level in any local pond or spring line?	**No**	No ponds or springs are present within 100m of the site.	OS and BGS Mapping
SLOPE STABILITY (Figure 4, CPG4 (Camden Council, 2015))			
Impact question	**Answer**	**Justification**	**Reference**
1) Does the existing site include slopes, natural or manmade, greater than 7°?	**No**	Site inspection and Ordnance Survey mapping.	Ordnance Survey Mapping
2) Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7°?	**No**	No re-profiling of the site is proposed	Drawings of proposed development
3) Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	**No**	Nearest railway cutting is approximately 100m to the North.	Ordnance Survey Mapping
4) Is the site within a wider hillside setting in which the general slope is greater than 7°?	**No**	Site inspection and Ordnance Survey mapping.	Ordnance Survey Mapping.
5) Is London Clay the shallowest strata at the site?	**Yes**	BGS 1:50,000 Geological Sheet 256 (North London) and site investigation.	BGS Sheet KGS report reference 17-135-R-001
6) Will any trees be felled as part of the proposed development and / or any works proposed within any tree protection zones where trees are to be retained?	**No**	No proposed tree-felling.	Drawings of proposed development
7) Is there any history of seasonal shrink-swell subsidence in the local area, and / or evidence of such effects at the site?	**No**	From visual inspection of the property there was no obvious evidence of damage to the structural fabric of the building.	
8) Is the site within 100m of a watercourse or potential spring line?	**Yes**	The course of the hidden River Westbourne lies approximately 70m to the west, running along the line of Lowfield Road.	Fig 2 of Ove Arup document, 2010
9) Is the site within an area of previously worked ground?	**No**	None shown on BGS mapping, historical Ordnance Survey shows the land to be agricultural land prior to construction of the properties in the area.	BGS and OS mapping

10) Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	**No**	Site underlain by London Clay	BGS Sheet KGS report reference 17-135-R-001
11) Is the site within 50m of Hampstead Heath ponds?	**No**	Site is approximately 3km to the south-west of Parliament Hill.	Ove Arup, 2010 OS Mapping
12) Is the site within 5m of a highway or pedestrian right of way?	**Yes**	The site frontage is onto Kylemore Road.	Drawings of proposed basement and site inspection
13) Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	**No**	The properties either side have existing basements similar to that under No. 28. It is proposed that the foundations will be underpinned in order to allow the existing basement floor to be lowered by a maximum of 0.33m.	Site inspection
14) Is the site over (or within the exclusion zone of) any tunnels e.g. railway lines?	**No**	Railway and underground lines located to the north, OS Mapping and Transport for London plans.	OS Mapping and TfL plans.
SURFACE WATER (Figure 5, CPG4 (Camden Council, 2015))			
Impact question	**Answer**	**Justification**	**Reference**
1) As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	**No**	The proposed design maintains the existing route for surface water disposal. There will be no increase to the impermeable cover, with the lightwell being constructed in an area which already has impermeable cover.	Drawings of proposed development
2) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**No**	See comments above.	Drawings of proposed development
3) Will the proposed basement result in changes to the profile of inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?	**No**	No changes to surface water disposal route.	Drawings of proposed development
4) Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	**No**	Site inspection and Ordnance Survey mapping.	Ordnance Survey Mapping.

5) Is the site in an area known to be at risk from surface water flooding, or is it at risk from flooding?	**No**	The Site lies within Flood Zone 1 according to the Environment Agency. The Site is at an elevation of c. 45mAOD. The SFRA (2014) shows the site to have a very low risk of flooding from Surface Water.	Environment Agency 2017 URS SFRA, LBC (July 2014)

4.0 GROUND CONDITIONS

4.1 Soil Conditions

The BGS 1:50,000 Geological Sheet No. 256 (North London) shows the site to be underlain by the London Clay Formation. A copy of the factual ground investigation report is included in Appendix 1. A hand-held windowless sampling rig was used to drill boreholes at the front and rear of the property, the borehole logs and location plan are included in the factual report. The boreholes encountered a thin veneer of made ground (0.2 - 0.8m) overlying the London Clay, no water was encountered in the boreholes.

In addition to the boreholes, hand-dug trial pits were excavated into the floor of the existing basement in order to determine the depths of the foundations. The trial pits had been open for approximately a week at the time of the inspection by KGS. The underside of the foundations, which consisted a corbelled brick footing, were encountered at 0.5m below the level of the basement floor. The footings were founded on London Clay, with a clayey sand (made ground) being present above. No water was encountered by the trial pits.

The London Clay Formation encountered generally comprised firm becoming stiff, brown-grey, slightly sandy, clay, with occasional sand partings.

4.2 Groundwater Conditions

The London Clay is classified as Unproductive Strata by the Environment Agency. Groundwater was not encountered by the boreholes or the trial pits.

5.0 GROUND MOVEMENT ASSESSMENT

5.1 Deepening of Existing Basement

The proposed deepening of the basement is shown on Design Works drawing number 170130/04 Rev. A. As the properties either side have similar basements the proposed basement floor lowering will not require a significant increase in the differential depth of foundations relative to the neighbouring property. It is proposed to underpin the existing foundations in order to allow the floor of the basement to be lowered and to include for a suitable floor construction. The underpinning is shown as being 600mm in depth.

The proposed sequence of works is as follows;

1. Laterally prop the base of the existing walls just above floor height, this can be a combination of waling beams and props as required.
2. Remove the existing floor construction.
3. Complete a 900mm wide excavation adjacent to the wall at mid-panel taken down to new formation depth.
4. Excavate under the existing masonry corbelled footing for its entire width.
5. Depending on the condition of the existing masonry adopt sacrificial trench props under the footing with spreader plates to suit the encountered ground conditions.
6. Drive 4 No. 600mm long B16 reinforcing bar into each side of the excavation such that a 300mm length is left exposed in the excavation to provide an enhanced shear key between each section of underpinning.
7. Install shuttering to front face of the excavation as required.
8. Cast a mass concrete pad to a level 75mm below the underside of the existing footing ensuring that it is well placed across the entire width and depth of the excavation.
9. Once the concrete has hardened finish the underpin with 75mm of ‘pinning up’, a non-shrink grout rammed into place ensuring that no gaps are left.
10. Complete points 3 to 9 in a suitable sequence along the lengths of foundation to be underpinned.
11. Once the underpinning works has been completed install the new in situ reinforced concrete floor slab that will act to buttress the walls and underpinning in the permanent case. (The out of plane lateral forces acting on the walls due to the newly created level difference will need to be analysed and if necessary a perimeter upstand can be cast on the concrete slab).
12. Remove the waling beams and props once the floor slab has achieved sufficient strength.

Underpinning of existing foundations is a recognised construction technique and it is considered given the proposed limited depth of lowering of the basement floor that the works can be undertaken without detriment to the party walls. The expected amount of movement to the party

wall would be negligible.

5.2 Lightwell

The proposed lightwell is 2m in depth below the level of the surrounding ground and it will be approximately 1.7m from the property boundary. As the property and adjoining properties have existing basements, the depths of which are greater than the proposed lightwell, it is not considered that there will be any impact from the lightwell excavation on the properties. The property and adjoining properties appear to be in a good state of repair and are showing no external evidence of any previous movement.

The edge of the excavation which runs parallel to Kylemore Road will be 1.7m away from the property boundary. Beyond the property boundary there is an approximately 2.5m wide footpath, a parking bay and then the edge of the public highway. For construction of the lightwell it will be necessary to provide temporary support to the excavation on three sides, a provisional temporary works methodology is presented on drawing 17-135-D-001, included at the rear of this report.

The excavation will be into firm to stiff London Clay, from Figure 6.15 of CIRIA C760 Guidance on embedded retaining wall design (2017) it is possible to estimate the horizontal and vertical movements that could be expected from the excavation of the lightwell. Assuming a low stiffness support system with temporary propping and an excavation depth of 2m it can be expected that a horizontal movement of the order of 8mm will occur at the wall, reducing to 6mm at the property boundary and a vertical movements of the order of 7mm at the wall and 4mm at the side boundary. It is considered that these levels of movement would not have a detrimental effect on the public highway or any services within the highway or footpath.

Assuming appropriate temporary support is employed under conditions of good workmanship for the construction of the lightwell it is considered that negligible damage can be expected to the property, adjoining properties and the public highway.

5.3 Movement Monitoring

It will be necessary to monitor the impact of the works on the adjoining properties and the public highway to ensure that movements are not excessive. The monitoring should comprise the following;

- Visual inspection of the party wall and any pre-existing cracking
- Attachment of tell tales to accurately record movement of any pre-existing cracks
- Installation of levelling targets to monitor settlement of the party walls and the public highway, to be monitored by standard optical equipment.

The levelling targets on the party walls should be no greater than 2m apart and located as close

to the top of the existing foundations as possible. The maximum allowable movement should be no more than 3mm between adjacent levelling targets.

The limits on maximum movement and proposed actions are given in the table below;

Movement	Category	Action
0 - 5 mm	Green	No action required
5 – 10 mm	Amber	Crack monitoring: Carry out local structural review; Preparation for the implementation of remedial measures should be required
>10 mm	Red	Crack monitoring: Implement structural support as required; Cease works with exception of necessary works for the safety and stability of the structure and personnel; Review monitoring data and implement revised method of works

Monitoring should be undertaken after every pin is cast for the first four pins to gauge the effect of the underpinning. It no significant movement is identified monitoring can be reduced to after every other pin.

6.0 CONCLUSIONS AND RECOMMENDATIONS

An assessment of the ground conditions has been made in relation to the potential impacts of the proposed basement deepening and construction a lightwell at 28 Kylemore Road. This assessment does not constitute a detailed structural design for the basement.

The property is a terraced house with an existing basement, the foundations are onto firm to stiff London Clay. No groundwater was encountered by the boreholes or trial pits.

The site is not at risk from any sources. The proposed lightwell will not increase the impermeable surface area of the site. The limited increase in depth of the basement should not impact on the groundwater regime, which was not encountered at this depth. It is considered that the overall run-off and related flooding risk from the proposed development will remain the same as for the current situation.

Given the ground conditions, and the limited deepening of the existing basement (0.33m) and the limited depth of the proposed lightwell (2m) it is considered that it should be possible to undertake the works with minimal impact on the property, adjoining properties or the public highway. With any damage to the adjoining properties falling into Category 0 or 1 of the Damage Categories after Burland 1995, with the degree of severity being negligible, which in relation to damage to the buildings would equate to fine cracks which are easily treated in normal decoration.

This assessment is based upon the assumption that the proposed works (permanent and temporary) will be designed by a suitably qualified and experienced Structural Engineer, will be undertaken to a high standard workmanship and be adequately supervised.

7.0 REFERENCES

7.1 Assessment of risk of damage to buildings due to tunnelling and excavation, Burland J B, 1995

7.2 Ground movements resulting from urban tunnelling: predictions and effects, Rankin W J, 1988

DRAWINGS

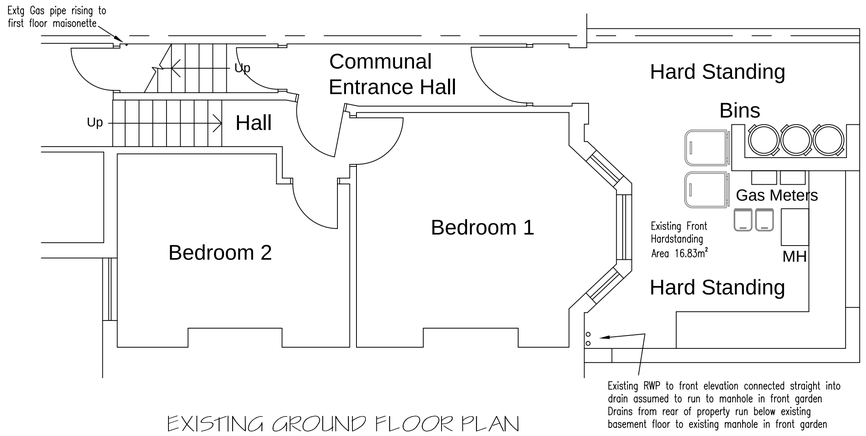
SCALE BAR ~ Meters

DECORATION

All new interior and exterior SW Joinery to be fully decorated including all concealed faces and edges. Knot, Prime, Stop, 2 Undercoats & Min 1 Gloss/Satin top coat to cover as directed by client.
All new interior and exterior HW Joinery to receive clear sealant prior to fixing and minimum 2 coats clear/tinted Gloss/Satin Varnish as directed by client. All preparation to closely follow manufacturers instructions. Exterior walls to be painted with minimum 3 coats masonry paint to match existing building where applicable including making good around new work/alterations

WALL & FLOOR TILING

All internal wall and floor tiling to be carried out using the appropriate & correct adhesives and grout. Ensure all surfaces are clean, even and flat before commencing. Prepare floors with 'Schluter-Ditra' waterproof anti-movement matting and walls with 'Schluter-Kerdi' waterproof fibreglass matting or equal approved laid in strict accordance with manufacturers instructions. Ensure that the waterproof layers are lapped and intact before laying any tiles over. Where tiled shower floor bases are required the waterproof layer is to be dressed into an appropriate trapped floor gulley with removable trim to access trap for cleansing. All tile joints to be mitred and plastic edge trim avoided unless agreed beforehand by client. Baths to be filled with water during fixing to walls/floor and whilst tiling. Any specialist tiles/stone/marble to be sealed after fixing in strict accordance with suppliers instructions. All tiling/sanitaryware/taps etc to be properly & thoroughly cleaned after fixing and protected with bubblewrap and hardboard etc taped in position. These areas thereafter to have restricted access. All silicone sealant/beading to be applied by a specialist at the appropriate time and left to cure. Baths to be filled with water



EXISTING GROUND FLOOR PLAN (STREET LEVEL)

ELECTRICAL SAFETY

All wiring & electrical work to be designed, installed, inspected & tested in accordance with BS7671, 17th & 18th Edition IEE Regs & Pt P of Building Regulations by competent qualified electricians registered with an approved authorised Pt P self certification scheme. Electrical Installation & Test Certificates to BS7671 to be issued to Client by installer within 30 Days of Completion

INTERNAL & EXTERNAL LIGHTING

All new lighting is to be energy efficient. LED lamps/fittings are recommended. Lamps having a luminous efficacy greater than 40 lumens/circuit Watt to be provided in all rooms, circulation spaces, outhouses, lofts, garages & conservatories and the like. All external lights to have lamps of the above efficacy or be automatically extinguished when there is enough daylight & when not required at night

VENTILATION

All habitable rooms to have 5% of floor area natural ventilation via opening doors or windows to external air. (Min ventilation rate for whole dwelling 0.3L/sec per m² of total floor area) Background ventilation of 40,000mm² required equally distributed. In addition kitchens to have at least a 30L/sec cooker hood ducted to external air or a separate 60L/sec full extract fan Mechanical Extraction also to be provided as follows: Utility Rooms-30L/sec Bath & Shower Rooms-15L/sec. Separate WC's to have either a window giving 5% floor area & background vent or 6L/sec extract fan. All extract fans to be linked to light switch & with 15 Min overrun unless room has an opening window

GLAZING ~ SAFETY

Any glass in a window within 800mm of floor level or 1500 if in a door or within 300mm each side of a door to be Laminated to BS 6206 unless pane of glass is less than 250mm wide & under 0.5sqm in area. Any opening part of a window within 800mm of floor to be provided with a horizontal guarding rail and vertical balustrade below with maximum 99mm apertures

FIRE ALARMS/SMOKE DETECTORS ~ SMOKE HEAT

Smoke Detectors to be mains wired to Pt P compliance. If one is activated then all must sound off. Provide in circulation areas where indicated by the symbol above and within 7.5m of doors to all habitable rooms. They should be ceiling mounted Min 300mm from walls or light fittings and be kept away from Heating or Air/Con appliances/outlets. System to be installed to accord with guidance in BS 5839-1:2002 & -6:2004. Smoke & Heat Detectors to comply with BS 5446-1:2000 & -2:2003 respectively

FIRE DOORS

All Flat Entrance Doors and other internal doors opening onto common stairs to be Half Hour Fire Resisting FD30S with perko self closing devices and fitted into frames/linings with 15x40mm stops glued and screwed in place and intumescent strips rebated into head and jambs of linings to form seal in the event of a fire. If not provided stops must be 25x40mm. All other doors forming protected flat entrance halls must be FD20 Fire Resisting (Self Closing Not Required)

ACCESSIBLE SOCKETS & SWITCHES

Wall mounted sockets outlets, TV & Phone points etc to be located Min 400mm & Max 1000mm above floor level and no nearer room corners than 350mm. Switches for permanently wired appliances, unless at a higher level for particular appliances, to be located within 400 & 1200mm above floor level. All sockets and isolation switches to clearly show that they are on/off. All switches and controls that require precise hand movements are located between 750 & 1200mm above floor level. Controls that require close vision are to be located between 1200 and 1400 above floor level with thermostats being at the top of the range

DOWNLIGHTERS

Down lighters are to be fully enclosed to maintain acoustic and fire separation whilst maintaining space separation to prevent overheating as recommended by the manufacturer

~ NOTES ~

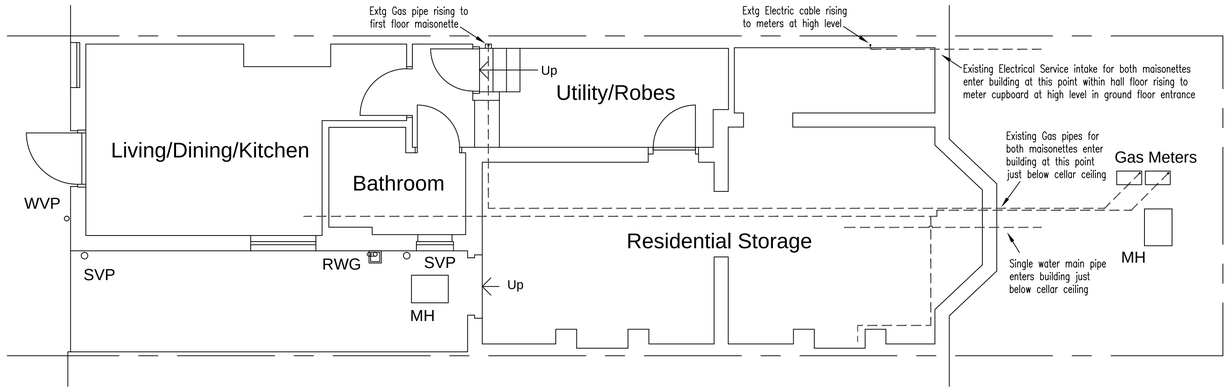
All Work to Clients & Local Authority Approval & All Relevant BS's to be complied with. Work Only to Written Dimensions unless directed to scale by Design Team. Report Discrepancy's and Obtain Permission Prior to Proceeding. Contractor Shall be Responsible to Rectify Any Variations carried out without Prior Approval. Any Disturbance to be Made Good to Match Existing or as Directed. Architraves, Cornices, Doors & Skirtings etc to Match Existing and be Purpose Made where an acceptable standard product is not readily available. Services to be Altered and Extended as Required

WINDOWS & EXTERIOR DOORS

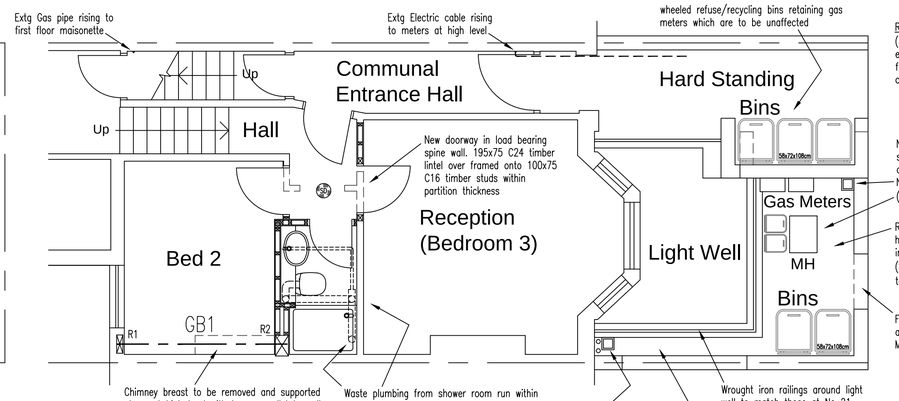
Materials for frames, hinges etc to match existing unless a complete new installation is called for. All to be provided with suitable locking devices to match the existing or multi point locking devices complying to insurance industry standards. Easy-clean hinges to be stainless steel types or equal approved with a full opening device where necessary for emergency escape purposes. Glazing to comply with safety glass rules, be double glazed with low-e, anti-glare & Argon fill all incorporated to achieve a U value as close to 1.4W/m²K as possible but not exceeding 2.0W/m²K. Provide the Maximum gap to sealed units possible for frame material selected. Obscured glass to be selected by client from samples to be provided by contractor. Draught stripping to be the best quality fitted into grooves/rebates as applicable. Frames to incorporate a thermal break except where wooden. Obtain Clients written Approval for all details including window/door configuration

EMERGENCY ESCAPE

All habitable rooms to have emergency exits of at least a window having a clear opening area of 0.33sqm & Min 450mm high or wide. The bottom of which should be within 1100mm of floor level. If safety guarding is provided to a window the clear opening are must be measured above the guarding



EXISTING LOWER GROUND FLOOR/ GARDEN FLOOR PLAN



PROPOSED GROUND FLOOR PLAN (STREET LEVEL)

Refuse Bin Requirements
(5no 240 L wheeled bins to replace existing arrangement and serve both flats. Existing 2no food waste containers retained.

New RW Gully to serve front hard standing so that surface water does not run onto public footpath
New drain to existing manhole (Replace cover with new)

Remainder of front garden to be hard-standing as other properties in the street with light-wells (Sand bedded block paving so as to be permeable)

Form opening in front garden wall to access remainder of front garden, Gas Meters & 2no 240 L wheeled bins.

CAVITY WALLS

Outer leaf to be 112.5mm second hand stock brickworkto match the existing & to be agreed with client. 100mm cavity completely filled with 100mm 'Drytherm 32' mineral fibre insulation cavity batts. Inner leaf to be 100mm 4.2N 'Plasmor Aglite' blockwork unless Structural Engineers details specify a higher requirement. Finish internally with 12.5mm Plasterboard on dabs with 2.5mm hard plaster set coat. Cavity wall ties to BS1243 (as amended) @ 450 Vert & 750 Horz c/c staggered. 225 Vert c/c to reveals and 'Thermabate' or equal insulated DPC cavity closures including below cills. Mortar joints to be in 1:1:6 mix cement/plasticizer/sand. All work below DPC level to be in sulphate resisting materials unless soil report or Local Authority indicate otherwise. DPC cavity trays, stepped as necessary and code 5 lead flashings above all abutments

DPC's & DPM's

All DPC's to BS 743 Min 150mm above finished ground levels, stepped as required to suit site levels. All on mortar bed. Vertically lap or tank as appropriate. Inner leaf DPC not to be above floor level and to be lapped to floor DPM's. Use Hi-Load DPC's below any concrete floors or floor beams. DPM's to be 1200 gauge polythene or equal approved & protected with soft sand blinding where necessary. All DPC's & DPM's to be lapped to existing at all abutments

DRAINAGE

All to be to BS 8301. 100mm ø plastic underground drains laid @ 1:40 falls in 150mm pea shingle bed and surround. Min 600mm cover below driveways or encase in concrete. Build pipes into walls where passing through with joints within 150mm of wall face and then at approximately 600mm from first joint to form a rocker pipe. All gulley's to be rodable back inlet types with fixed covers/gratings. large radius bends at base of soil stacks. provide one way valves to drains or flexible anti climb fins to stacks to prevent rodents climbing pipes to exit drains. All drains to be accessible and rodable. 450mm ø plastic or 450x450mm semi-engineering brick inspection chambers on 150mm concrete bases. Concrete backfill to plastic IC's. Maximum depth 1.2m. Covers 450mm ø or 430mm sq. All internal IC's etc to be fitted with double seal bolt down air tight covers and frames. Refer to plan for further requirements and/or greater depths etc. All paved areas to be provided with drainage in the form of gulley's or channels discharging to a separate surface water drainage system together with rainwater from roofs

PIPE & VENT DUCTWORK

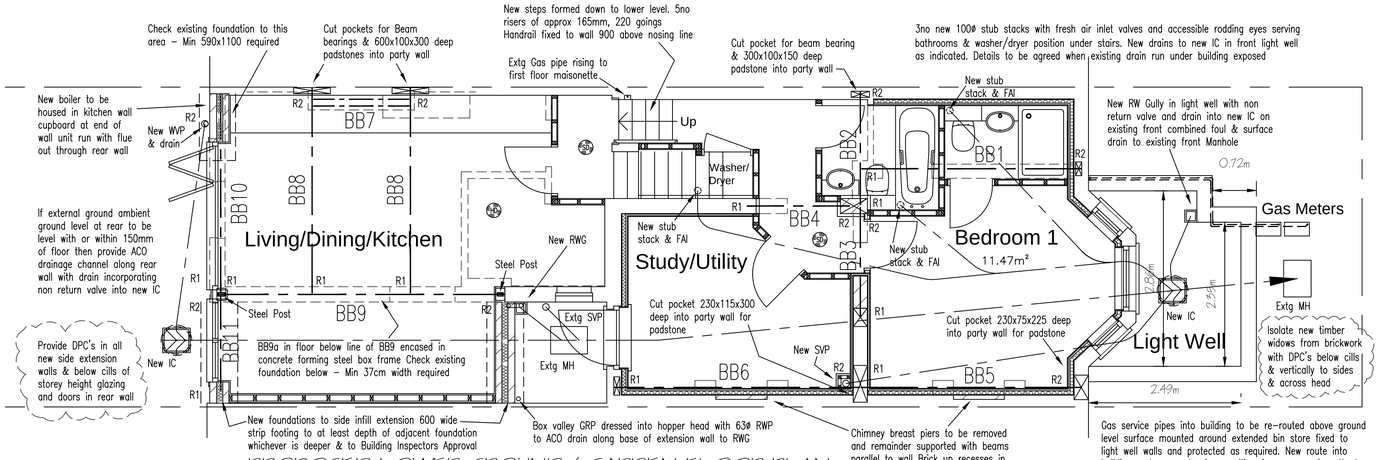
Encase all ducts and stack pipes etc in 2 layers 12.5mm plasterboard fixed to break joint & with plaster skim finish. 100mm 'Knauf' earthwool Acoustic Roll infill throughout. 50x50 SW framework. Access panels in 2 layers 15mm Masterboard or similar fire retardant material screw fixed into 25mm rebated frame. Low level to stacks. Intumescent fire collars to all pipes passing through compartment floors into another part of the building used by a different occupant

WASTE PLUMBING

All to be to BS 5572. 100mm ø soil & vent stacks or stub stacks as directed. 100mm ø WC branches with 50mm deep 'P' traps. All other traps accessible and cleanable. Waste & trap sizes as follows: - Basins & Bidets 32mm ø, Sinks & Washing machines etc 40mm ø all with 75mm deep traps. baths & Showers 40mm ø with 50mm deep traps. No waste to be connected to a stack within 200mm of a WC branch. Increase pipe sizes from 32 to 40mm @ 1.7m, 40 to 50mm @ 3.0m. Any wastes over 4.0m provide anti-syphon traps or a vent connected to waste within 300mm of trap, rising continuously either to external air or back to stack above highest flood level. Wherever possible & always at head of drain stacks to be vented to external air via balloon cage 900mm above any ventilation opening within 3.0m. Code 5 lead collars/sleeves above roof abutments. Fresh air inlet valves only to be used in accordance with manufacturers instructions and Local Authority Approval. provide rodding eyes to all bends & junctions. Box in & conceal wastes etc in agreement with client/owner

PARTITIONS ~ TIMBER STUD

75x50mm SW studs @ 400c/c. Noggins @ 800c/c. 75x50 base and top plates. Double up joists below partitions unless otherwise specified. 12.5mm plasterboard & 2.5mm skim coat of plaster finish both sides with 75mm 'Knauf' earthwool Acoustic Roll infill throughout. All studwork within a bath or shower room (or other wet area) to be lined out on wet side with aqua panel or equal approved purpose made boards



PROPOSED LOWER GROUND/ GARDEN FLOOR PLAN

Water service to be temporarily re-routed to avoid excavation works insulated where exposed. Provide duct with draw string dropped down behind & below base of light well & basement floor to a depth of at least 600mm. Locate riser pipe to upper maisonette and reconnect water main at appropriate time in contract period. Provide new metered water supply to lower maisonette run within same duct route into building

REV N – Clarification of DPC provision	11/03/2020
REV M – Electric, Gas & Water Services Routes	24/10/2019
REV L – Bin store & existing manhole clarified	31/05/2019
REV K – Bin store & front garden walls revised	28/05/2019
REV J – Lightwell drainage revised	05/06/2018
REV I. – Foundations details updated	22/05/2018
REV H – Lightwell revised (width reduced)	27/03/2018
REV G – Party Wall interventions clarified	23/03/2018
REV F – Rear extension removed – layout updated	28/02/2018
REV E – Rear extension combined with side infill	12/12/2017
REV D – Rear extension changed to side infill	15/11/2017
REV C – Extg & Propd hard surface areas added	30/08/2017
REV B – Existing & preliminary proposed surface water drainage added Chimney breast removal notes added	29/08/2017
REV A – Lightwell & front garden layout revised	04/05/2017
REVISIONS	DATE

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THE DESIGN WORKS

TITLE
EXISTING & PROPOSED FLOOR PLANS

ADDRESS
28 KYLEMORE ROAD
LONDON NW6 2PT

CLIENT
COBSTAR Ltd

SCALE 1:50 & 1:100 @ A3 | DATE JAN 2017
@ A1

DRAWING No. 170130/ 01 | REV. N

0 1 2 3 4 5 6 7 8 9 10

SCALE BAR ~ Meters

EXISTING SECTION A-A

FOUNDATIONS

Mass filled strip footings to dims shown using 1:2:4 mix (20N/mm²) concrete Sulphate resisting cement where applicable. Foundations to be taken down into virgin ground to at least the depth of existing or Min 600mm below any tree roots encountered in the excavations whichever is the deeper but do not undermine any adjacent foundations without express permission. 100mm thick Claymaster is to be provided to the inside face of all external foundations & to one face of internal foundations that are deeper than 1.5m. If at all uncertain consult Building Control Inspector on site at the earliest opportunity All foundations must be inspected & approved prior to placing of concrete

FOOTING WALLS

All to be built in common fletton bricks or 7N/mm² dense concrete blocks in 1:3 cement sand mortar up to DPC level. Sulphate resisting cement only where necessary. All walls to be built on center of foundations unless otherwise stated. Cavity's to be filled with lean mix concrete to 300 below lowest DPC level

GROUND FLOOR (Back Addition)

35mm liquid screed on 500 gauge polythene moisture control layer on 75mm Kingspan Kooltherm K103 Floor Board insulation or equal approved with 25mm strip around perimeter of rooms to isolate screed & prevent a cold bridge on 1200 gauge polythene DPM on 100mm thick 1:2:4 mix concrete oversite slab on 150mm layer well consolidated hardcore. Strip all top soil or other deleterious material from site of building. Build up hardcore in layers NE 150mm thick & overall Max 600mm thickness. Existing floors in back addition to be removed and levels reduced for new floor construction throughout

LATERAL RESTRAINT

Anchor roofs, ceilings and intermediate floors to external and internal load bearing walls as applicable @ Max 2.0m c/c. 30x5 galvanized steel straps notched over at least 3No joists, bent as required and extended down walls Min 600mm. Straps to be hooked over inner leaf at floors or restraint hook joist hangers to be used. Applies to new work in all cases and existing only where specifically directed

BOILERS, HEATING & HW CONTROLS

Boilers to be fueled by Mains natural gas and to have a "SEDBUK" of at least 90% and be a condensing type with system controls that switch the boiler off if there is no demand for heating or hot water. Heating system to have zoned controls separate for living and sleeping areas. In larger properties no one zone should exceed 150sqm. Each zone for space heating and the hot water system to have separate temperature & time controls. Hot water storage to be a factory insulated vessel with a minimum 35mm thick coating of PU foam (Min 30kg/cum density) or greater if pressurized including other adjacent equipment & all pipework to be insulated including vent pipes & primary flow & return to a temperature range of −40°C to +700 °C. All systems to be properly commissioned prior to handover and a report issued together with full operating instructions handed to client prior to occupation of the building. Boiler flues (fan assisted) to be sited Min 300mm from any openings into the building, 200mm below eaves and 150mm min from any drain or soil pipes

TIMBER

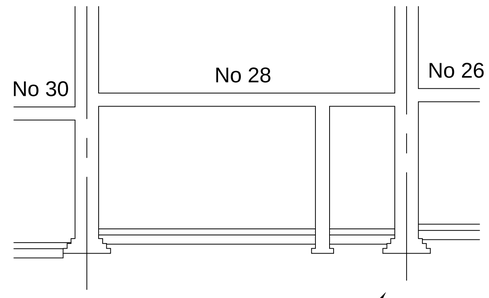
All to be C16–C24 grade unless otherwise specified. Structural Engineers details to take precedence. Roof timbers, any ends to be built into walls or others in a vulnerable location to be treated with a preservative containing a fungicide. Roof timbers to be pressure impregnated with preservative. Spike all doubled joists etc with 100mm wires @ 600c/c askew from both sides Bolt multiple timbers as specified with M12 4.6 black bolts @ 450c/c staggered & with 63mm ϕ tooth ring plate connectors and washers etc

STEELWORK

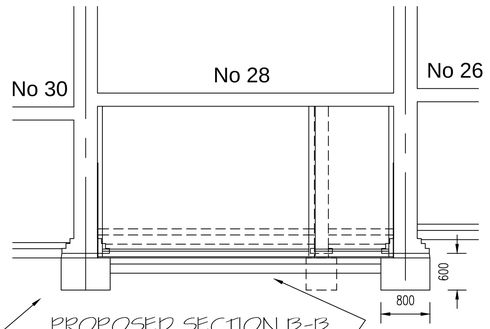
All to be grade 43 to BS 4 Pt 1 & BS 4848 Pts 2&4 painted with 2 coats grey oxide primer after first removing any surface rust etc. Any joints to be bolted or welded to separate detail. 1:2:4 mix concrete or engineering brick padstones to bearings as specified. Structural Engineers details to take precedence. Encase steelwork in 2 layers 15mm plasterboard with staggered joints nailed to SW cradles. Plaster skim coat finish to any casing not concealed by other parts of the structure etc. Beams within floor or ceiling voids to have Min 1 layer of plasterboard in addition to ceiling plasterboard

~ NOTES ~

All Work to Clients & Local Authority Approval & All Relevant BS's to be complied with. Work Only to Written Dimensions unless directed to scale by Design Team. Report Discrepancy's and Obtain Permission Prior to Proceeding. Contractor Shall be Responsible to Rectify Any Variations carried out without Prior Approval. Any Disturbance to be Made Good to Match Existing or as Directed. Architraves, Cornices, Doors & Skirtings etc to Match Existing and be Purpose Made where an acceptable standard product is not readily available. Services to be Altered and Extended as Required



EXISTING SECTION B-B



PROPOSED SECTION B-B

Existing foundation levels have been exposed to determine precise depth & width of existing foundations – currently brick spreader courses are shown as further investigation of any compacted gravel layer below brick footings are still required

It is proposed to replace the existing floor to the basement rooms with new solid floors to achieve a ceiling height of around 2.3m. This will require nominal underpinning with excavations approximately 0.6m below the bottom of the existing brick spreader courses with a 75mm dry pack bed. Maximum reduced level required around 0.75m with a reduction in finished floor level of around 0.33m

THERMAL INSULATION TO EXISTING SOLID WALLS

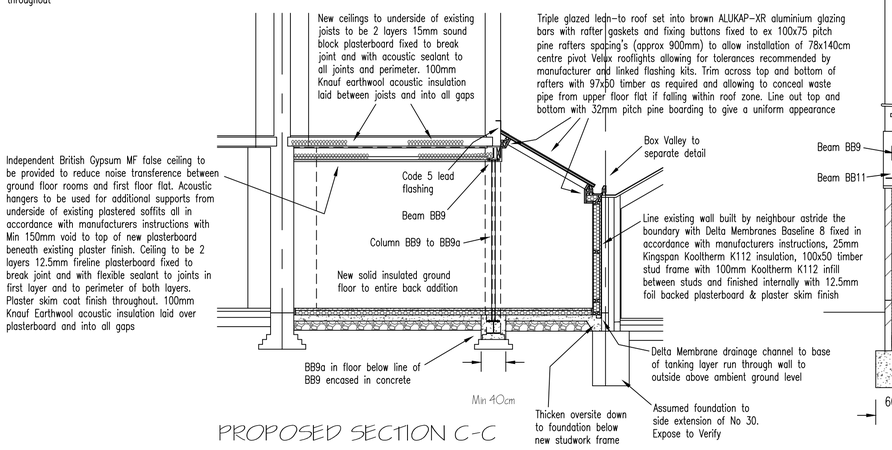
Existing solid brickwork walls to be insulated where external, party walls or non heated space on other side of wall. Line brickwork internally with Baseline 8 waterproofing membrane and fix with 25x50 tanalised timber battens vertically at Max 600c/c in accordance with manufacturers instructions. Battens to be packed and plumbed as required. If existing walls more than 25mm out of plumb consult design team prior to proceeding for a decision. Then fix 72.5mm Kingspan Kooltherm K18 insulated plasterboard to timber battens with skim coat finish internally. If reduction in floor space exceeds 5% then insulation thickness may be reduced proportionally to meet 5% loss of floor area.

TANKING MEMBRANE

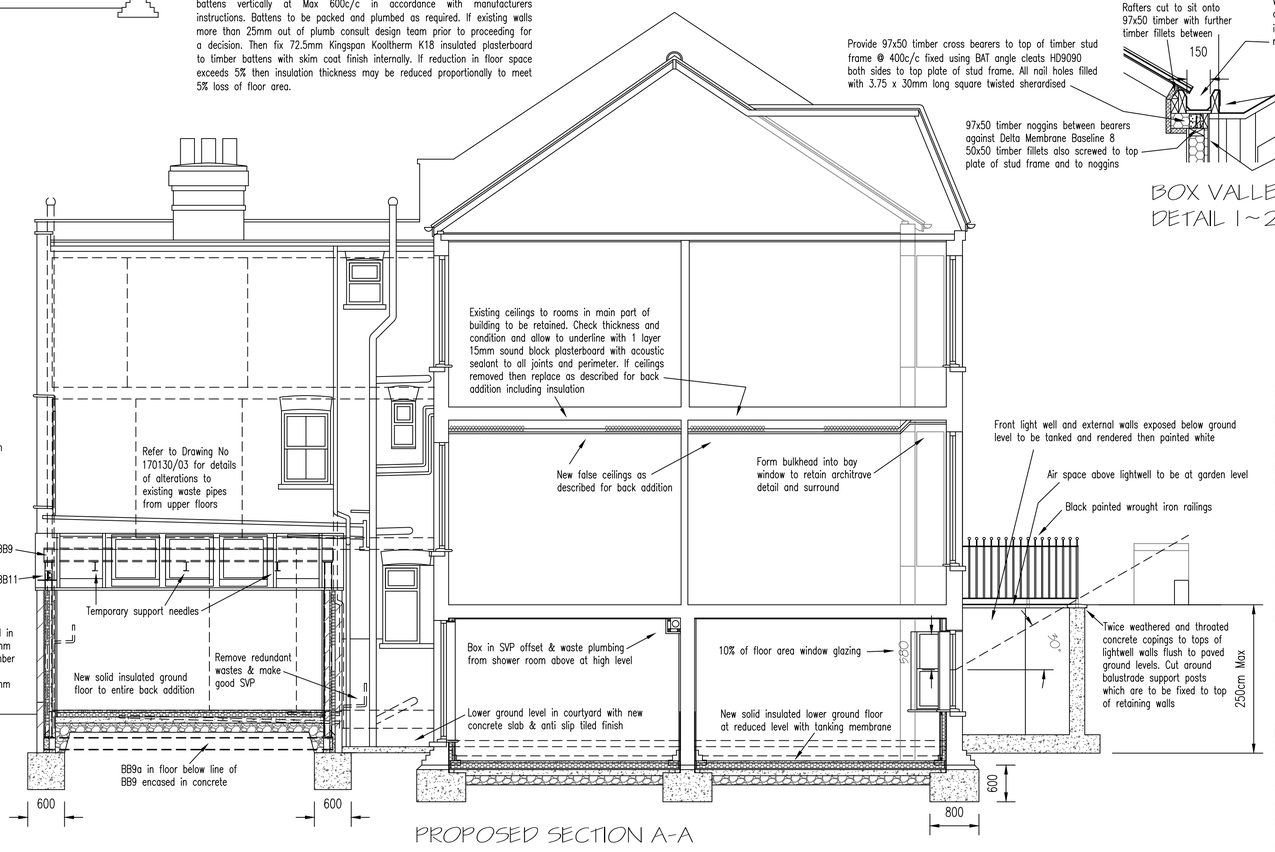
Entire lower ground floor together with external & party walls where below adjacent ground levels to be tanked with Delta-MS 500 or Baseline 20 tanking membrane or equal approved installed by a registered installer giving a 30 year product guarantee to cover membrane and ancillary products and a minimum 12 year insurance backed installation guarantee. Delta aquaduct/channel drainage system to be provided to drain into sump with pump to drainage system at front of building. All to be carried out in strict accordance with manufacturers instructions.

LOWER GROUND FLOOR (Main Building)

35mm liquid screed on 500 gauge polythene moisture control layer on 75mm Kingspan Kooltherm K103 Floor Board insulation or equal approved with 25mm strip around perimeter of rooms to isolate screed & prevent a cold bridge on Delta MS 20/Baseline 20 waterproof tanking membrane with perimeter drainage channels or equal approved on 100mm thick 1:2:4 mix concrete oversite slab on 150mm layer well consolidated hardcore. Drainage to tanking as specified under Tanking Specification



PROPOSED SECTION C-C



PROPOSED SECTION A-A

Provide 97x50 timber cross bearers to top of timber stud frame @ 400c/c fixed using BAT angle cleats HD9090 both sides to top plate of stud frame. All nail holes filled with 3.75 x 30mm long square twisted sherardised

Rafters cut to sit onto 97x50 timber with further timber fillets between

150

Turn existing lead up face of 150x50 timber & dress GRP down over with minimum 100mm lap

97x50 timber noggins between bearers against Delta Membrane Baseline 8 50x50 timber fillets also screwed to top plate of stud frame and to noggins

Delta Membrane Baseline 8 fixed to existing wall

BOX VALLEY DETAIL 1~20

Existing lead dressed over wall to be rolled back to allow installation of new box valley on top of wall using 150x50 timbers with top corners chamfered, 19mm WBP ply base and 25x25 timber fillets all screwed together & finished with a GRP Fibreglass roofing system for which guarantees are generally available for 20, 25, 30 or 40 years depending on materials used and installation methods. Topcoat finishing layer on roofing resin on 600g/m² reinforcement mat to allow for box valley to be laid flat

REVISIONS	DATE
REV G – Depth of lightwell excavation & air space	16/10/2019
REV F – Construction drawing update	05/06/2018
REV E – Proposed Section C–C added	23/05/2018
REV D – Existing chimney to back addition added & revert to side extension only	23/03/2018
REV C – Rear extension combined with side infill	12/12/2017
REV B – Rear extension changed to side infill	15/11/2017
REV A – Underpinning details incorporated following trial hole exploratory excavations	04/05/2017

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THE DESIGN WORKS

TITLE
EXISTING & PROPOSED SECTIONS

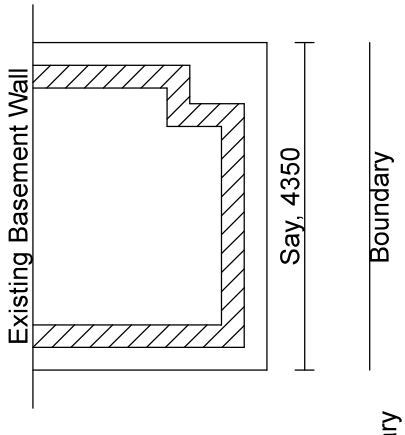
ADDRESS
28 KYLEMORE ROAD
LONDON NW6 2PT

CLIENT
COBSTAR Ltd

SCALE @ A1 1:50 & 1:100 @ A3 | DATE JAN 2017

DRAWING No. 170130/04 | REV. G

Consider INITIAL evaluation of Lightwell construction :



For INITIAL evaluation calcs, ASSUME :

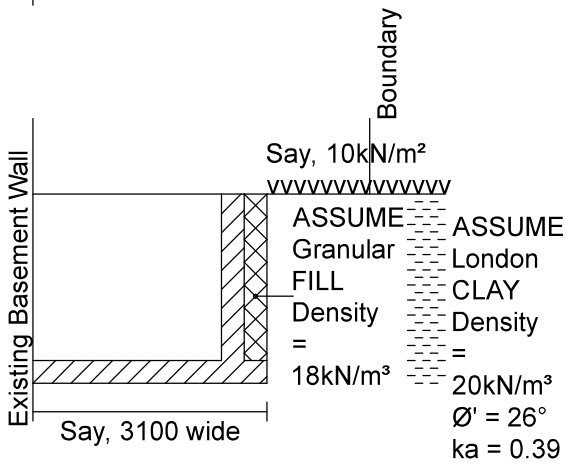
No groundwater present.

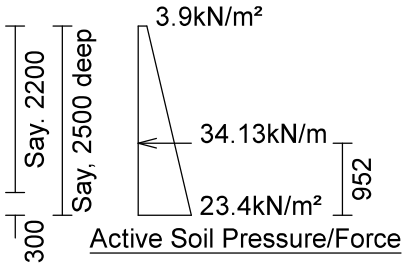
London CLAY soil.

Lightwell construction to be reinforced concrete.
(NB: Final construction may be reinforced brickwork/blockwork on reinforced concrete slab.)

"Backfill to wall stems to be granular FILL.

10kN/m² surface surcharge.





Consider weight of Lightwell (per m run) :

Base slab = 3.1 x 0.3 x 24kN/m³ = 22.32kN/m

Wall stem = 2.2 x 0.3 x 24kN/m³ = 15.84kN/m

Backfill = 2.2 x 0.3 x 18kN/m³ = 11.88kN/m

i.e. Total Weight = 50.04kN/m

Take moments at and above u/s slab/existing basement wall :

22.34 x 1.55 + 15.84 x 2.65 + 11.88 x 2.95 - 32.50
= say, 79kNm/m

Hence,
Resultant at 79/50.04 = 1.579m from existing basement wall.

Therefore, eccentricity (e) = 1.550 - 1.579
= -0.029m from C/L base slab

Thus, $q_{ref(after\ Meyerhof)}$ = 50.04/(3.1 - (2 x 0.029))
= say, 16.5kN/m²/m

Consider moments above u/s of base for Active Force (per m run) :

34.13 x 0.952 = say, 32.50kNm/m

By Inspection,
Bearing Capacity of London CLAY
and
structural adequacy of lightwell construction
OK!

NOTES

1.

Rev.	Revision Detail	Drawn	Date
00	Preliminary/Initial Issue	IFG	18/08/17

CLIENT:

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E-mail: info@keygs.com
Web: www.keygs.com

PROJECT:
26 Kylemore Road
London
NW6 2PT

TITLE:
INITIAL Evaluation
of
Lightwell Construction

Drawn:	Checked:	Date:
IFG	??	18/08/17
Scale: 1:100	Original Sheet Size: A4	Status: PRELIM
Drawing No.: 17-135-D-002		Revision: 00

APPENDIX 1

KEY GS

Geological & Geotechnical Consultants

28 Kylemore Road, NW6 2PT

Report on Ground Investigation (April 2017)

Prepared for Cobstar Limited

Geological & Geotechnical Consultants

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Job Number: 17-135

Report Number: 17-135-R-001

Cobstar Limited

28 Kylemore Road, NW6 2PT

Report on Ground Investigation (April 2017)

Prepared by:

R Westnedge BSc MSc FGS .....

Approved by:

B Duthie BEng CGeol FGS .....

Report Distribution List

Name	Copies	Rev.	Date	Copies	Rev.	Date	Copies	Rev.	Date
T Covey	PDF	v.1	21/04/17						

CONTENTS

1.0 INTRODUCTION

Key GeoSolutions Ltd (KGS) have been commissioned by Cobstar Limited to undertake a ground investigation at 28 Kylemore Road in order to ascertain the ground conditions for the assessment of a proposed extension.

The property is a mid-terrace two-storey house with a basement, constructed in the late 19th Century. It is proposed to construct a lightwell to the font of the property and to extend the lower ground / garden floor to the rear. The topography of the site is such that the rear extension will be wholly above ground.

The comments given in this report and any opinions expressed are based on the ground conditions encountered during the site work, the results of tests made in the field and on information made available by Cobstar Limited. There may be, however, conditions pertaining to the site which have not been disclosed by the investigation and which therefore could not be taken into account in this report. In particular old foundations or underground services may be present that could affect the proposed development. The term 'topsoil' is used in this report to describe the surface, usually organic, layer including turf and shallow soils, weathered material with roots etc. and should not be taken to imply agricultural soil suitable for sale.

2.0 SITE OVERVIEW

2.1 Site Location

The site, which may be located by approximate National Grid Reference 525232mE 184479mN, is situated on the west side of Kylemore Road, West Hamstead, in Camden, London (Figure 1).

The property is a mid-terraced house built between 1874 and 1894 (source old OS maps), the property has an existing basement to the rear of the property. It is proposed to extend the current basement by 300mm beneath the existing floor.

2.2 Geology of the Site

The site is covered by BGS 1: 50,000 Geological Sheet No. 256 (North London). This indicates the site to be underlain by deposits of the London Clay Formation of Eocene age, no superficial deposits are shown to overlie the London Clay. The London Clay Formation comprises of fine, sandy, silty clay.

The London Clay Formation is underlain at depth by Lambeth Group deposits (formerly known as the Woolwich & Reading Beds). These comprise of stiff glauconitic sandy clays and dense very fine-grained sands.

3.0 GROUND INVESTIGATION

Two boreholes (WS01 and WS02) were sunk at the property, one at the front and one to the rear, in order to investigate the ground conditions in accordance with the guidelines laid down in BS EN 1997-2:2007. The boreholes were sunk using a hand held windowless sampling rig provided by Apex Drilling Ltd. The approximate locations of the boreholes are shown on Figure 1. In addition four hand dug trial pits were excavated through the floor of the existing basement in order to determine the depth of the existing foundations. The depths of the boreholes and trial pits and descriptions of the soils encountered are given in the records in Appendix 1.

Shear vane tests and disturbed samples were taken at the depths shown on the borehole records. The results of the Shear vane tests are provided on the window sample logs within Appendix 1. Physical testing was carried out on three representative samples of the ground encountered; the results are given in Appendix 2.

On completion of each borehole a standpipe was installed to a depth of approximately 2.70mbgl; details of the installations are given on the borehole records.

4.0 DISCUSSIONS ON GROUND CONDITIONS

4.1 Soil Conditions

Two boreholes (WS01 and WS02) and four hand dug trial pits (TP01 to TP04) were sunk at the positions shown on Figure 1.

The boreholes encountered a thin veneer of made ground (0.2 - 0.8m) overlying the London Clay, no water was encountered in the boreholes.

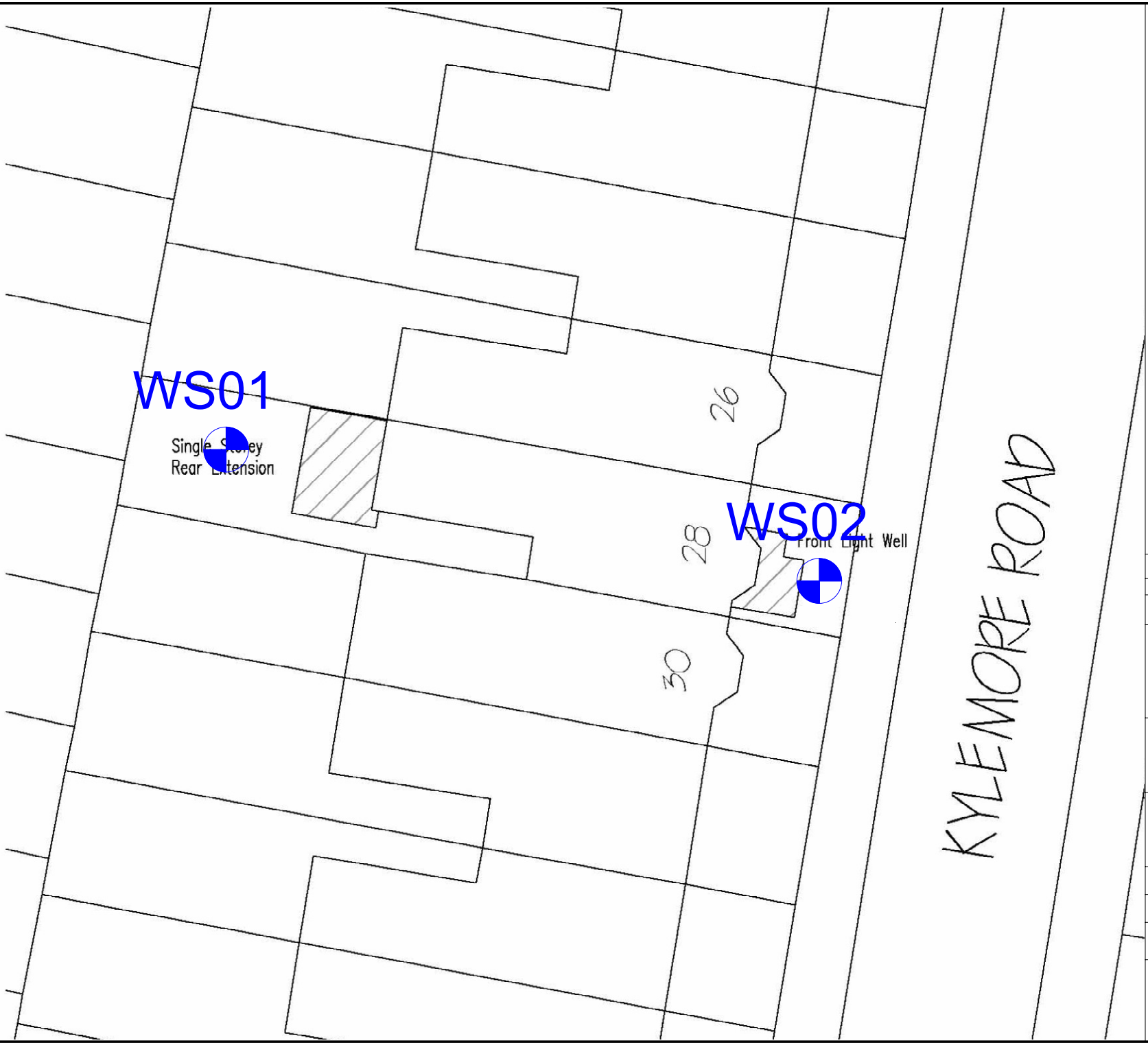
In addition to the boreholes, hand-dug trial pits were excavated into the floor of the existing basement in order to determine the depths of the foundations. The trial pits had been open for approximately a week at the time of the inspection by KGS. The underside of the foundations, which consisted a corbelled brick footing, were encountered at 0.5m below the level of the basement floor. The footings were founded on London Clay, with a clayey sand (made ground) being present above. No water was encountered by the trial pits.

4.2 Foundations

The made ground is not consider to be a suitable load bearing strata, therefor, the foundations should be taken down to the London Clay. For traditional strip footings it is recommended that an Allowable Bearing Pressure (ABP) of 100kN/m² be adopted. This assumes a minimum of firm clay being encountered at formation level. The foundations should be formed with a minimum foundation depth of 1.0m below existing ground level and below any Made Ground/Topsoil.

The Atterberg tests carried out show that the samples of the London Clay tested may be classified as clay of very high plasticity and therefore is susceptible to shrinking and swelling. Using the guidance provided by the NHBC (Chapter 4.2 “Building near trees”), the modified PI indicates that the clays tested are of high volume change potential, hence, the foundation designs should account for the trees on and adjacent to the site whether they are retained or removed.

FIGURES



NOTES

1.

Rev.	Revision Detail	Drawn	Date
01	First Issue	RW	04/05/17

CLIENT:

Cobstar Ltd

PROJECT:

28 Kylemore Road

TITLE:

Borehole Location Plan

Drawn:	Checked:	Date:
RW	BD	May '17
Scale: 1:200	Original Sheet Size: A4	Status: DRAFT

Drawing No.

Figure 1

Revision: **01**

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APPENDICES

APPENDIX 1

Window Sample Logs

Key GeoSolutions
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Fax: 01952 822961

TRIAL PIT NUMBER TP01

CLIENT Cobstar Ltd **PROJECT NAME** 28 Kylemore Road

PROJECT NUMBER 17-135 **PROJECT LOCATION** Camden

DATE STARTED 12/4/17 **COMPLETED** 12/4/17 **CO-ORDINATES** mE, mN

EXCAVATION CONTRACTOR APEX **GROUND ELEVATION** **TRIAL PIT SIZE**

EXCAVATION METHOD Hand Dug Trial Pit **LOGGED BY** Ruby Westnedge **CHECKED BY** BD

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION & REMARKS
0.5			Reddish Brown slightly silty gravelly clayey SAND with inclusions of brick and concrete. 0.00m to 0.50m ; Exposed foundations
		0.50	Bottom of trial pit at 0.50 metres.

NOTES

SAMPLE TYPE KEY U = Undisturbed D = Disturbed B = Bulk J = Jar VA = Shear Vane SPT = Standard Penetration Test

Key GeoSolutions
info@keygs.com
Telephone: 01952 822960
Fax: 01952 822961

TRIAL PIT NUMBER TP02

CLIENT Cobstar Ltd **PROJECT NAME** 28 Kylemore Road

PROJECT NUMBER 17-135 **PROJECT LOCATION** Camden

DATE STARTED 12/4/17 **COMPLETED** 12/4/17 **CO-ORDINATES** mE, mN

EXCAVATION CONTRACTOR APEX **GROUND ELEVATION** **TRIAL PIT SIZE**

EXCAVATION METHOD Hand Dug Trial Pit **LOGGED BY** Ruby Westnedge **CHECKED BY** BD

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION & REMARKS
			Reddish Brown slightly silty gravelly clayey SAND with inclusions of brick and concrete.
			0.00m to 0.40m ; Exposed foundations
			0.40

Bottom of trial pit at 0.40 metres.

NOTES

SAMPLE TYPE KEY U = Undisturbed D = Disturbed B = Bulk J = Jar VA = Shear Vane SPT = Standard Penetration Test

Key GeoSolutions
info@keygs.com
Telephone: 01952 822960
Fax: 01952 822961

TRIAL PIT NUMBER TP03

CLIENT Cobstar Ltd **PROJECT NAME** 28 Kylemore Road

PROJECT NUMBER 17-135 **PROJECT LOCATION** Camden

DATE STARTED 12/4/17 **COMPLETED** 12/4/17 **CO-ORDINATES** mE, mN

EXCAVATION CONTRACTOR APEX **GROUND ELEVATION** _____ **TRIAL PIT SIZE** _____

EXCAVATION METHOD Hand Dug Trial Pit **LOGGED BY** Ruby Westnedge **CHECKED BY** BD

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION & REMARKS
0.5			Brown slightly clayey gravelly SAND, with inclusions of brick and concrete. 0.00m to 0.50m ; Exposed foundations 0.15m ; exposed drainage pipe
		0.50	Bottom of trial pit at 0.50 metres.

NOTES

SAMPLE TYPE KEY U = Undisturbed D = Disturbed B = Bulk J = Jar VA = Shear Vane SPT = Standard Penetration Test

Key GeoSolutions
info@keygs.com
Telephone: 01952 822960
Fax: 01952 822961

TRIAL PIT NUMBER TP04

CLIENT Cobstar Ltd **PROJECT NAME** 28 Kylemore Road

PROJECT NUMBER 17-135 **PROJECT LOCATION** Camden

DATE STARTED 12/4/17 **COMPLETED** 12/4/17 **CO-ORDINATES** mE, mN

EXCAVATION CONTRACTOR APEX **GROUND ELEVATION** **TRIAL PIT SIZE**

EXCAVATION METHOD Hand Dug Trial Pit **LOGGED BY** Ruby Westnedge **CHECKED BY** BD

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION & REMARKS
0.5			Reddish Brown slightly silty gravelly clayey SAND with inclusions of brick and concrete. 0.00m to 0.50m ; Exposed foundations
0.50			Bottom of trial pit at 0.50 metres.

NOTES

SAMPLE TYPE KEY U = Undisturbed D = Disturbed B = Bulk J = Jar VA = Shear Vane SPT = Standard Penetration Test

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WELL NUMBER WS01

CLIENT Cobstar Ltd **PROJECT NAME** 28 Kylemore Road

PROJECT NUMBER 17-135 **PROJECT LOCATION** Camden

DATE STARTED 12/4/17 **COMPLETED** 12/4/17 **CO-ORDINATES** mE, mN

DRILLING CONTRACTOR APEX **GROUND ELEVATION** **HOLE SIZE**

DRILLING METHOD Windowless Sampler **LOGGED BY** Ruby Westnedge **CHECKED BY** BD

DEPTH (m)	SAMPLE TYPE NUMBER	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION & REMARKS	WELL DIAGRAM
				Black very sandy CLAY, with occasional brick fragments.	
0.20				Soft light brown slightly sandy CLAY.	
				0.30m ; rare medium gravel sized brick fragments.	
0.5					
0.60				0.60m ; becoming firm Firm to stiff light brownish grey CLAY.	
				0.80m ; rare white gravel and occasional pockets of sand.	
1.0					
1.5	B VA	70/80/75 (avg 75 kPa)			
				1.80 ; becoming stif	
2.0	B				
2.5	VA	90/80/85 (avg 85 kPa)			
2.50				Refusal at 2.50 metres. Bottom of borehole at 2.50 metres.	

NOTES

SAMPLE TYPE KEY U = Undisturbed D = Disturbed B = Bulk J = Jar VA = Shear Vane SPT = Standard Penetration Test

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WELL NUMBER WS02

CLIENT Cobstar Ltd **PROJECT NAME** 28 Kylemore Road

PROJECT NUMBER 17-135 **PROJECT LOCATION** Camden

DATE STARTED 12/4/17 **COMPLETED** 12/4/17 **CO-ORDINATES** mE, mN

DRILLING CONTRACTOR APEX **GROUND ELEVATION** **HOLE SIZE**

DRILLING METHOD Windowless Sampler **LOGGED BY** Ruby Westnedge **CHECKED BY** BD

DEPTH (m)	SAMPLE TYPE NUMBER	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION & REMARKS	WELL DIAGRAM
0.5				Brown slightly gravelly slightly clayey SAND with occasional rootlets.	
				0.80	
1.0	VA B	32/30/28 (avg. 30 kPa)		Soft to firm light greyish brown slightly gravelly slightly sandy CLAY.	
				1.20	
1.5				Firm brown CLAY with occasional sand pockets.	
2.0	VA	45/40/45 (avg. 43 kPa)			
2.5	B			2.50m ; becomes blueish grey	
	VA	76/72/75 (avg. 74 kPa)			
				2.70	

Refusal at 2.70 metres.
Bottom of borehole at 2.70 metres.

NOTES

SAMPLE TYPE KEY U = Undisturbed D = Disturbed B = Bulk J = Jar VA = Shear Vane SPT = Standard Penetration Test

APPENDIX 2

Laboratory Results

TERRA TEK
SITE INVESTIGATION & LABORATORY SERVICES

Key GeoSolutions Limited
Suite 6
Nova House
Audley Avenue Enterprise Park
Newport
Shropshire, TF10 7DW
For the attention of Ruby Westnedge

Report No: B20773
Issue No 02

LABORATORY TEST REPORT

Project Name	**28 KYLEMORE ROAD**		
Project Number	**B20773**	Date samples received	24/04/2017
Your Ref		Date written instructions received	24/04/2017
Purchase Order	17-135	Date testing commenced	24/04/2017

Please find enclosed the results as summarised below

Figure / Table	Test Quantity	Description	ISO 17025 Accredited
1	~	Summary of Geotechnical Tests	See report
2	3	BRE Suite - Soil	
3 - 5	3	Atterberg Limit	
App S1	~	Sample Descriptions - Soil	N/A
App S2	~	Deviating Samples - Soil	N/A
App S3	~	Summary of In-House Analytical Test Methods - Soil	N/A

Remarks :

Issued by : Stephen Langman Date of Issue : 09/05/2017

Approved Signatories : S. Langman 09/05/2017

G Wilson (JMD/Laboratories Director), S Langman (Laboratory Coordinator)

Key to symbols used in this report
S/C : Testing was sub-contracted

Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.
The results reported relate to samples received in the laboratory only.
All results contained in this report are provisional unless signed by an approved signatory
This report should not be reproduced except in full without the written approval of the laboratory.
Under multisite accreditation the testing contained in this report may have been performed at another Terra Tek laboratory.
The enclosed results remain the property of Terra Tek Limited and we reserve the right to withdraw
our report if we have not received cleared funds in accordance with our standard terms and conditions
Only those results indicated in this report are UKAS accredited and any opinions or interpretations expressed are outside the scope of UKAS accreditation.
Feedback on the this report may be left via our website www.terratek.co.uk/contact-us

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 0126
25 YEARS 1990-2015

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Head Office : 62 Rochsolloch Road, Airdrie, ML6 9BG

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: 28 KYLEMORE ROAD

Client:

Engineer:

Contract No B20773

Sample Identification							Atterberg limits						Density		Total Stress			
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Sample Description	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage retained 425µm %	Atterberg Classification	Particle Density Mg/m³	Bulk Mg/m³	Dry Mg/m³	Shear Strength kPa	Apparent Cohesion C kPa	Angle of Shearing Resistance Phi	Other Tests
WS01	2.00-2.50		D	417407	Brown CLAY with occasional fine to medium gravel.	31	76	22	54	1	CV							BRE SD1 Suite
WS02	0.80-1.00		D	417409	Brown CLAY with occasional fine to medium gravel.	33	72	21	51	1	CV							BRE SD1 Suite
WS02	1.00-1.20		D	417408	Brown CLAY with occasional fine to medium gravel.	28	72	18	54	0	CV							BRE SD1 Suite
Notes: Opinions and interpretations are outside the scope of UKAS accreditation					UKAS Accredited Test Y/N	Test details are given on the 'Notes on Laboratory Procedures' sheet: Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	See individual report sheets

Originator	Approved
ME	S. Langman 09/05/2017

SUMMARY OF GEOTECHNICAL TESTS

Figure 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: 28 KYLEMORE ROAD

Client:

Engineer:

Contract No B20773

Sample Identification																							
Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Sulphate (acid soluble as SO4) %	Sulphate (water soluble in 2:1 extract) as SO4 g/l	pH	Chloride (water soluble) %	Magnesium (water soluble in 2:1 extract) mg/l	Ammoniacal Nitrogen (as N) mg/kg	Nitrate mg/kg	Total Sulphur %											
WS01	2.00-2.50		D	417407	0.06	0.10	7.8	<0.01	8	2.1	260	0.05											
WS02	1.00-1.20		D	417408	0.43	2.05	7.8	<0.01	265	2.6	25	0.07											
WS02	0.80-1.00		D	417409	0.08	0.08	7.9	<0.01	9	2.4	140	<0.05											
Limits of Detection					0.02	0.01	0.1	0.01	1	0.1	1	0.05											
Terra Tek Analysis Method					TP029	TP043	TP019	TP134	TP136	TP072	S/C	S/C											
Accreditation M=Mcerts U=UKAS N=No accreditation					M	M	M	M	N	N	N	N											

Originator	Checked & Approved
TGH	S. Langran 09/05/2017

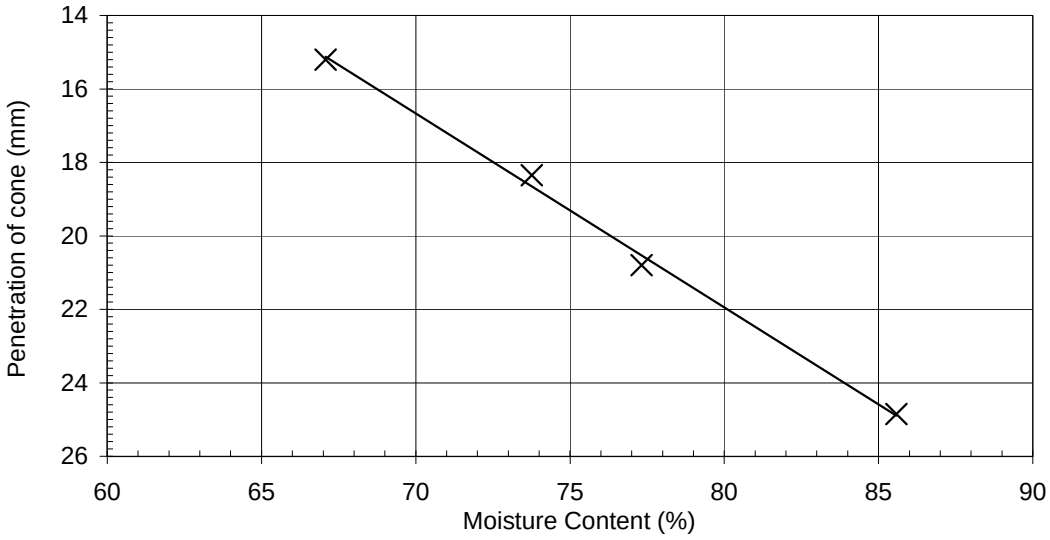
BRE SD1 SUITE - SOIL

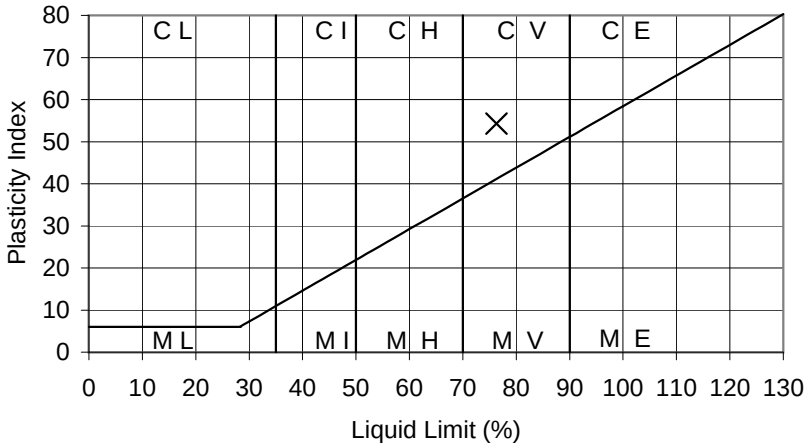
Figure 2

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES	Site 28 KYLEMORE ROAD	**Contract No. B20773**
	Client	Hole ID WS01
	Engineer	Sample Ref Depth (m) 2.00-2.50 Sample Type D

Non Engineering Description : Brown CLAY with occasional gravel. Gravel is fine.

Preparation : Sample as received





Results :

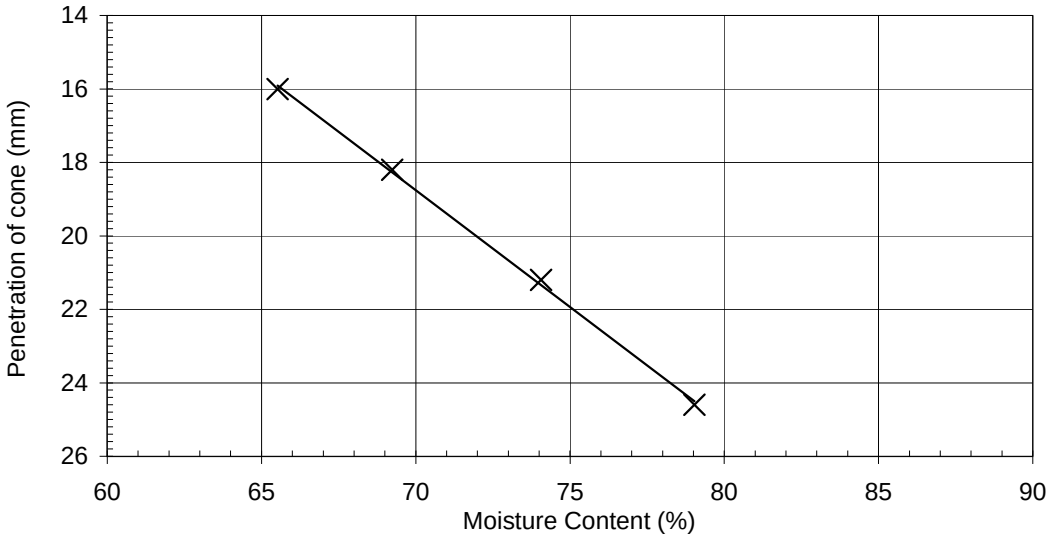
As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	31	%
Percentage retained on 425µm sieve :	1	%
Liquid Limit :	76	%
Plastic Limit :	22	%
Plasticity Index :	54	
Equivalent moisture content of material passing 425µm sieve :	31	%
Liquidity Index :	0.17	

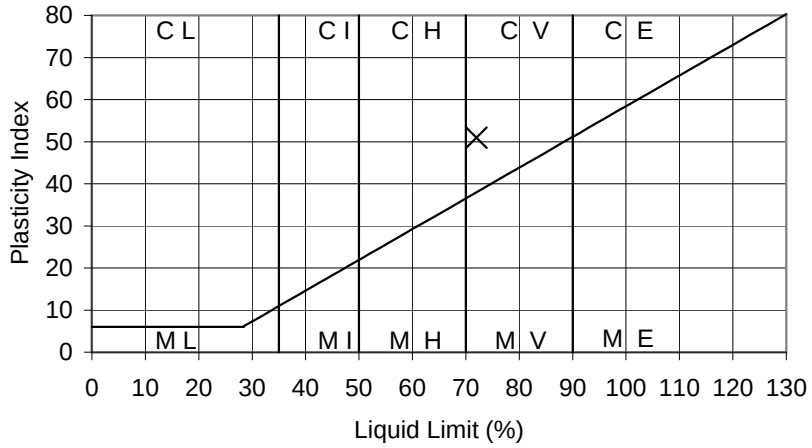
Originator	Checked & Approved	**Liquid Limit (Four Point Cone Penetrometer Method)** **Plastic Limit, Plasticity Index & Liquidity Index** BS 1377:Part 2:Clause 4.3:1990 BS 1377:Part 2:Clause 5:1990	**Figure 3**
KP	S. Langman 09/05/2017		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES	Site 28 KYLEMORE ROAD	**Contract No. B20773**
	Client	Hole ID WS02
	Engineer	Sample Ref Depth (m) 0.80-1.00 Sample Type D

Non Engineering Description : Brown CLAY with occasional gravel. Gravel is fine.

Preparation : Sample as received





Results :

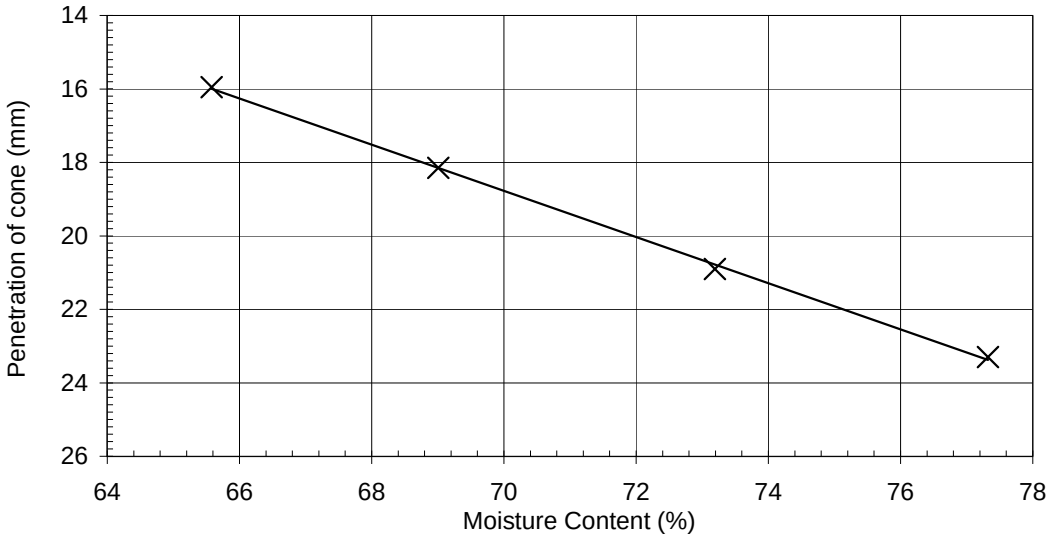
As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	33	%
Percentage retained on 425µm sieve :	1	%
Liquid Limit :	72	%
Plastic Limit :	21	%
Plasticity Index :	51	
Equivalent moisture content of material passing 425µm sieve :	33	%
Liquidity Index :	0.24	

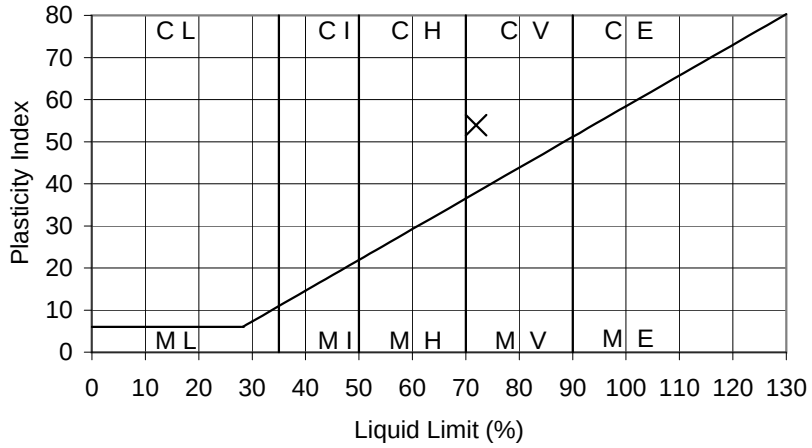
Originator	Checked & Approved	**Liquid Limit (Four Point Cone Penetrometer Method)** **Plastic Limit, Plasticity Index & Liquidity Index** BS 1377:Part 2:Clause 4.3:1990 BS 1377:Part 2:Clause 5:1990	**Figure 4**
KP	S. Langman 09/05/2017		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES	Site 28 KYLEMORE ROAD	**Contract No. B20773**
	Client	Hole ID WS02
	Engineer	Sample Ref Depth (m) 1.00-1.20 Sample Type D

Non Engineering Description : Brown CLAY.

Preparation : Sample as received





Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	28 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	72 %
Plastic Limit :	18 %
Plasticity Index :	54
Equivalent moisture content of material passing 425µm sieve :	28 %
Liquidity Index :	0.19

Originator	Checked & Approved	**Liquid Limit (Four Point Cone Penetrometer Method)** **Plastic Limit, Plasticity Index & Liquidity Index** BS 1377:Part 2:Clause 4.3:1990 BS 1377:Part 2:Clause 5:1990	**Figure 5**
KP	S. Langman 09/05/2017		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site 28 KYLEMORE ROAD

Client

Engineer

Contract No B20773

Sample Identification				Lab Sample ID	Date Sampled	Temperature of cool box on receipt °C	Description
Exploratory Hole	Depth m	Sample Ref	Sample Type				
WS01	2.00-2.50		D	417407	12/04/17	11.0	Brown CLAY with occasional fine to medium gravel.
WS02	1.00-1.20		D	417408	12/04/17	11.0	Brown CLAY with occasional fine to medium gravel.
WS02	0.80-1.00		D	417409	12/04/17	11.0	Brown CLAY with occasional fine to medium gravel.

Notes

1. Where a date of sampling is not provided, the sample is classified as deviating.
2. Samples are considered deviating if the incorrect sample container type has been used. This is indicated within the report tables.
3. Results reported for samples classified as deviating may be compromised.

Originator	Checked & Approved	LABORATORY DESCRIPTIONS	Appendix S1
TGH	S. Longman 09/05/2017		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site 28 KYLEMORE ROAD

Client

Engineer

Contract No B20773

Sample Identification				Lab Sample ID	Date Sampled	Deviating conditions						Preservatives used
Exploratory Hole	Depth m	Sample Ref	Sample Type			Sampling date has not been provided	Exceeded maximium holding time for selected test(s)	Presence of headspace in sample vial	Poorly fitting cap or lid	Damaged container		
WS01	2.00-2.50		D	417407	12/04/17							
WS02	1.00-1.20		D	417408	12/04/17							
WS02	0.80-1.00		D	417409	12/04/17							

NOTES
1 Results reported for samples classified as deviating may be compromised. Deviation types are shown as "X" or "Yes" in the table above.
2 The absence of "X" or "Yes" in the table above indicates no reported deviations.
3 Deviations due to use of incorrect sample container are shown on result tables.
4 Deviating results are indicated within result tables.

Originator	Checked & Approved
TGH	S. Longman 09/05/2017

DEVIATING SAMPLES - SOIL

Appendix S2

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site 28 KYLEMORE ROAD

Client

Engineer

Contract No B20773

Method Code	Reference	Description of Method	ISO17025 Accredited	MCERTS Accredited	Wet/Dry Sample Tested
GP001	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Preparation of soil samples for chemical analysis	Yes	Yes	N/A
GP012	BS EN 12457-3: Characterisation of Waste - Compliance test for leaching of granular waste materials and sludges (two-stage batch test)	Preparation of soil samples for two-stage leachate test			Dry
TP019	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of pH in 2.5:1 water/soil extract using pH meter.	Yes	Yes	Dry
TP029	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of acid soluble sulfate by gravimetry.	Yes	Yes	Dry
TP032	MAFF Book 427: The Analysis of Agricultural Materials: Method 8	Determination of water soluble boron by colorimetry	Yes		Dry
TP033	APHA/AWWA, 19th edition: Method 5520E	Determination of Toluene Extractable Matter by soxhlet extraction.	Yes		Dry
TP040	APHA/AWWA, 19th edition: Method 3500Cr-D	Determination of hexavalent chromium by colorimetry.	Yes		Dry
TP041	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of organic matter by titrimetry.	Yes		Dry
TP042	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of loss on ignition at 50-440°C by gravimetry	Yes	Yes	Dry
TP043	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of water soluble sulfate in 2:1 water/soil extract	Yes	Yes	Dry
TP045	GACHAMJA A.M. Chromatography and Analysis: 1992 9-11 (modified)	Determination of polyaromatic hydrocarbons extractable in dichloromethane, by GC/MS	Yes	Yes	Dry
TP046	MEWAM method: Phenols in water and Effluents: 4-aminoantipyrine method	Determination of monohydric phenols by steam distillation/colorimetry	Yes	Yes	Dry
TP047	MEWAM method: Cyanide in Waters etc	Determination of Free Cyanide by steam distillation/colorimetry	Yes		Dry
TP048	MEWAM method: Cyanide in Waters etc	Determination of total cyanide by steam distillation/colorimetry.	Yes	Yes	Wet
TP049	MEWAM method: Cyanide in Waters etc	Determination of complex cyanide by calculation	Yes		Dry
TP050	MEWAM method: Determination of Thiocyanate ,1985	Determination of thiocyanate by colorimetry	Yes	Yes	Dry
TP051	USEPA Method 9030B	Determination of acid soluble sulfides by steam distillation/colorimetry.	Yes	Yes	Dry
TP052	BS1881: Part 324, 1988: Testing Concrete	Determination of elemental sulfur by soxhlet extraction and titrimetry.	Yes		Dry
TP067	TNRCC Method 1005: 2001 (modified)	Determination of pentane/acetone extractable petroleum hydrocarbons (C8 - C40) by GC/FID	Yes	Yes	Wet
TP072	In-house documented method	Determination of ammoniacal nitrogen by colorimetry.			Dry

Notes

1. Terra Tek (Birmingham) are MCERTS accredited for clay, sand & loam matrix types only, where they constitute the major component of the sample. Other coarse granular materials, ie gravel, are not accredited where they comprise the major component of the sample.
2. Results are expressed on a dry-weight basis (samples dried at 30°C ± 5°C) except where stated.
3. The laboratory removes any material >2mm prior to analysis. The quantity and nature of any material removed from samples is recorded and the information is available on request.
4. The laboratory records the date of analysis of each parameter. This information is available on request.
5. Where a parameter cannot be determined in house it is our policy to use a UKAS/MCERTS accredited laboratory wherever possible. Terra Tek will assume responsibility for the quality of subcontracted tests and the performance of the subcontractor chosen. Where there is no known UKAS/MCERTS laboratory for a particular parameter, a laboratory listed within the Terra Tek Approved Subcontractors list, which is subject to performance assessment, will be selected.

Originator	Checked & Approved	**SUMMARY OF IN-HOUSE ANALYTICAL TEST METHODS (SOIL)**	**Appendix S3**
N/A	N/A		Sheet 1 of 2

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site 28 KYLEMORE ROAD

Client

Engineer

Contract No B20773

Method Code	Reference	Description of Method	ISO17025 Accredited	MCERTS Accredited	Wet/Dry Sample Tested
TP073	In-house documented method	Determination of anionic detergent (MBAS) by colorimetry			Dry
TP074	In-house documented method	Determination of water soluble fluoride by ion selective electrode			Dry
TP098	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of acid soluble chloride by titrimetry			Dry
TP099	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of water soluble chloride by titrimetry	Yes	Yes	Dry
TP100	Wisconsin DNR Modified GRO method, Method for Determining Gasoline Range Organics	Determination of Volatile Petroleum Hydrocarbons/GRO.	Yes	Yes	Wet
TP110	USEPA Methods 8082A & 3665A	Determination of Total & Speciated 7 PCB Congeners by GC/MS SIM	Yes	Yes	Wet
TP114	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of carbonate in soil (rapid titration method)			Dry
TP126	TNRCC Method 1006 (modified)	Extracted petroleum hydrocarbons from TP067 split into aromatic and aliphatic fractions. Analysed by GC/FID.	Yes		Wet
TP134	In-house documented method	Determination of water soluble chloride by titrimetry	Yes	Yes	Dry
TP135	USEPA Methods 8100 & 8270D. In-house method TP045	Determination of polyaromatic hydrocarbons extractable in dichloromethane, by GC/MS (with concentration stage)			Dry
TP145	USEPA Methods 3550C & 8270D	Determination of Semi-Volatile Organic Compounds by GC/MS	Yes	Yes	Wet
TP147	USEPA Methods 8082A & 3665A	Determination of total & speciated WHO 12 PCB Congeners by GC/MS SIM.			Wet
TP150	USEPA Methods 8081B & 8141B	Determination of pesticides and herbicides in soil by GC/MS SIM			Dry
TP152	USEPA Method 556	Determination of carbonyls in soil by GC/MS.			Wet
TP154	USEPA Method 5021. Wisconsin DNR modified GRO method	Determination of volatiles in soil by GC/MS headspace	Yes	Selected	Wet
TP158	USEPA Method 1671	Determination of glycols in soil by GC/FID DI			Wet

Notes

1. Terra Tek (Birmingham) are MCERTS accredited for clay, sand & loam matrix types only, where they constitute the major component of the sample. Other coarse granular materials, ie gravel, are not accredited where they comprise the major component of the sample.
2. Results are expressed on a dry-weight basis (samples dried at 30°C ± 5°C) except where stated.
3. The laboratory removes any material >2mm prior to analysis. The quantity and nature of any material removed from samples is recorded and the information is available on request.
4. The laboratory records the date of analysis of each parameter. This information is available on request.
5. Where a parameter cannot be determined in house it is our policy to use a UKAS/MCERTS accredited laboratory wherever possible. Terra Tek will assume responsibility for the quality of subcontracted tests and the performance of the subcontractor chosen. Where there is no known UKAS/MCERTS laboratory for a particular parameter, a laboratory listed within the Terra Tek Approved Subcontractors list, which is subject to performance assessment, will be selected.

Originator	Checked & Approved	SUMMARY OF IN-HOUSE ANALYTICAL TEST METHODS (SOIL)	Appendix S3
N/A	N/A		Sheet 2 of 2