

BASEMENT IMPACT ASSESSMENT

**24 - 28 Warner Street
Clerkenwell
London
EC1**

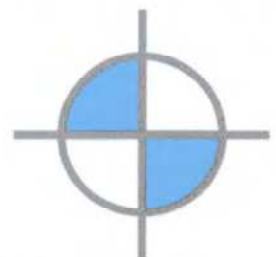
for

Aitch Group

LBH4006

AUGUST 2012

LBH
WEMBLEY



**Geotechnical &
Environmental**

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Project No: LBH4006

Report Ref: LBH4006 Ver 2.1

Date: 29/08/2012

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FOREWORD - GUIDANCE NOTES

GENERAL

This report has been prepared for a specific client and to meet a specific brief. The preparation of this report may have been affected by limitations of scope, resources or time scale required by the client. Should any part of this report be relied on by a third party, that party does so wholly at its own risk and LBH WEMBLEY Geotechnical & Environmental disclaims any liability to such parties.

The observations and conclusions described in this report are based solely upon the agreed scope of work. LBH WEMBLEY Geotechnical & Environmental has not performed any observations, investigations, studies or testing not specifically set out in the agreed scope of work and cannot accept any liability for the existence of any condition, the discovery of which would require performance of services beyond the agreed scope of work.

VALIDITY

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 shall be at the client's sole and own risk. 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 therefore not be relied upon in the future and any such reliance on the report in the future shall again be at the client's own and sole risk. LBH WEMBLEY Geotechnical & Environmental should in all such altered circumstances be commissioned to review and update this report accordingly.

THIRD PARTY INFORMATION

The report may present an opinion on the disposition, configuration and composition of soils, strata and any contamination within or near the site based upon information received from third parties. However, no liability can be accepted for any inaccuracies or omissions in that information.

DRAWINGS

Any plans or drawings provided in this report are not meant to be an accurate base plan, but are used to present the general relative locations of features on, and surrounding, the site.

1.0 INTRODUCTION

It is proposed to re-develop this 300m² former Latchfords Timber Merchants site with a residential flat development that will include an area designated as basement.

1.1 Brief

LBH WEMBLEY Geotechnical & Environmental were commissioned to provide a Basement Impact Assessment (BIA) to support the planning application to London Borough of Camden in 2011. This report is a revision of that assessment to take account of changes to the configuration of the planned basement.

The BIA is directed to determine whether the proposed basement will :

- cause harm to the built and natural environment
- result in flooding
- lead to ground instability.

In order to complete the assessment, a previous desk study and site investigation were supplemented by further desk study to retrieve geotechnical information from nearby sites, a site walkover and monitoring of standpipes installed in two of the site investigation boreholes.

1.2 Report Structure

This report commences with a characterisation of the site and then progresses to a formal Basement Impact Assessment. The latter has been achieved by implementing a staged assessment as follows:

- Stage 1 - Screening;
- Stage 2 - Scoping;
- Stage 3 - Site investigation and study;
- Stage 4 - Impact assessment

1.3 Previous Reports

In addition to information set out in Camden Geological, Hydrogeological and Hydrological Study (CGHHS) prepared for the London Borough of Camden by Ove Arup in November 2010 as guidance for subterranean development, this assessment draws upon information contained in two recent reports that have been prepared specific to the site and the proposed development.

- Site Investigation Survey by Soil Environment Services Report Ref SES/TH/WS/1#1 dated 8th August 2011
- Archaeological Desk Based Assessment by CGMS Report Ref MS/12570 dated February 2011

2.0 **SITE CHARACTERISATION**

2.1 **Site Location**

The site is situated on the southwest side of Warner Street and may be approximately located by National Grid Reference TQ 312 821.

2.2 **Topographical Setting**

The site lies at an elevation of approximately +13m OD, on a southwest-facing slope near the base of a southeast trending shallow valley that contains the (now culverted) River Fleet.

2.3 **Site Description**

The site layout is currently a single property used until recently as a timber merchant. The main structure occupies Nos. 26 and 28 Warner Street and comprises a pair of tall open brick built shed buildings extending to the back of the site and separated by an open area that has been recently covered in. A toilet block stands at the rear end of the site, and a brick office is located in the eastern corner of the site. The structure is single storey with a partial mezzanine floor around the edges

The building at No. 28 Warner Street is a similar timber storage shed but is a more recent construction constructed on what had previously been left as an open timber yard. This structure extends back in to Warner Yard as far as the adjacent Nos. 26 and 28, but the site extends slightly further. The latter area comprises an open walled-off section of overgrown yard situated at the lower level of Warner Yard, which stands at approximately +11.5m OD.

The entire site is covered in concrete flooring at level of approximately +13.3m OD. (It should be noted that the levels shown on the drawings submitted for planning relate to an arbitrary site datum level of +50.0 SD assigned to this existing ground floor level.)

2.4 **Site History**

The site lay within open sloping land to the northeast of the Fleet River until the development of Great Warner Street in the 18th Century, when residential properties were

constructed. Throughout the 19th Century the site comprised three adjacent separate properties.

No. 24, at the west of the site, was the Red Lion public house, comprising a main building at the street frontage with two outbuildings extending back to the Red Lion Yard (the precursor of Warner Yard).

Nos. 26 and 28 Warner Street appear to have been residential properties again with the main structures located on the street frontage and outhouse, likely toilets, in the backyards.

The construction of Warner Street across the slope would have led to these properties either all lying below the street level or to them being raised up on building platforms. A likely scenario is that the rear outbuildings and toilets were situated at the lower level of the Yard to the rear of the properties but that the main buildings were constructed with an undercroft or basement cut into the rising ground.

The overpass (Rosebery Avenue) which crosses Warner Street to the northwest of the site was constructed at the end of the 19th Century and saw the demolition of the properties to the northwest of 24 Warner Street and the creation of the sloping alleyway of Warner Yard that is now present to the northwest of the site.

During the Second World War it seems that the central property, 26 Warner Street, may have suffered a direct hit and that the adjacent properties (24 and 28 Warner Street) were damaged beyond repair. Goad Plans from 1942, 1951, 1961 and 1967 appended to this report show the area of clearance after the War and the progressive development of the timber yard and storage sheds that remain on site today.

2.5 Geological Information

The British Geological Survey (BGS) (England and Wales sheet 256 North London 1994) indicates the site to lie on Alluvial Deposits associated with the valley of the River Fleet, underlain by the London Clay Formation.

2.6 Hydrological Information

The Environment Agency (EA) indicates that the site is located upon superficial soils that are designated as a Secondary A aquifer by the British Geological Survey (BGS). These are defined as permeable layers capable of supporting water supplies at a local rather than strategic scale and are generally aquifers formerly classified as minor aquifers. The site does not lie within any groundwater abstraction Source Protection Zone (SPZ).

2.7 Ground Conditions

The anticipated geological conditions have been confirmed by the site survey investigation in that the site has been shown to be underlain, at least in part, by the feather edge of an alluvial tract overlying the London Clay.

The site investigation survey has established that beneath approximately 200mm of concrete surfacing, the site is underlain by some made ground extending to between 3.4m at the front of the site and 4.0m at the rear of the site. The made ground appears to comprise a mixture of dirty black/brown and grey sandy gravel containing abundant brick fragments and an assortment of stone fragments, brick and glass that are suggestive of demolition materials.

No specific relic basement floor seems to have been noted, but the presence of this thickness of made ground of this nature may be taken as reasonable evidence of probable former basements or undercrofts that were backfilled after the War.

There appears to be a sloping surface to the underlying natural soils, so that these were apparently encountered some 600mm higher at the front of the site.

The natural firm to stiff grey or stiff dark grey clay encountered in the base of Borehole Nos. 3 and 4 in the northwestern building at depths of 3.4 and 4.0m respectively probably reflects downwashed London Clay Formation material. However, this material appears to have been found at a deeper level of approximately 4.8m in Borehole No. 2, the southernmost borehole, and is capped here by an approximately 800mm thickness of soft dark grey organic silt. This organic silt can be interpreted as representing alluvial deposition associated with the channel of the River Fleet, the course of which can be identified from old maps as running within approximately 20m of this borehole.

The records of previous boreholes constructed on a site to the southeast are appended and these found some evidence of possible alluvium and confirm the course of the Fleet Valley feature, suggesting the river course to lie at a possible depth of approximately 6m below the street level.

A more recent borehole constructed at a similar level to the site but to the east of the site on the opposite side of Warner Street found some 5m of made ground and groundwater on the surface of the London Clay at 5.4m depth. This borehole seems to have demonstrated that the London Clay formation is relatively thin in the locality and the presence of the underlying Lambeth Group (Woolwich and Reading Clay) at less than 10m depth, and the Thanet Sand at around 24m depth.

2.8 Groundwater Conditions

During the site investigation survey groundwater seepages were noted within the alluvial silt that extended from approximately 4.0m to 4.8m depth in Borehole No. 2. A further seepage was noted emanating from a more permeable layer within the underlying clay deposits at 5.5m depth.

Subsequent monitoring (24th November 2011) of standpipes installed in Borehole Nos. 2 and 3 of the original survey confirmed an absence of groundwater in Borehole No.3, and a groundwater table standing at 4.15m depth (approximately +9.15m OD)

Recent monitoring (29th August 2012) of standpipe installed in Borehole No. 3 of the original survey is understood to have encountered groundwater at 4.36m depth. However, in view of the upper surface of the clay lying at a 3.5m depth this is interpreted as the collection of water into an effective sump. It has not been possible to dip Borehole No. 2 on this occasion, but a more recently installed borehole within the rear central area of the site is understood to be showing groundwater at 3.88m depth, suggesting the groundwater table currently standing at approximately +9.40m OD)

The hydrogeological regime beneath the site may be subject to seasonal and longer term cyclical influences. Further monitoring of the groundwater levels prior to commencement of the development is therefore advisable in order to confirm the prevailing situation for construction.

2.9 Proposed Development

The proposed development will comprise demolition of the existing buildings and the construction of twelve residential apartments situated in four above ground floors with a single basement level under the rear two thirds of the property. Because the site is located on a hillside, the floor level of the new basement (approximately +10.1m OD) will in fact lie less than 1.5m below the ground level of Warner Yard at the rear of the property.

Excavation for the new basement is therefore not expected to reach the surface of the natural soils, which appear to lie at over 3m below the level of Warner Street at the front of the property and over 2m below the Yard level at the rear of the property. Importantly, the new excavation is also not expected to encounter the groundwater table, which appears to lie at a similar depth.

The party wall to No. 30 Warner Street has been shown to be founded at a level of approximately +10.8m OD. On the other side of the property, the section of boundary wall adjacent to entrance to Warner Yard has been indicated to be founded at the same level, of +10.8m OD.

Given the substantial depth of made ground beneath the site, it is anticipated that piled foundations will be adopted throughout the new development. These will be small diameter bored piles terminated in the London Clay or Lambeth Group at depth beneath the site.

3.0 BASEMENT IMPACT ASSESSMENT

3.1 STAGE 1 - SCREENING

The first stage of the BIA is the identification of any matters of concern relating to

- Groundwater flow
- Land stability
- Surface flow and flooding

In order to identify what issues are relevant to the proposed scheme a series of questions are addressed. Where the answer is “Yes” or “Unknown” to any of the questions these matters are given further consideration in Section 3.2. Justification is given for “No” answers.

3.1.1 GROUNDWATER FLOW

Question 1: Is the site located directly above an aquifer?

YES

Information from the Environment Agency indicated that the site is located upon superficial soils that are designated as a Secondary A aquifer by the British Geological Survey (BGS). These are defined as permeable layers capable of supporting water supplies at a local rather than strategic scale and are generally aquifers formerly classified as minor aquifers.

Question 1 b: Will the proposed basement extend beneath the water table surface?

NO

(see section 2.9)

Question 2: Is the site within 100m of a watercourse, well (used/disused) or a potential spring line?

YES

The historical course of the River Fleet is located some 20m to the rear (south) of the property

Question 3: Is the site within the catchment of the pond chains on Hampstead Heath?

NO

(see CGHHS)

Question 4: Will the proposed basement development result in a change in the proportion of hard surfaced/paved areas?

NO

(see submitted plans)

Question 5: As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?

NO

(see submitted plans)

Question 6: Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond (not just the pond chains on Hampstead Heath) or spring line?

NO

(see section 2.9)

3.1.2 LAND STABILITY

Question 1: Does the existing site include slopes, natural or manmade, greater than 7°?

NO

(see submitted plans)

Question 2: Will proposed re-profiling or landscaping at the site change slopes at the property boundary to more than 7°?

NO

(see submitted plans)

Question 3: Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?

NO

(see submitted plans)

Question 4: Is the site within a wider hillside setting in which the general slope is greater than 7°?

NO

Although there are some areas relatively close to the site that have slopes greater than 7° this cannot be said to be the general slope angle. The alley, Warner Yard, adjacent to the site slopes down at an angle of approximately 5°.(see submitted plans)

Question 5: Is the London Clay the shallowest strata at the site?

NO

(see site investigation survey)

Question 6: Will any trees be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained?

NO

(see submitted plans)

Question 7: Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site?

NO

(local knowledge)

Question 8: Is the site within 100m of a watercourse or a potential spring line?

YES

The historical course of the River Fleet is located some 20m to the rear (south) of the property.

Question 9: Is the site within an area of previously worked ground?

NO

(local knowledge)

Question 10: Is the site within an aquifer?

YES

Information from the Environment Agency indicated that the site is located upon superficial soils that are designated as a Secondary A aquifer by the British Geological Survey (BGS).

These are defined as permeable layers capable of supporting water supplies at a local rather than strategic scale and are generally aquifers formerly classified as minor aquifers.

If so will the proposed basement extend beneath the water table such that dewatering may be required during construction?

NO

(see section 2.9)

Question 11: Is the site within 50m of the Hampstead Heath ponds?

NO

Question 12: Is the site within 5m of a highway or pedestrian right of way?

YES

The site adjoins Warner Street and Warner Yard

Question 13: Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?

YES

The adjacent property No. 30 Warner Street is understood not to contain a basement.

Question 14: Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?

NO

(local knowledge)

3.1.3 SURFACE FLOW AND FLOODING

Question 1: Is the site within the catchment of the pond chains on Hampstead Heath?

NO

(see CGHHS)

Question 2: 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

(see submitted plans)

Question 3: Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?

NO

(see submitted plans)

Question 4: Will the proposed basement result in changes to the profile of the inflows (instantaneous and long-term) of surface water being received by adjacent properties or downstream watercourses?

NO

(see submitted plans)

Question 5: Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?

NO

(see submitted plans)

Question 6: Is the site in an area known to be at risk from surface water flooding, such as South Hampstead, West Hampstead, Gospel Oak and King's Cross, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature?

NO

(see CGHHS)

3.2 **STAGE 2 - SCOPING**

The scoping stage of the BIA requires identification of the potential impacts of the proposed scheme.

The Stage 1 Screening has identified the following potential matters of concern:

1. The site lies on an aquifer. This could affect both groundwater flow and land stability.
2. The site lies within 100m of a watercourse. This could affect both groundwater flow and land stability.
3. The site lies within 5m of a highway or pedestrian right of way. This could affect land stability.
4. The proposed basement will significantly increase the differential depth of foundations relative to a neighbouring property. This could affect land stability.

3.2.1 **Aquifer**

If the basement were to extend into the underlying aquifer this could affect the groundwater flow regime and in that case any dewatering for the basement could cause ground settlement that could affect neighbouring structures.

3.2.2 **Watercourse**

If the new basement were to interrupt the groundwater flow associated with the Fleet River this could alter the groundwater flow regime.

3.2.3 **Highway**

The site lies adjacent to Warner Yard and to the pavement of Warner Street. The excavation of basements could threaten the structural stability of these.

3.2.4 **Neighbouring Property**

The proposed basement will be immediately adjacent to No. 30 Warner Street. The latter property has high level foundations there would be a risk of the adjacent deeper excavation causing structural damage to this property.

3.3 **STAGE 3 – SITE INVESTIGATION AND STUDY**

An archaeological desk study that summarised the history of the site and its immediate surroundings was undertaken in February 2011 by CGMS. A geotechnical site investigation survey was subsequently undertaken in July 2011 by Soil Environment Services in order to develop a better understanding of the ground model beneath the site.

For the purposes of the BIA, and to specifically address the issues of concern identified in the previous section, these studies have been supplemented by further desk study to retrieve geotechnical information from nearby sites, a site walkover and monitoring of standpipes installed in two of the site investigation boreholes.

3.4 **STAGE 4 – IMPACT ASSESSMENT**

The scoping stage has identified potential effects of the development on those attributes or features of the geological, hydrogeological and hydrological environment. This stage is concerned with evaluating the direct and indirect implications of each of these potential impacts.

3.4.1 **Aquifer**

If the basement were to extend into the underlying aquifer this could affect the groundwater flow regime and in that case any dewatering for the basement could cause ground settlement that could affect neighbouring structures. However, the site investigation survey has shown that the new basement will not extend as deep as the natural soils beneath the site and hence will not reach the designated aquifer. No dewatering is envisaged for the new basement construction and hence no potential impact is envisaged.

3.4.2 **Watercourse**

If the new basement were to interrupt the groundwater flow associated with the Fleet River this could alter the groundwater flow regime. However, the site investigation survey has shown that the new basement will not extend as deep as the natural soils beneath the site and the proposed lowest basement floor level of +10.67m OD will lie some 1.5m above surface of the natural soils within which the groundwater table appears to run. It is anticipated that piled foundations will be adopted for the new development, but it is anticipated that even the deepest pile cap excavations will not reach the natural soil. Hence, although any groundwater flow will be penetrated by the piles themselves, the groundwater flow regime is not expected to be significantly affected on this basis and no stability impact is envisaged.

3.4.3 Highway

The site lies adjacent to Warner Yard and to the pavement of Warner Street. The proposed basement area will be set back from the street, such that a temporary slope batter of approximately 35° would extend to the rear of the pavement.

The basement area will sit immediately adjacent to Warner Yard, which provides vehicular access to neighbouring properties within the Yard. Full temporary and permanent support will need to be provided to retain the perimeter of both areas of proposed basement. It is possible that there are existing basement perimeter walls buried beneath the site that might be further explored and incorporated in to the design of the temporary works.

3.4.4 Neighbouring Property

The proposed basement will be immediately adjacent to No. 30 Warner Street. The latter property has high level foundations so there will be a risk of any adjacent deeper excavation causing structural damage. It is understood that initial discussions have been held with the neighbouring land owners, the Grant Trust to agree the extent of temporary support and underpinning required to protect the party wall foundations from movement or collapse. It is understood that it is intended to deepen these party wall foundations though conventional underpinning by approximately 1.4m depth, to a level of +9.4m OD.

4.0 CONCLUSION

It appears that the proposed basement construction will do little other than to locally restore ground / floor levels to those that have been previously present. The following conclusions are drawn from this assessment.

1. The development is not expected to have any adverse impact upon the groundwater regime beneath the site and no specific drainage mitigation measures are warranted.
2. Lateral support will need to be maintained at all times to both Warner Street and the ramped access roadway leading down to Warner Yard at the rear of the site. It is possible that there are existing basement perimeter walls buried beneath the site that might be explored and incorporated in to the design of the temporary works.
3. Lateral and Vertical support will need to be maintained at all times to neighbouring properties including No. 30 Warner Street and No. 8 Warner Yard. Underpinning of No. 30 Warner Street is anticipated.

APPENDIX

GOAD PLANS

PREVIOUS BGS BOREHOLES

ARCHAEOLOGICAL ASSESSMENT

SITE INVESTIGATION SURVEY

CHAR. E. GOAD, JR.
CIVIL ENGINEERS

EXPLANATION OF SIGNS USED ON INSURANCE PLANS OF TOWNS & CITIES

16 CROUCH HILL
LONDON N.A.

ABBREVIATIONS

ASB.	ASBESTOS
CI	CORRUGATED IRON
D.I.D.	DOUBLE IRON DOORS
DR	DRAWING
D	DWELLING
EL	ELECTRICIAN
(E.M.)	ELECTRIC MOTORS
(ENG.)	STEAM ENGINE
F	FURNITURE
GA	GARAGE
(G.E.)	GAS ENGINE
H.W.	HARDWARE
I.C.	IRON COLUMNS OR STEEL STANCHIONS
J	JEWELLERY
M.C.	METAL CLAD
M.W.	MANCHESTER WAREHOUSE
M.L.	MATCH (OR WOOD) LINED
OL	OIL & COLOR
(O.E.)	OIL ENGINE
P.H.	PUBLIC HOUSE
S	SHOP
S.I.D.	SINGLE IRON DOORS
S.I.S.	SINGLE IRON SHUTTERS
T	TAILORS
TE	TENEMENTS
W.G.	WIRED GLASS
W.N.	WIRE NETTING OVER GLASS

COLORS

[Red]	BRICK, STONE, OR CONCRETE
[Yellow]	WOOD
[Green]	AREAS CLEARED DUE TO ERECTION ACTION
[Blue]	SKYLIGHTS ON 1 & 2 STORY BUILDINGS
[Orange]	SKYLIGHTS ON HIGHER BUILDINGS
[Grey]	METAL BUILDINGS
[Brown]	TIMBER FRAMED OR STAGED

WALLS

[Red]	PARTY WALL, 2 STORIES OR OVER, A PROBABLE FIRE CUT OFF ENTIRE WALL, BUT DOUBTFUL AS FIRE CUT OFF
[Red]	DEFECTIVE WALL - IMPERFECT
[Red]	WALL ABOVE, IRON COLORED UNDER
[Red]	WALL SOME FLOORS ONLY (OR WOOD OR PLASTER PARTITION)
[Red]	ABOVE ROOF 6" TO 1'-6"
[Red]	— OR — 1'-6" TO 2'-6"
[Red]	MATCH OR WOOD LINED
[Red]	WOOD CLAD WITH CORRUGATED IRON

OPENINGS

[Red]	PASSAGE UNDER	
[Red]	ON ALL FLOORS	
[Red]	SOME FLOORS ONLY	UNPROTECTED
[Red]	ALL FLOORS (PROTECTED)	
[Red]	ALL FLOORS (SOME PROTECTED)	SINGLE IRON DOORS
[Red]	SOME FLOORS ONLY (PROTECTED)	
[Red]	ALL FLOORS (SOME PROTECTED)	DOUBLE IRON DOORS
[Red]	ALL FLOORS (PROTECTED)	
[Red]	SOME FLOORS ONLY (PROTECTED)	
[Red]	WOOD LOADING DOOR	
[Red]	IRON LOADING DOOR	

WINDOWS

[Red]	ON ALL OR MOST FLOORS	
[Red]	MORE THAN USUAL	
[Red]	OVERLOOKING	UNPROTECTED
[Red]	NEARLY ALL GLASS	
[Red]	OPENING TWO & WINDOWS OVER	
[Red]	ON SOME FLOORS ONLY	
[Red]	PROTECTED BY WIRED GLASS	
[Red]	PROTECTED BY SINGLE IRON SHUTTERS	
[Red]	PROTECTED BY DOUBLE IRON SHUTTERS	
[Red]	WINDOWS IN FRONT & REAR OF BUILDINGS UNDERSTOOD UNLESS OTHERWISE SHOWN	

FLOORS

1 2 3 4 M ON BUILDINGS ARE NUMBER OF STORIES ABOVE GROUND (2ND FLOOR & ATTIC)
2 4 6 8 MEANS 2 STORIES & 2 BASEMENTS, 2ND & 3RD BASEMENT

SKYLIGHTS

A LESS THAN 50 SQUARE FEET (EACH 10' x 6' OR 7' x 7')
B OPENINGS THROUGH 2 FLOORS UNDER (EACH STORM DENOTES AN OPENING)
C WITH HILL HOLE THROUGH 3 FLOORS
D LANTERN LIGHTS (SEE ONLY GLASS) OVER 50 SQ. FT. TO SCALE
E OR VENT OR RAISED VENTILATOR

HOISTS & LIFTS

H OPEN
L OPEN TO STREET
E ENCLOSED BRICK OR FIRE RESISTING WOOD GLASS DOORS
IRON DOORS SHOWN AS EXPLAINED UNDER "OPENINGS"

ROOFS

ASB.	ASBESTOS	PROFILES
C	CONCRETE	
CI	CORRUGATED IRON	
M	METAL	
P	PATENT (FELT & PAPER)	
S	SLATE	
T	TILE	

SUNDRIES

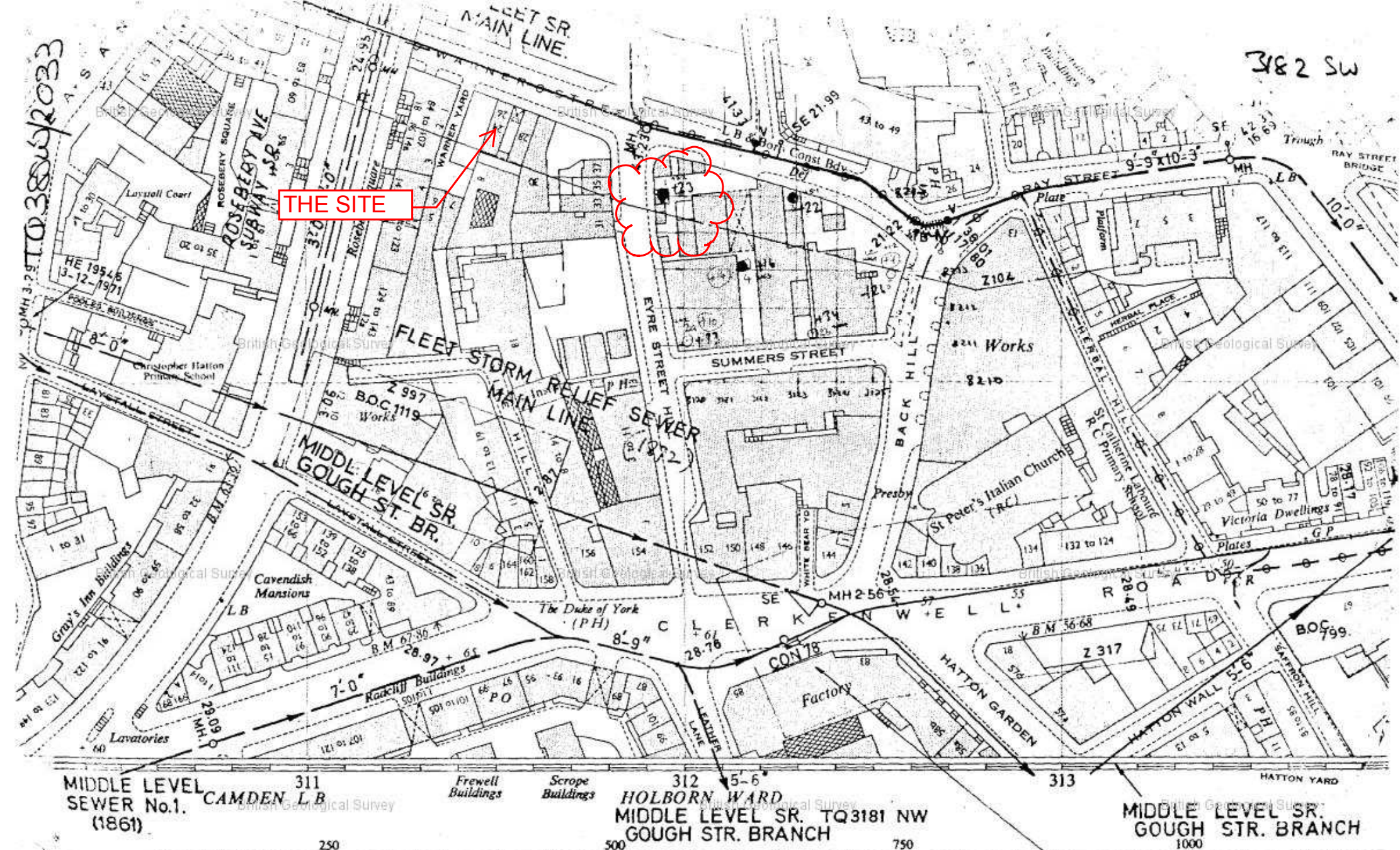
[Symbol]	STEAM BOILERS
[Symbol]	BOILER SET IN BRICK
[Symbol]	FACTORY CHIMNEYS
[Symbol]	STEAM ENGINE
[Symbol]	OVERHANGING WOOD CORNICE
[Symbol]	FIRE ALARM BOX
[Symbol]	OR KEY PLAN
[Symbol]	HYDRANT
[Symbol]	HYDRAULIC HYDRANT
[Symbol]	PRIVATE HYDRANT OR STAND PIPE
[Symbol]	DOUBLE HYDRANT
[Symbol]	SALT WATER HYDRANT
[Symbol]	SPRINKLER OR AUTO ALARM BELL

REFERENCE NUMBERS

[Red]	NUMBERS PARALLEL WITH STREET ARE EXISTING STREET NO.
[Red]	WHERE TWO SETS OF STREET NO. IN SAME BLOCK COINCIDE, ADDITIONAL ARBITRARY NO. ARE GIVEN TO ONE SET (500 & UPWARDS)
[Red]	WHERE BUILDINGS TO WHICH THEY APPLIED ARE DEMOLISHED, STREET & ARBITRARY NO. ARE SHOWN & CROSSED THROUGH ON REVISION
[Red]	ARE STREET WIDTHS
[Red]	ARE HEIGHTS OF GROUND ABOVE OR DRAINAGE DATUM
[Red]	HEIGHT IN FEET OF ADJOINING BUILDINGS WHERE STORIES DIFFER IN HEIGHT
[Red]	SIZES OF WATER MAINS SUPPLYING HYDRANTS







Control of the Ordnance Survey, Chessington, Surrey, 1962.

Middle Level Sewer No.1. (Main Line) Survey Bks 9A.B.C & 8.D.

Middle Level Sewer No.2 (Main Line) Survey Bks. 30 B. 27.D.

Main Line Survey Dis. 27A. L1C.

Middle Level Sewer Gough St. Survey Bks. 29A. 8.D.

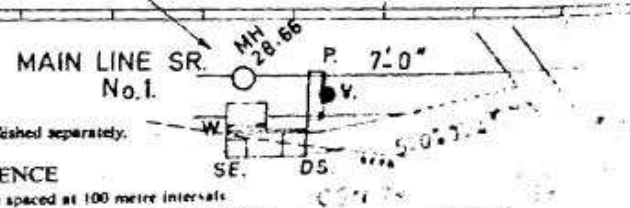
REFERENCE

For fuller information see Reference Card published separately.

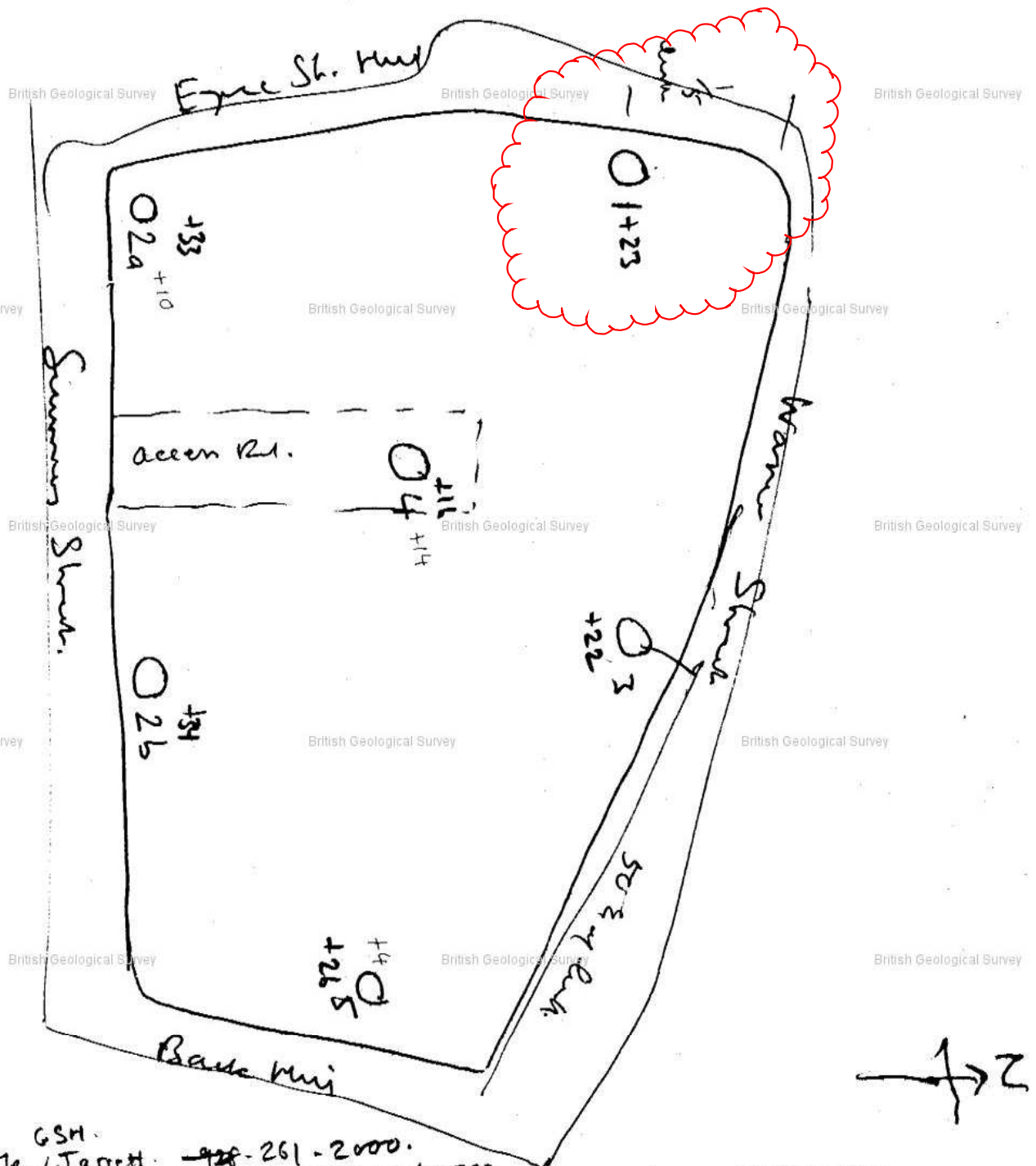
NATIONAL GRID REFERENCE

The lines on the plan form part of the National Grid and are spaced at 100 metre intervals.

The reference figures give the position of a point to the nearest 10 metres provided as follows:



1438SW/2033



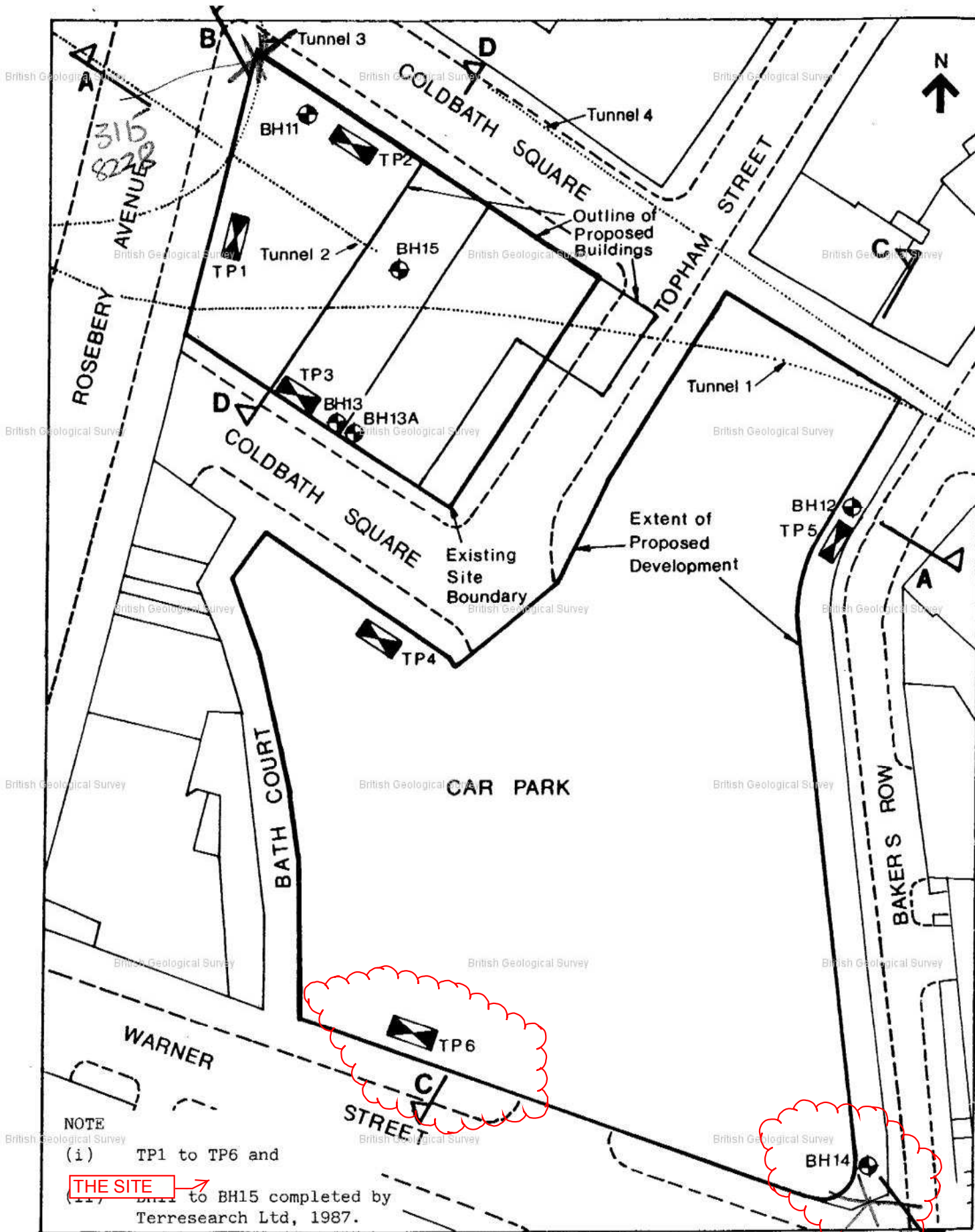
GSH.
SE. Pym Me. Jarrett. 261-261-2000.
Gne Courfield. 261-2000-2792
CEGB. Me. Duval. 0483-69951 ? na man.

Institute of Geological Sciences



TQ 88SW 12033
DRIFT USED
3122.8214 (TQ 3182SW)
British Geological Survey
6-in or 1:10 000 Map Registration No.
Page
National Grid Reference
TQ 3182 SW (1250 sheet)

Name and Number of Shaft or Borehole: speak to WSWERS 405
Western DSO. 5211
BACK HILL (L.E.B.) n. to phos. ... 6th
Le Grand Sutchell & Gell Report No: 5414.

Geological Classification	Description of Strata	Thickness metres	Depth metres
No Levels given. A	BH 1 = 1 +43.5 (ft) Brought Forward NGR 31195 82150		
Mr Adams, x 238	Made up Ground MGRD	15'-0"	15'-0"
Lesco House 928-6933	Black mud & stones SUPD	4'-0"	19'-0"
{ Mr. Baker 71k Mr. James	Brown clay & stones SUPD \downarrow +23	1'-6"	20'-6"
Carl E. Jones	Brown mottled clay LC - 2	3'-0"	23'-6"
	Blue clay LC - 2	3'-0"	26'-6"
	Brown mottled clay LC - 3 coded	3'-6"	30'-0"
	BH 2A = 2 +50.5 NGR 31201 82112		
Ring Mr Adams	Made up Ground MGRD	14'-0"	14'-0"
Friday. 928-6933 x6. 238	Blue River mud & stones sup \downarrow +33.5	3'-0"	17'-0"
	Brown mottled clay LC	3'-6"	20'-6"
	Brown clay LC	3'-6"	24'-0"
Stamford St.	Blue clay LC +10' 00	16'-0"	40'-0"
Lesco House	Brown mottled clay WRB +182 +5' 00	5'-0"	45'-0"
in Woburn Rd. E. n. Portofino.	Woolwich & Reading Beds WRB	5'-0"	50'-0"
Flaw 5	BH 2B. = 3 +48.5 NGR 31234 82114		
the right side of hill.	Made up Ground MGRD	10'-0"	10'-0"
	Brown clay & stones SUPD \downarrow +34.4'	2'-3"	12'-3"
	Brown mottled clay (wide) LC	7'-9"	20'-0"
	Blue clay (LC) LC	12'-0"	32'-0"
	BH 3 = 4 +41.75 NGR 31229 82130		
Large 928-6933	Made up ground MGRD	12'-0"	12'-0"
	Black mud & stones SUPD	5'-0"	17'-0"
L.E.B.	Sandy blue clay & stones SUPD	2'-6"	19'-6"
Lesco House	Dirty gravel SUPD +21.75	0'-6"	20'-0"
Ring of 1	Brown clay LC - 2	5'-0"	25'-0"
Western St.	Brown mottled clay LC - 3 coded	5'-0"	30'-0"
844 6882			



LEGEND

- Centre line of GPO underground tunnels
-  Trial Pit Locations
-  Borehole Locations

SITE PLAN

TQ38SW/3521-3532