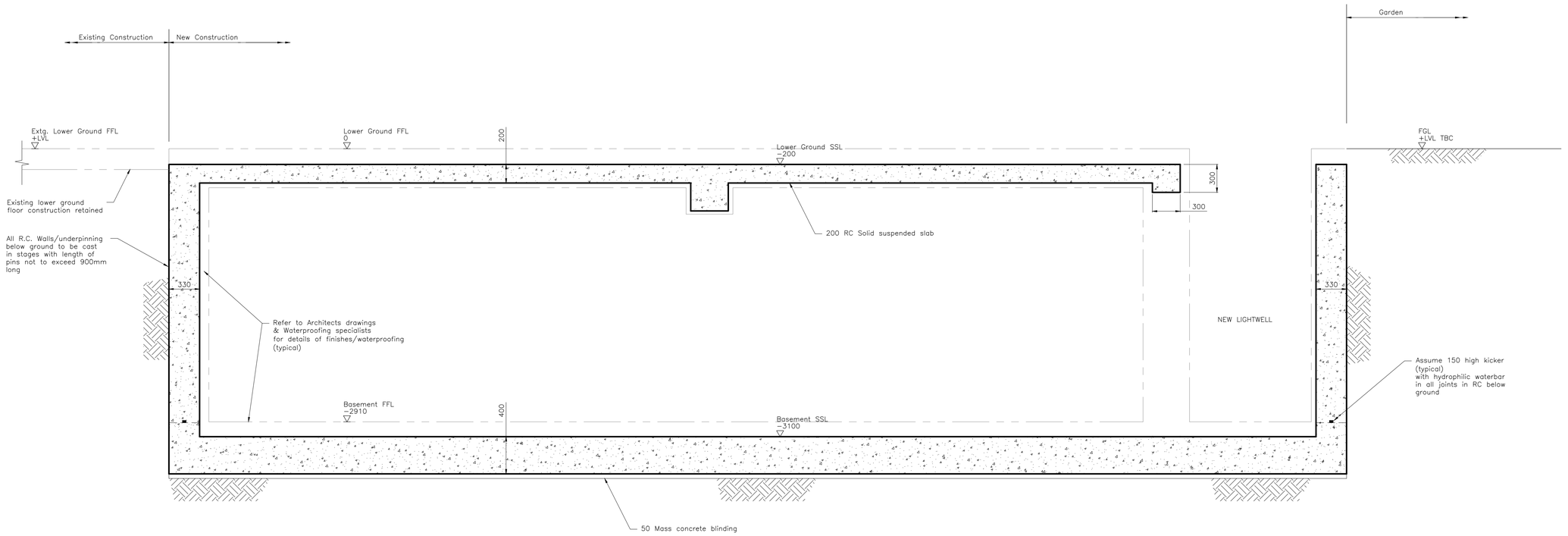


SECTION A−A

NOTES:

1. All structural engineering drawings are to be read with the specification and with all relevant Architect's and Service Engineer's drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only.
3. All dimensions are in millimetres and levels in metres.

LEGEND:−

Denotes existing masonry wall.

Denotes new brick wall.
(to be fully tooth bonded into existing)

Denotes new reinforced concrete

NOTE:−
WATERPROOFING TO BE TO ARCHITECTS DETAILS TO BE CARRIED OUT BY SPECIALIST.

Rev	Date	Issued	Amendment
A	07.10.15	DJP	UPDATED
−	18.06.15	DJP	ISSUED FOR PLANNING

Status
PLANNING

SINCLAIR JOHNSTON
Consulting Civil & Structural Engineers

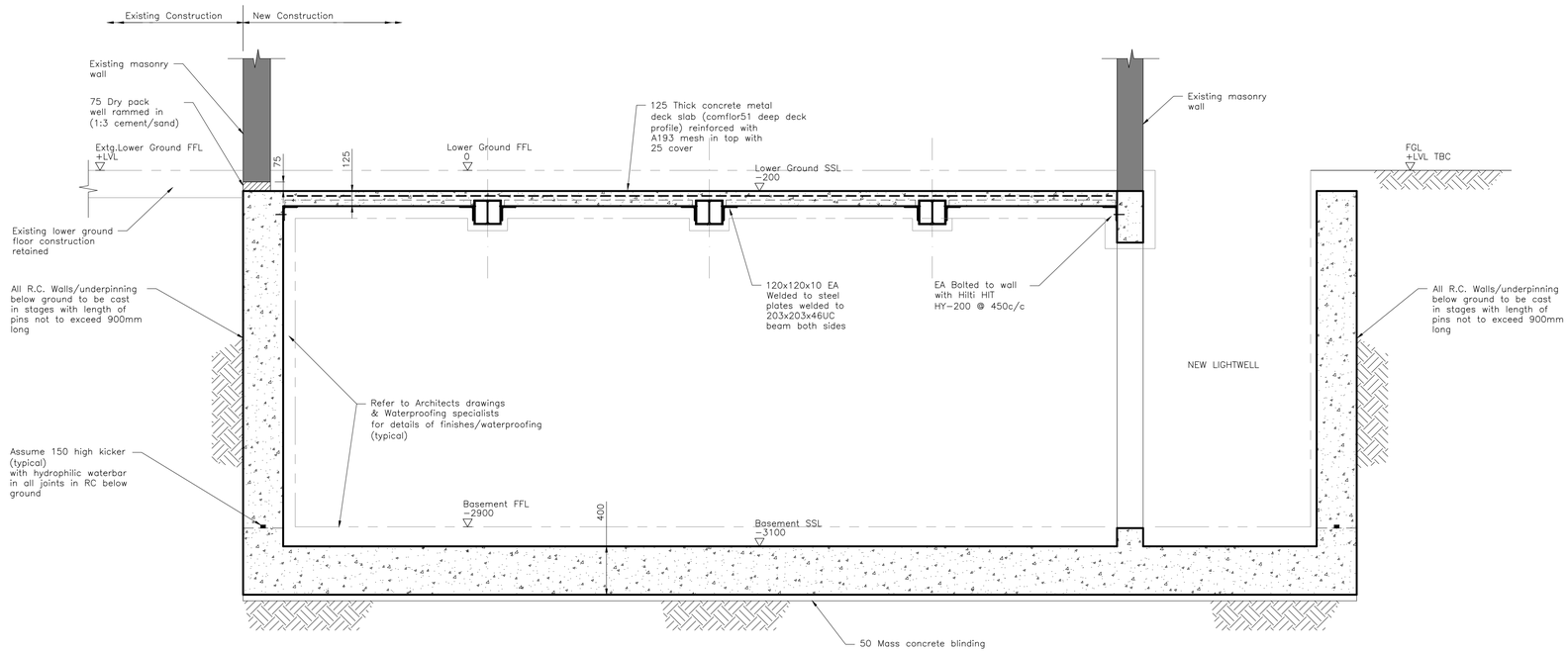
93 Great Suffolk Street
London SE1 0BX
T: 020 7593 1900
F: 020 7593 1910
www.sinclairjohnston.co.uk

109 KING HENRY'S ROAD LONDON NW3

PROPOSED SECTION A−A

Drawn D Phillips
Scale 1:25 at A1

Project No./Drawing No. 8438/020
Rev A



SECTION B−B

NOTES:

1. All structural engineering drawings are to be read with the specification and with all relevant Architect's and Service Engineer's drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only.
3. All dimensions are in millimetres and levels in metres.

LEGEND:−

Denotes existing masonry wall.

Denotes new brick wall. (to be fully tooth bonded into existing)

Denotes new reinforced concrete

NOTE:−
WATERPROOFING TO BE TO ARCHITECTS DETAILS TO BE CARRIED OUT BY SPECIALIST.

Rev	Date	Issued	Amendment
−	18.06.15	DJP	ISSUED FOR PLANNING

Status: PLANNING

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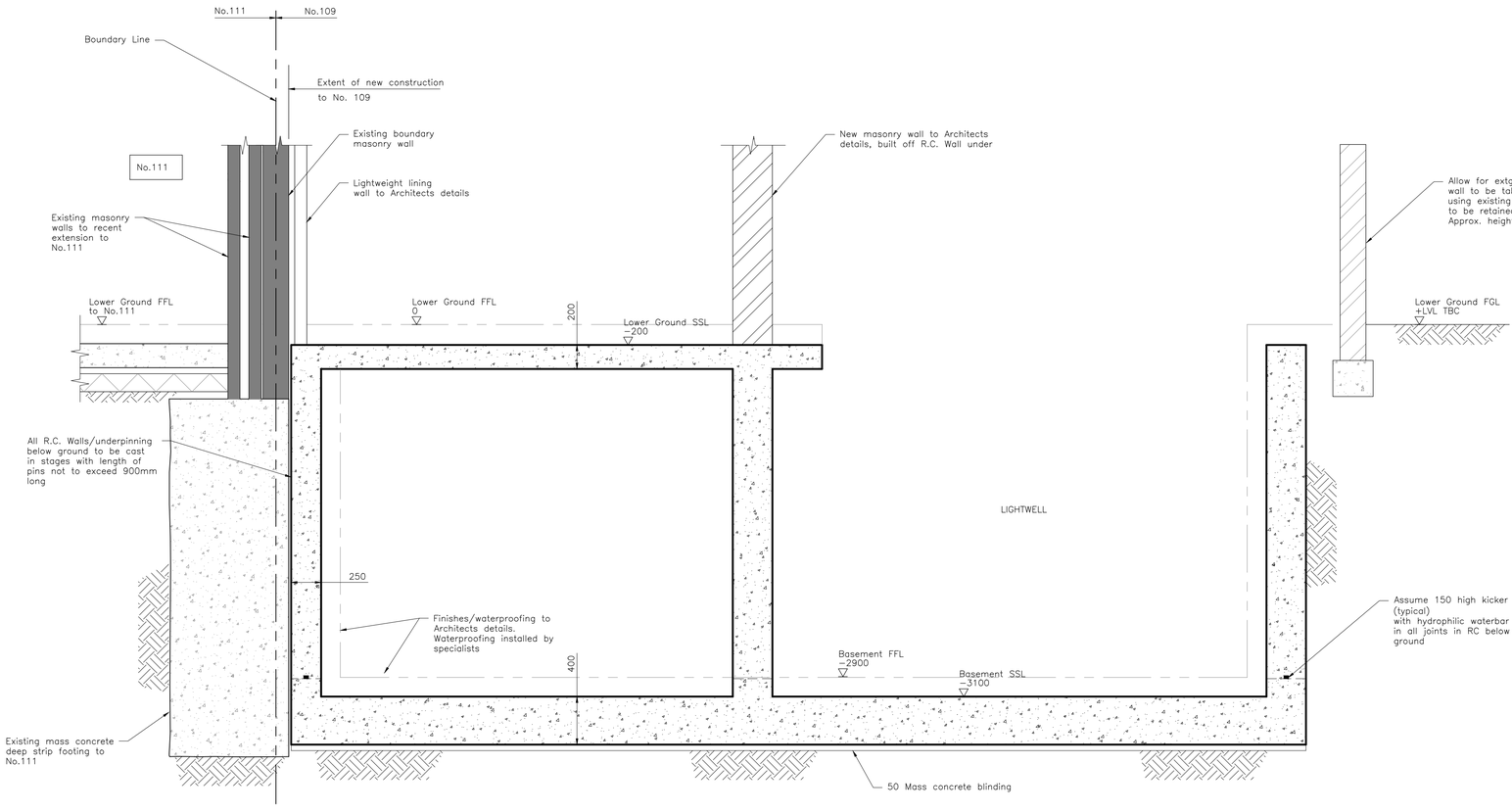
109 KING HENRY'S ROAD
LONDON NW3

PROPOSED SECTION B−B

Drawn D Phillips | Scale 1:25 at A1

Project No./Drawing No. 8438/021 | Rev −



SECTION C−C

NOTES:

1. All structural engineering drawings are to be read with the specification and with all relevant Architect's and Service Engineer's drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only.
3. All dimensions are in millimetres and levels in metres.

LEGEND:−

Denotes existing masonry wall.

Denotes new brick wall.
(to be fully tooth bonded into existing)

Denotes new reinforced concrete

Denotes existing reinforced concrete

NOTE:−
WATERPROOFING TO BE TO ARCHITECTS DETAILS TO BE CARRIED OUT BY SPECIALIST.

Rev	Date	Issued	Amendment
−	18.06.15	DJP	ISSUED FOR PLANNING

Status
PLANNING

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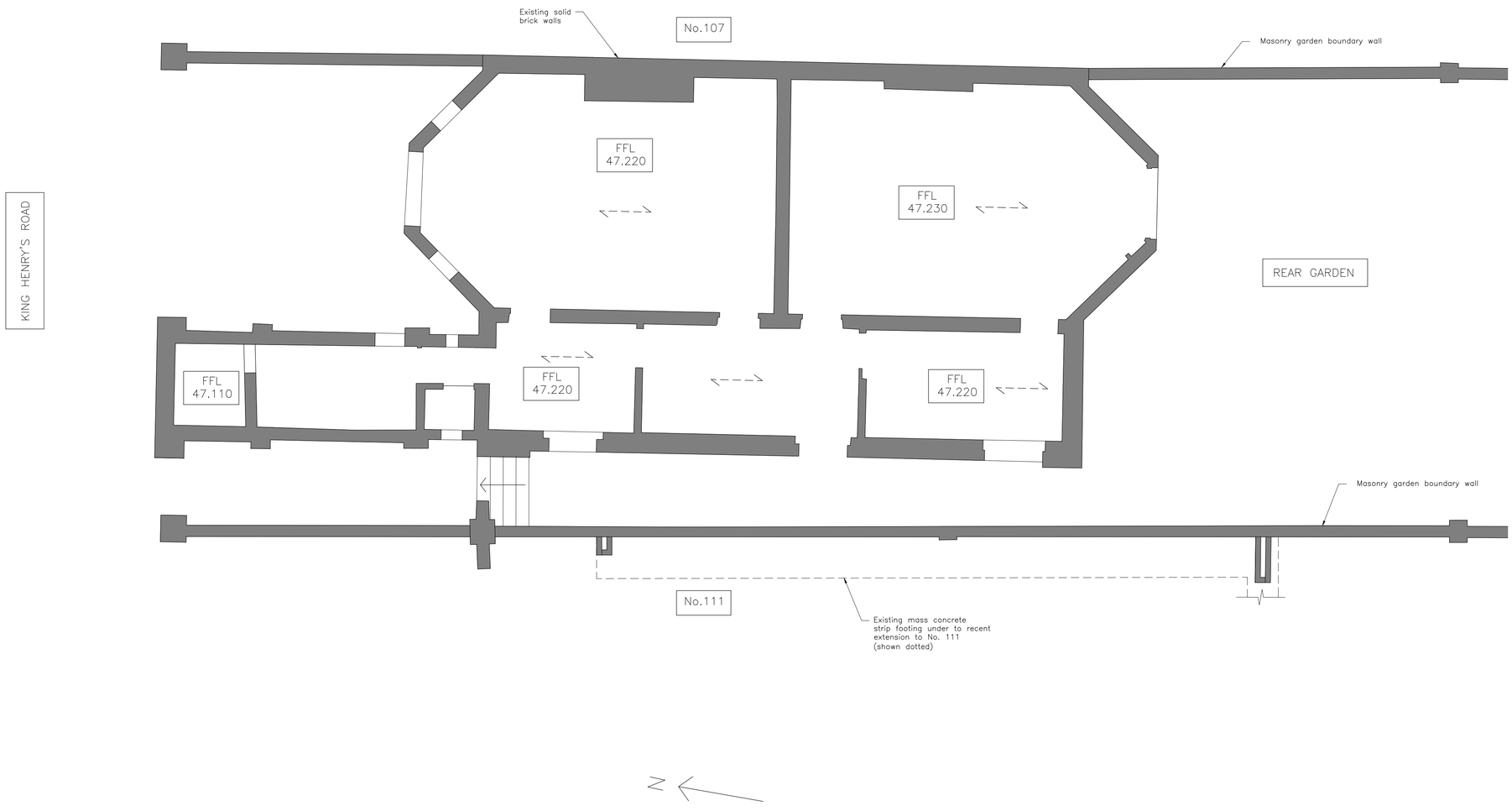
109 KING HENRY'S ROAD LONDON NW3

PROPOSED SECTION C−C

Drawn D Phillips
Scale 1:25 at A1

Project No./Drawing No.
8438/22
Rev
−



NOTES:

1. All structural engineering drawings are to be read with the specification and with all relevant Architect's and Service Engineer's drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only.
3. All dimensions are in millimetres and levels in metres.

LEGEND:–

Denotes existing masonry wall.

Denotes assumed span of existing timber floor

Rev	Date	Issued	Amendment
–	18.06.15	DJP	ISSUED FOR PLANNING

Status

PLANNING

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109 KING HENRY'S ROAD LONDON NW3

EXISTING LOWER GROUND FLOOR PLAN

Drawn D Phillips

Scale 1:50 at A1

Project No./Drawing No.
8438/059

Rev
–

Statement of experience on basements

Soiltechnics have carried out a large number of investigations for basement constructions throughout the UK and in more recent years outside the UK

The following table provides a limited number examples (for illustration purposes) of investigations carried out for basements which include interpretative reports providing parameters for detailed design such as settlement / heave, ground movements around basements, hydrological effects and in some cases preliminary design of piles.

Location	ground conditions	Basement	Approx size (m)	Date
Northamptonshire	Glacial Till	Single storey archive store for Rolls Royce. Part open excavation for construction of reinforced concrete box subsequently backfilled	10 x 8	Circa 1992
Central London (Kings Road)	Terrace sands and gravels over London Clays	Two storey deep car park with gardens at ground level. Contiguous pile wall with subsequent insitu concrete box	40 x 20	Circa 2000
Central London (Finsbury square)	Terrace sands and gravels over London Clays	Two storey deep basement below multi storey building with adjacent buildings. Contiguous pile wall with subsequent insitu concrete box	30 x 20	Circa 2002
Central London (Union Street)	Terrace sands and gravels over London Clays	Two storey deep basement below multi storey building with adjacent buildings including tube tunnels. Contiguous pile wall with subsequent insitu concrete box	40 x 30	2009
Central London (Blackfriars)	Terrace sands and gravels over London Clays	Two storey deep basement below multi storey building with adjacent buildings including railway viaduct . Contiguous pile wall with subsequent insitu concrete box	40 x 20	2005
Central London (Imperial College)	Terrace sands and gravels over London Clays	Single storey deep basement below multi storey residential block. Sheet pile walls with subsequent insitu concrete box	60 x15	2005
Coventry University	Mercia Mudstones	Single storey deep basement with three storey building over. Part cut and part sheet piled with subsequent insitu concrete box	50 x50	2010
Rabat Grand theatre Bouregrerg Morrocco	Alluvial gravels over sandstone	Single storey deep basement. Open excavations and sheet piles walls with subsequent insitu concrete box. Piled foundation for super structure. Area subject to earthquakes and liquefaction. Outline design of piles, specification for piling and testing.	50 x50	2012
Central London (various locations)	London Clays occasionally overlain with terrace sands and gravels	Various existing terraced semi and detached domestic properties. New single and two storey deep basements under building foot prints and extending into gardens. Construction using traditional underpinning techniques and contiguous / secant piled walls	Various	2000 to date
Central London (Holland Park)	London Clays	Two locally three storey deep basement below new four storey block of flats. Secant piled walls and insitu concrete box	70 x 20	2014

Curriculam Vitae
Nigel Thornton
B.Sc, C.Eng, MICE, MCIHT, FGS.

soiltechnics
environmental and geotechnical consultants

Qualifications

- Awarded degree in Civil Engineering., City University, London in 1980
- Elected Member of the Institution of Civil Engineers in 1983 (Chartered Civil Engineer)
- Member of the Chartered Institution of Highways and Transportation since 1984
- Fellow of the Geological Society since 1986

Employment History

• Northampton Borough Council	1975 - 1980
• Northamptonshire County Council	1980 - 1989
• The John Parkhouse Partnership	1989 - 1989
• Associate Partner	1989 - 1993
• Partner	1993 - 2005
• JPP Consulting (Director)	2005 to date
• Soiltechnics (Director)	1993 to date

Note

- In 2005, the John Parkhouse Partnership was incorporated into JPP Consulting Ltd (current complement 28 staff)
- Founding Director of Soiltechnics Ltd, a company specialising in geotechnical and geo-environmental matters. (Current complement 27 staff)

Relevant Experience

Bridgeworks

General design, contract administration and site supervision of various highway bridges and retaining structures.

Geotechnical and Geo-environmental

As Geotechnical Project Manager for Engineering Services Laboratory at NCC (ESL). (1985 - 1989)

Control of ground investigations for major highway schemes for local authority including implementation of fieldwork, direction of laboratory testing and production of factual and interpretative reports, following and satisfying geotechnical certification procedures for Department of Transport (schemes up to £15m)

Generally, at ESL, Soiltechnics and JPP.

Design and specification of earthworks, including determination of slope stability. Investigation and remediation of unstable slopes.

Control, implementation of fieldwork and production of geotechnical reports for industrial and commercial developments, housing schemes and water authority infrastructure (scheme values up to £80m).

Investigations for outline designs of landfill sites. Investigations for redevelopment of chemically contaminated sites, assessment of the same, design and verification of remediation works. Production of tender and contract documents for ground investigations.

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	Investigations into mine workings and assessment of their stability. Specifications for ground improvement works (vibrotreatment) and piling. Investigations and reporting on a wide range of basement constructions for commercial and residential buildings 1 to 4 stories deep. Producing basement impact reports. Lecturing to other professionals on the investigation assessment and remediation of contaminated land, and EPA part IIA Lectures to local ICE branch on geotechnical aspects.
Materials Management	Production of construction material specifications, primarily in concrete, aggregates and bituminous mixtures, but including masonry, timer, steel and protective systems. Control and implementation of investigations into failures of construction materials including scheduling and analysing test data, and production of technical reports providing specifications for appropriate remedial measures.
Building Structures	Structural inspections and surveys on a wide range of commercial, domestic, industrial and military buildings including direction of appropriate investigations and production of details repairs/construction specifications. Design and checking of building structures in timber, steel, concrete and masonry including supervision of works on site. Design works carried out both manually and using computerised systems following current British Standards and other recognised design standards.
Road Pavement Structures	Direction and implementation of condition surveys and investigations of road pavement using falling weight deflectometer, deflectograph bump integrator and coring. Direction of testing regimes for bituminous and cement bound and unbound pavement materials. Production of reports on condition and assessment of load carrying capacity of existing roadways and specification and structural design for new roadways for both highway and industrial use. Design of various road pavement structures (flexible and rigid) using Highways Agency guidelines and British Ports Federation guidelines.
Drainage and Flood Risk Assessments	Design of main (adoptable) and private foul and stormwater infrastructure for housing, commercial and industrial schemes, including detention basins, infiltration systems, pumping stations etc. Production of flood risk assessment reports.
Quality Assurance	Assisting in production of main laboratory procedures to obtain NAMAS accreditation for large spectrum of soils and materials testing. Geotechnical contributions to Quality Assurance Manual for Soiltechnics/JPP and implementation of procedures.
CPD and Health and Safety	Attendance of in house CPD Seminars and production of Health and Safety Plans/files for building works. Author of in house risk assessment and Practice policies.
Litigation	Acting as expert witness on numerous construction related matters.
Publications	Co-author of a book entitles 'Cracking and Building Movement' published by the Royal Institution of Chartered Surveyors, in late 2004.

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Chord Environmental Ltd

Stuart Hadley
Soiltechnics Ltd
Cedar Barn
White Lodge
Walgrave
Northampton
NN6 9PY

Your Ref: 109 King Henry's Road
Our Ref: 1127/LJE160915

For the attention of: Stuart Hadley

16th September 2015

109 King Henry's Road BIA Review

Dear Stuart,

Further to your instruction to proceed on behalf your client (Starlit Properties Ltd) I have undertaken a review of the Basement Impact Assessment (BIA) prepared by Soiltechnics Ltd for the proposed basement development at 109 King Henry's Road.

I have reviewed the design of the proposed basement development, together with the information presented within the above documents, against the requirements of the Camden BIA guidance set out within DP27 and CPG4 (2015).

Chord Environmental specialise in the provision of hydrogeological services with extensive experience in the UK supporting both private and public sector clients. I am a geologist and hydrogeologist and have a BSc. in geology from the University of Bristol, a MSc. in hydrogeology from the University of East Anglia and am also a Chartered Geologist and fellow of the Geological Society. I am Managing Director at Chord Environmental and was previously a Technical Director with Paulex Environmental Consulting and managed Hyder Consulting (UK) Ltd's groundwater team.

I have been a hydrogeologist for 17 years. During that time I have advised on over 90 basement developments. Much of my career has been spent assessing the impact of development on the quality and quantity of groundwater resources. I have worked for both promoters and regulators of schemes and have acted as an expert witness for the Highways Agency and on BIA schemes.

Development proposal

The site is occupied by a four storey semi-detached house including a lower ground floor which is c.1.6m below ground level at the front and north of the property and marginally above ground level to the south and rear of the property. I understand the proposed development comprises a single storey, 3.5m deep basement, fully extending beneath the ground floor footprint and 6m into the rear gardens including lightwells.

Environmental Site Setting

The BIA screening assessment and site investigation interpretation has identified 109 King Henry's Road to be underlain by the Eocene London Clay as shown on the British Geological Survey 1:50,000 scale map (Sheet 256 – North London) to a depth of c.80m. The London Clay is classified as Unproductive Strata by the Environment Agency, strata with low permeability that have negligible significance for water supply or base flow to rivers. The very low permeability of the London Clay results in very low rates of rainfall infiltration and correspondingly, very high rates of rainfall runoff.

The London Clay, together with the clays of the Lambeth Group, acts as an effectively impermeable confining layer over the Chalk which lies at a depth of over 100m beneath the site.

There are no surface water features within 500m of the site. Figure 11 of the "Camden Geological, Hydrogeological and Hydrological Study", shows a headwater tributary of the former Tyburn watercourse to have run just over 200m to the west of the proposed development. The Tyburn is now culverted beneath South Hampstead and discharges to the Thames.

King Henry's Road does not lie within an area of flood risk as designated by the Environment Agency and was not identified as being one of the roads affected by the surface water flooding events of the area which occurred during 1975 and 2002.

Surface Flow and Flooding Assessment

The BIA screening, scoping and risk assessments have followed the CPG4 guidance criteria and screening questions. The potential surface flow and flooding issue raised by the screening and scoping exercises have been appropriately addressed by Soiltechnics within the report and no areas of concern relating to the proposed development were identified.

Subterranean (Groundwater) Flow Screening Assessment

The BIA screening, scoping and risk assessments have followed the CPG4 guidance screening questions. I have commented on the answer to each question below.

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

  As the Site is mapped as being underlain by a significant thickness of London Clay, designated as Unproductive Strata by the Environment Agency, I agree it is not located above an aquifer. The geology of the areas is well understood and the published geological map is based on extensive borehole data.

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

  No. No groundwater was encountered within the London Clay during the site investigations. The London Clay is not capable of transmitting groundwater but because it is predominantly clay, it does hold water. As such there is not generally a water table present within it. Monitoring boreholes drilled within the London Clay often slowly fill with groundwater over time; however there is little or no hydraulic continuity between boreholes due to the very low permeability of the clay and ability of the clay matrix to hold or adsorb water.

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

  No surface water features are present within 500m of the site. The London Clay is not capable of providing groundwater baseflow to watercourses and is classified Unproductive Strata. The proposed basement would therefore not act to prevent groundwater flow to any watercourses, wells or spring lines.

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

  No. The Site is located more than 1.5 km south, and down topographic gradient, of the Hampstead Heath ponds and therefore lies outside their hydrological catchment area.

- **Question 4: Will the proposed development result in a change in the proportion of hard surfaced / paved area?**

  The proposed basement development would result in a net increase in hard surfaced area. In relation to the assessment of the proposed development on groundwater flow, the purpose of this question is to determine whether rainfall recharge to an underlying aquifer would be reduced. However, the London Clay's low permeability results in a negligible rate of rainfall infiltration and a correspondingly high rainfall runoff rate, therefore the proposed basement would not have an impact on groundwater resources.

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

  No. The lowly permeable nature of the London Clay strata is unsuitable for receiving surface water discharge to ground due to extremely low infiltration rates.

- **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?**

  I agree there are no mapped local groundwater dependent ponds or spring lines present within 100m of the Site. This is consistent with the geology and hydrogeology of the area.

Slope Stability Assessment

The BIA screening, scoping and risk assessments have followed the CPG4 guidance criteria and screening questions. The potential slope stability issues raised by the screening and scoping exercises have been appropriately addressed by Nigel Thornton (C.Eng) of Soiltechnics Ltd within the BIA report and no areas of concern relating to the proposed development were identified.

Conclusions

The BIA report has appropriately characterised 109 King Henry's Road with respect to its geological and groundwater site setting. As the site is underlain by low permeability London Clay, the geological and hydrogeological setting of 109 King Henry's Road is not sensitive with respect to groundwater resources or flow.

The purpose of the Basement Impact subterranean or groundwater flow assessment is to identify the potential for the proposed basement development to cause groundwater impacts and subsequently identify areas which require further investigation. The proposed development would be sited within a significant thickness of London Clay and no potential adverse groundwater impacts have been established by these assessments.

Yours sincerely,

John Evans BSc MSc CGeol.

Director

THE GEOLOGICAL SOCIETY
CGeol
CHARTERED GEOLOGIST
Fellow No. 1012979

Proposed development,
109 King Henry's Road

soiltechnics
environmental and geotechnical consultants

Key

TP — Approximate location of trial pit excavation

BH — Approximate location of borehole formed by Cable and Tool percussive techniques

Title	Scale	Drawing number
Plan showing observed site features and location of exploratory points	1:200 @ *A3*	02

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Key to legends

Composite materials, soils and lithology

Topsoil	Made Ground	Boulders
Chalk	Clay	Coal
Cobbles	Cobbles & Boulders	Concrete
Gravel	Limestone	Mudstone
Peat	Sand	Sand and Gravel
Sandstone	Silt	Silt / Clay
		Siltstone

Note: Composite soil types are signified by combined symbols.

Key to 'test results' and 'sampling' columns

Test result	
Depth	Records depth that the test was carried out *(i.e.: at 2.10m or between 2.10m and 2.55m)*
Result	PID - Photo Ionisation Detector result (ppm equivalent Isobutylene) PP – Pocket penetrometer result (kN/m^2) HVP – Hand held shear vane result (kN/m^2) *PP result converted to an equivalent undrained shear strength by applying a factor of 50. Where at least 3 results obtained at same depth then an average value may be reported.*
	SPT – Standard Penetration Test result (uncorrected)[1,2,3] *SPT(c) – Standard Penetration Test result (solid cone) (uncorrected)*[1,2,3]

Sampling		
From (m) To (m)	Records depth of sampling	
Type	D	Disturbed sample
	B	Bulk disturbed sample
	ES	Environmental sample comprising plastic and/or glass container
	W	Water sample
	U (32)	Undisturbed sample 100mm diameter sampler with number of blows of driving equipment required to obtain sample

Note [1]: Seating blows recorded in brackets.
Note [2]: Casing depth records depth of casing when SPT or SPT(c) was carried out.
Note [3]: Water depth records depth of water when SPT or SPT(c) was carried out.

Water observations

Described at foot of log and shown in the 'water strike' column.

▼ = water level observed after specified delay in drilling

▽ = water strike

Standpipe details

Gravel filter

Arisings

Bentonite

Slotted pipe

Unslotted pipe

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WELL	DESCRIPTION	LEGEND	DEPTH (m)	WATER STRIKE	TEST RESULTS				SAMPLING		
					TYPE/ DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	FROM (m)	TO (m)	TYPE
	Grass onto dark brown slightly silty slightly sandy CLAY with rare gravels of fine to medium sub-angular brick. MADE GROUND		0.20						0.20	0.50	B
	Medium strength dark brown slightly silty slightly gravelly CLAY. Gravel consists of fine to medium sub-angular brick and organic matter. MADE GROUND		0.50								
	Medium strength brown and orange brown mottled light grey silty CLAY with rare gravels of fine to couarse angular to sub-angular brick. MADE GROUND		1.00		PP 1.00	75			1.20		D
	Medium becoming high strength brown mottled grey slightly silty CLAY. LONDON CLAY FORMATION				PP 1.80	75					
					PP 2.00	100			2.00	2.45	U(65)
									2.00		D
									2.50		D
					PP 2.80	100					
					PP 3.00	100			3.00		D
					PP 4.00	100			4.00		D
					SPT 5.00-5.45	(4) 18	1.60	DRY	5.00	5.50	D
									5.00		D
					PP 5.00	117					
					PP 6.00	125			6.00	6.50	D
									6.00		U(100)
	BOREHOLE TERMINATED AT 7.00m		7.00		PP 7.00	175			7.00		D

Notes:

Ground level (mAOD)

Co-ordinates

Title
Borehole record

Method of excavation
Cable and tool percussion rig

Groundwater observations
No groundwater encountered.

Date of excavation (range if applicable)
18/05/2015

Appendix
C

Location plan on drawing number
02

BH01

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WELL	DESCRIPTION	LEGEND	DEPTH (m)	WATER STRIKE	TEST RESULTS				SAMPLING		
					TYPE/ DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	FROM (m)	TO (m)	TYPE
	Grass onto medium strength brown and grey slightly silty slightly sandy slightly gravelly CLAY. Gravel consists of fine to coarse angular to sub-angular brick, organic matter and rare fine to medium sub-rounded to rounded quartzite. MADE GROUND				PP 0.50	50					
			0.50						0.80	1.00	B
	Grass onto medium strength brown and grey slightly silty slightly sandy slightly gravelly CLAY with rare roots up to 7mm in diameter. Gravel consists of fine to coarse angular to sub-angular brick, organic matter and rare fine to medium sub-rounded to rounded quartzite. MADE GROUND				PP 1.20	50			1.20		D
			1.50		SPT	(2) 12	1.50	DRY	1.50	2.00	D
					1.50-1.95				1.50		D
					PP 1.50	75					
					PP 1.80	100			2.00		D
					PP 2.00	100					
	High strength becoming very high strength brown occasionally mottled grey slightly silty CLAY with occasional fine to medium mudstone gravels to 3m depth. LONDON CLAY FORMATION										
					SPT	(3) 14	1.50	DRY	3.00	3.50	D
					3.00-3.45				3.00		D
					PP 3.00	125					
					PP 3.50	125					
					PP 4.00	125			4.00	4.45	U(63)
									4.00		D
									4.50		D
					PP 4.60	125					
					PP 5.00	125			5.00		D
					PP 6.00	150			6.00		D
	BOREHOLE TERMINATED AT 7.00m		7.00		PP 7.00	150			7.00		D

Notes: Standpipe installed to 7m depth.

Ground level (mAOD)

Co-ordinates

Title
Borehole record

Method of excavation
Cable and tool percussion rig

Groundwater observations
No groundwater encountered.

Date of excavation (range if applicable)
19/05/2015

Appendix
C

Location plan on drawing number
02

BH02

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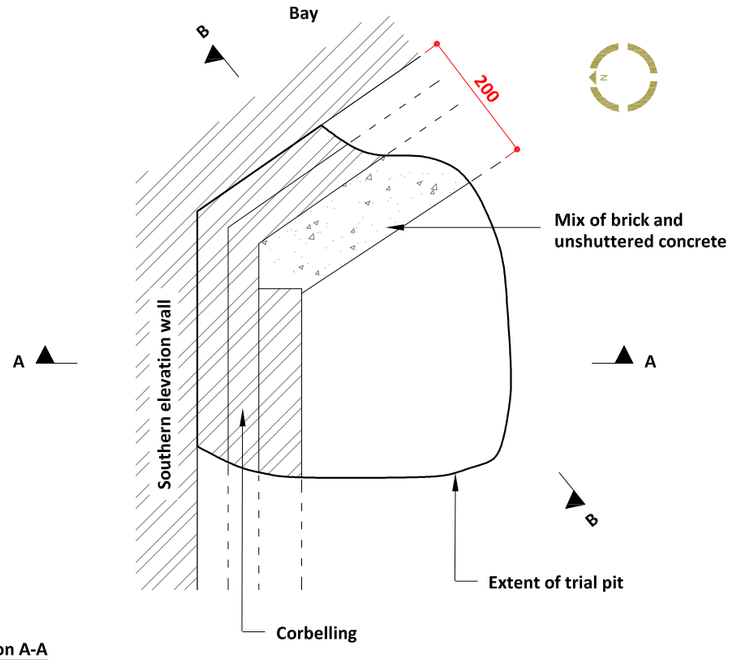
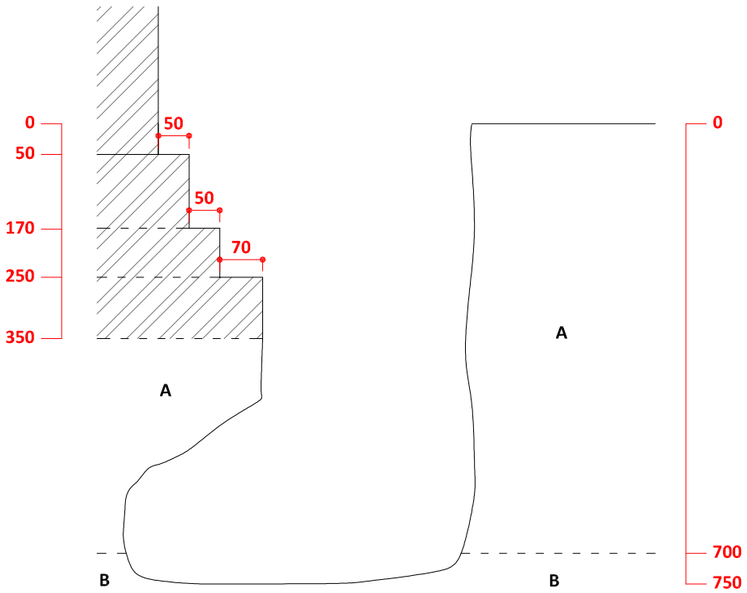
Plan

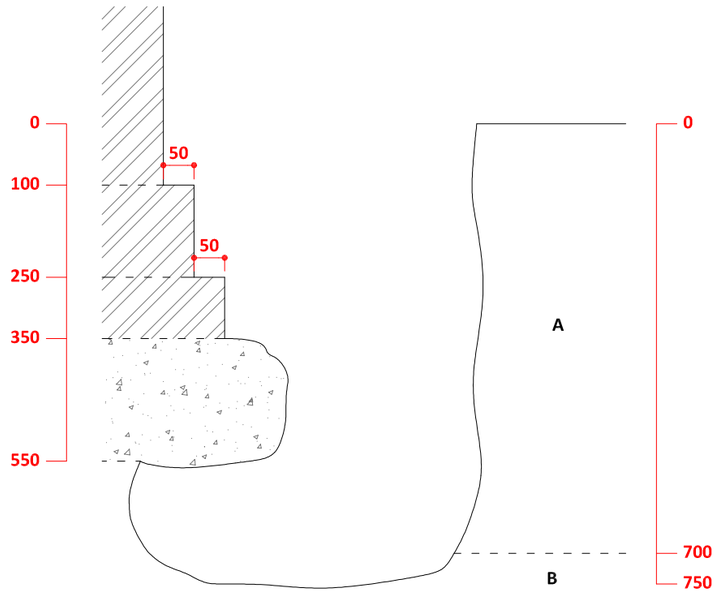


Photographic record

Section A-A



Section B-B



Key

A. Medium strength brown and grey silty sandy very gravelly CLAY with occasional cobbles of brick and concrete. Gravel consists of sub-angular to sub-rounded brick, flint and concrete.
(MADE GROUND)

B. Medium strength brown mottled grey slightly silty slightly sandy slightly gravelly CLAY. Gravel consists of fine to medium sub-angular to sub-rounded flint.
(LONDON CLAY FORMATION)

Observed features
Assumed features

Denotes brickwork

Denotes concrete

Notes

1. All dimensions shown in millimetres
2. Disturbed sample taken from 0.4m depth

Method of excavation	
Hand tools	
Trial pit dimensions	
As shown	
Groundwater observations	
No groundwater encountered	

Title	Trial pit number
Trial pit record	TP01
Date of excavation	Location plan on drawing number
09.04.2015	02
Scale	Appendix
1:10 at A3	B

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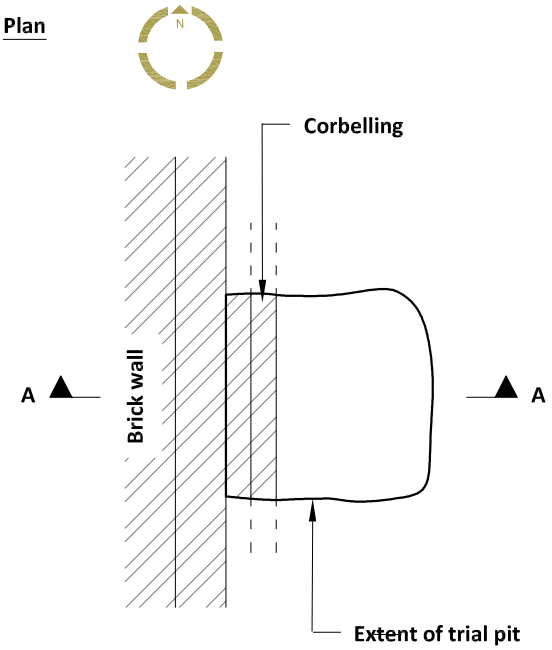
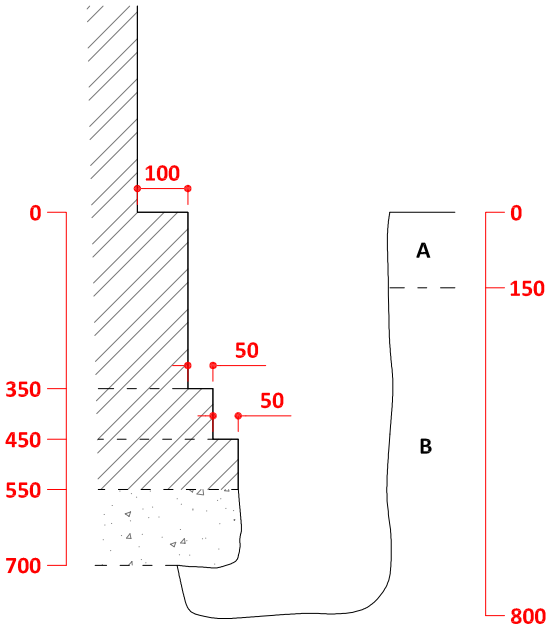
Plan



Section A-A



Photographic record

Key

A. Brown and grey silty sandy very gravelly CLAY with occasional cobbles of brick and concrete. Gravel consists of fine to coarse sub-angular to sub-rounded brick, flint and concrete.
(MADE GROUND)

B. Medium strength brown mottled grey slightly silty sandy gravelly fine to medium CLAY with occasional cobbles of brick. Gravel consists of brick, sub-angular to sub-rounded flint and concrete.
(MADE GROUND)

Observed features
Assumed features

Denotes brickwork
Denotes concrete

Notes

1. All dimensions shown in millimetres
2. Disturbed samples taken from 0.1m and 0.4m depths
3. Pocket penetrometer testing:
   - PP 0.2m = 58 kN/m²
   - PP 0.4m = 50 kN/m²
   - PP 0.6m = 68 kN/m²

Method of excavation
Hand tools
Trial pit dimensions
As shown
Groundwater observations
No groundwater encountered

Title
Trial pit record
Trial pit number
TP02
Date of excavation
09.04.2015
Location plan on drawing number
02
Scale
1:15 at A4
Appendix
B

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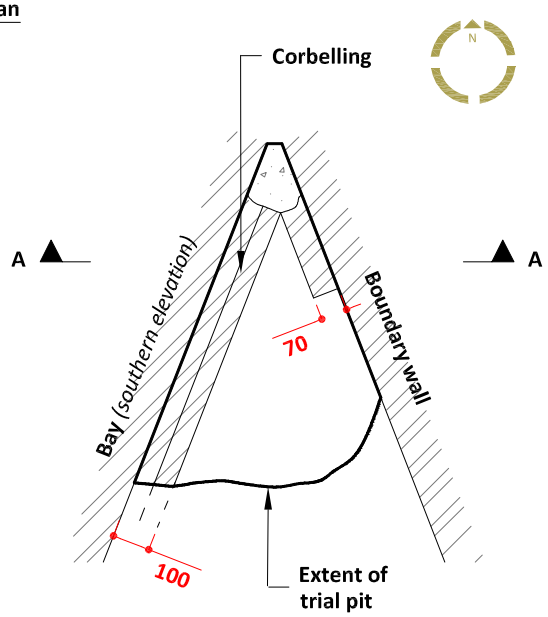
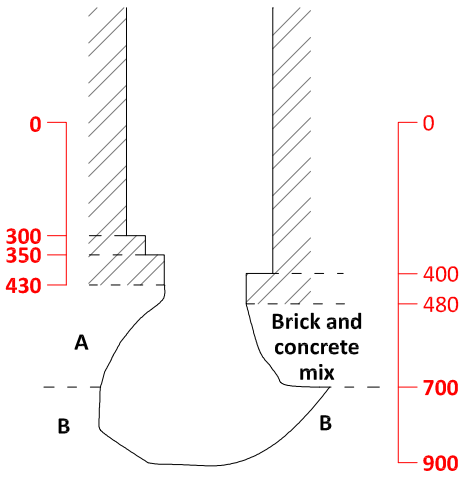
Plan



Photographic record

Section A-A



Key

A. Medium strength brown and grey silty sandy very gravelly CLAY with occasional cobbles of brick and concrete. Gravel consists of sub-angular to sub-rounded brick, flint and concrete.
(MADE GROUND)

B. Medium strength brown mottled grey slightly silty slightly sandy slightly gravelly CLAY. Gravel consists of fine to medium sub-angular to sub-rounded flint.
(LONDON CLAY FORMATION)

Observed features
Assumed features

Denotes brickwork
Denotes concrete

Notes

1. All dimensions shown in millimetres
2. Disturbed samples taken from 0.2m and 0.8m depth

Method of excavation	
Hand tools	
Trial pit dimensions	
As shown	
Groundwater observations	
No groundwater encountered	

Title	Trial pit number
Trial pit record	TP03
Date of excavation	Location plan on drawing number
09.04.2015	02
Scale	Appendix
1:20 at A4	B

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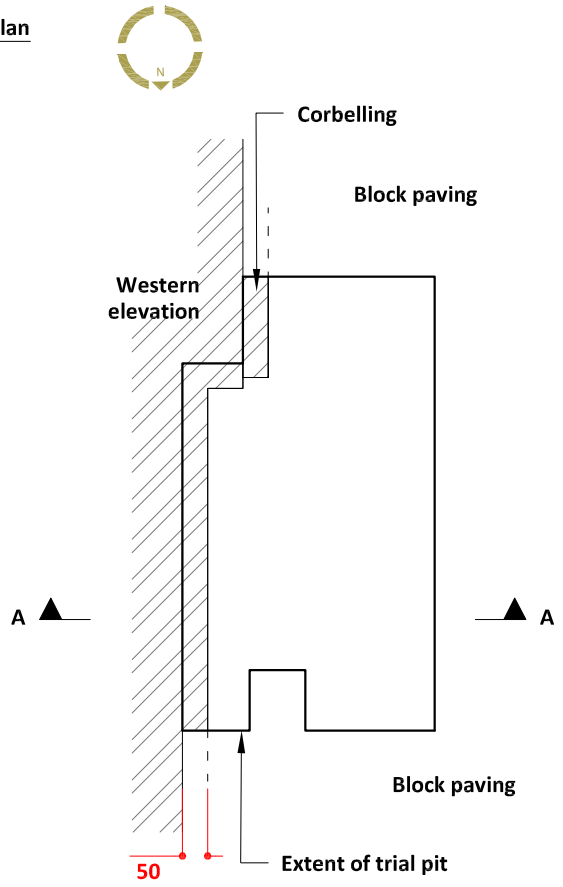
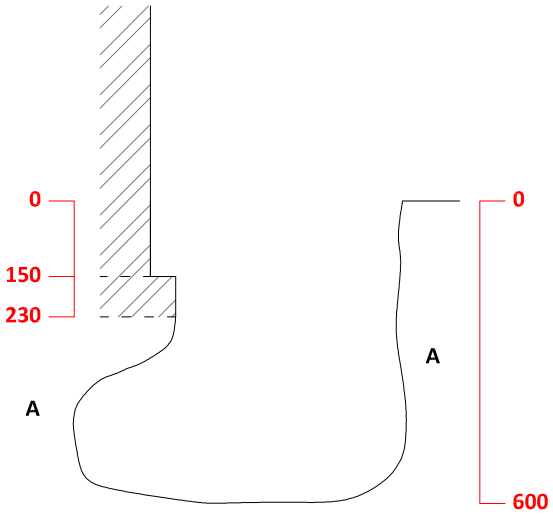
Plan



Photographic record

Section A-A



Key

A. Medium to low strength brown and grey silty sandy very gravelly CLAY with occasional cobbles of brick and concrete. Gravel consists of sub-angular to sub-rounded fine to coarse brick, flint and concrete.
(MADE GROUND)

Observed features
Assumed features

Denotes brickwork
Denotes concrete

Notes

1. All dimensions shown in millimetres
2. Disturbed samples taken from 0.4m depth
3. Pocket penetrometer testing:
   - PP 0.2m - 1.0/1.0/1.0 (50 kN/m²)
   - PP 0.4m - 0.5/0.5/0.3 (21 kN/m²)
   - PP 0.5m - 0.3/0.5/0.5 (21 kN/m²)

Method of excavation	
Hand tools	
Trial pit dimensions	
As shown	
Groundwater observations	
No groundwater encountered	

Title	Trial pit number
Trial pit record	TP04
Date of excavation	Location plan on drawing number
09.04.2015	02
Scale	Appendix
1:15 at A4	B

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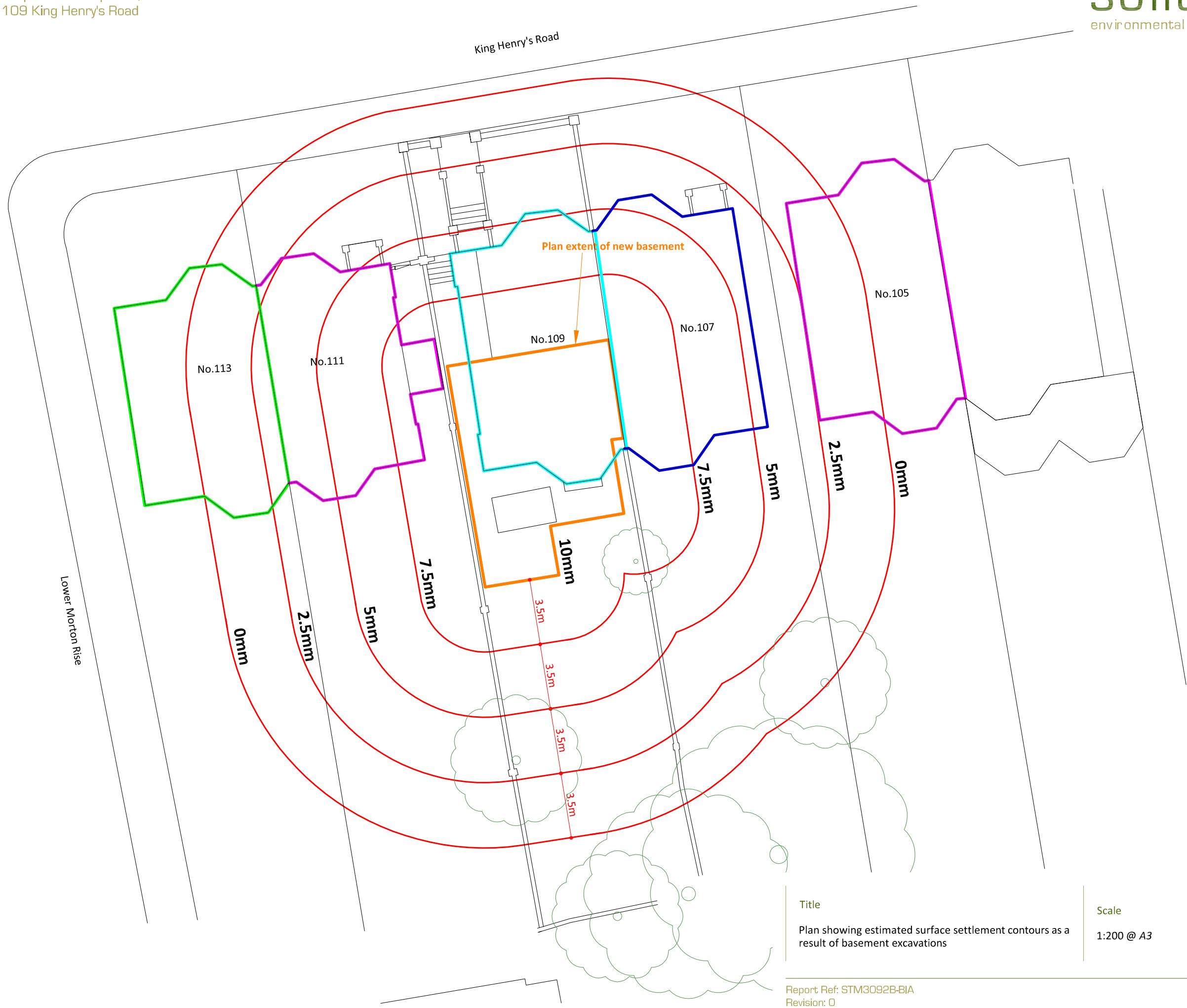

Title	Scale	Drawing number
Plan showing estimated surface settlement contours as a result of basement excavations	1:200 @ *A3*	01

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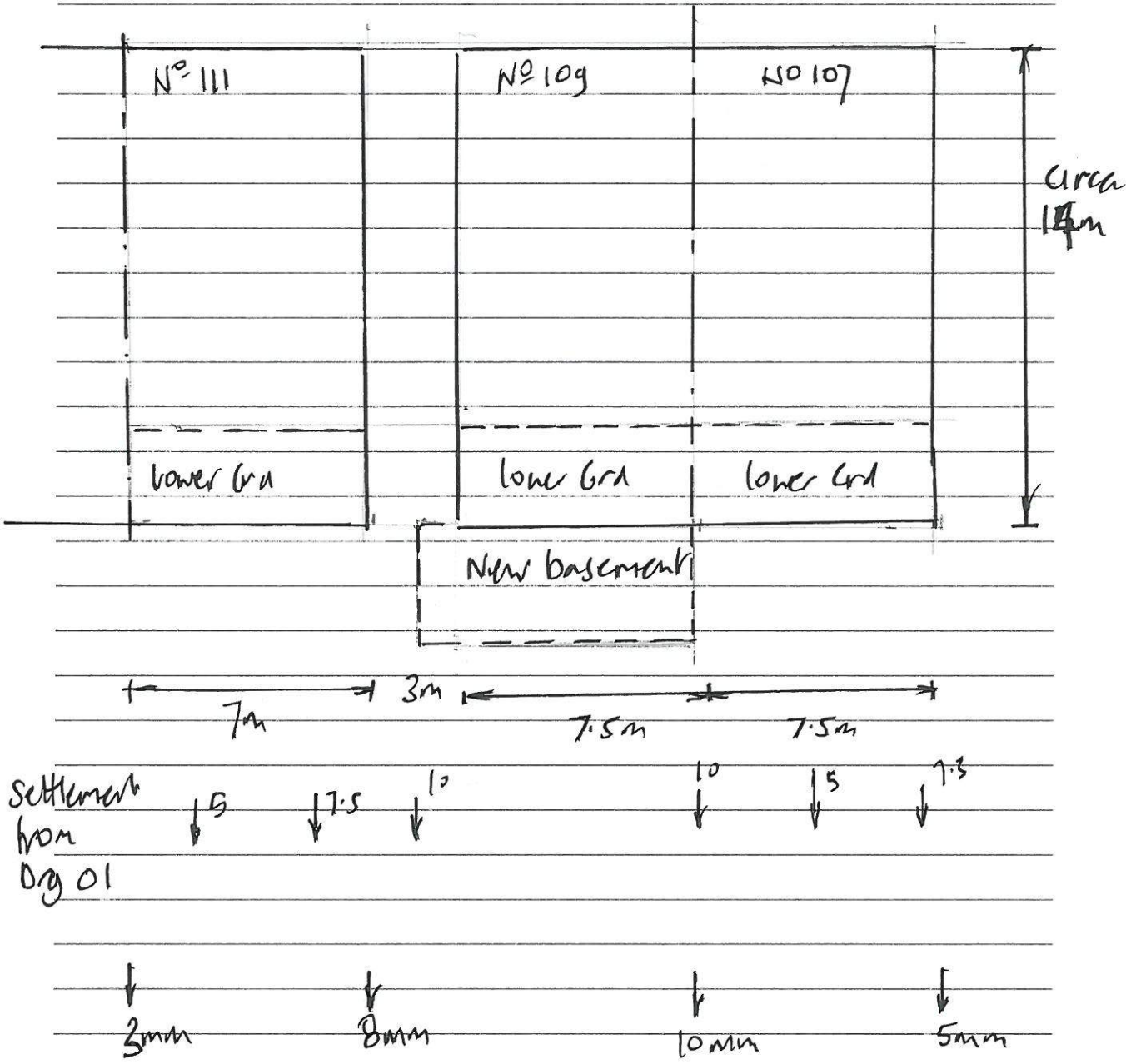
Rear Elevations on Nº111, 109 and 107 King Henry's Road



settlements on end wall / party wall lines

Originator SH	Checked NLT	Title Estimate of tensile strain in masonry
Sheet number 10f4		Date: September 2015

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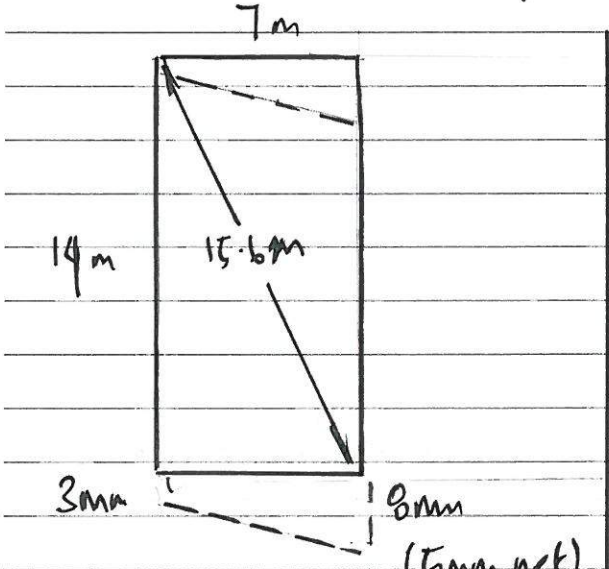
Elevations on page 1 considered to be most vulnerable to movement damage due to excavation of basement at N° 109. Refer drawing 01 for predicted movement / settlement contours

Consider rear elevation of N° 111.

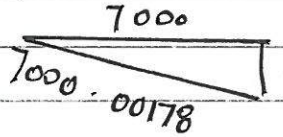


Deformation - vertical component only

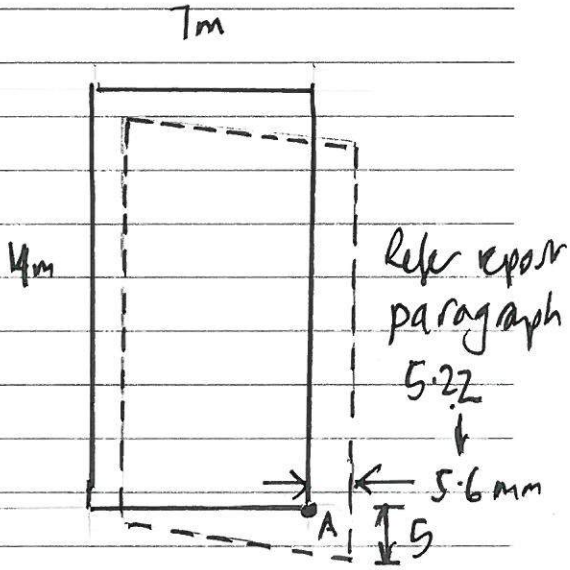
tensile strain on diagonal

$\frac{5}{15600} \times 100 = 0.032\%$

tensile strain on horizontal

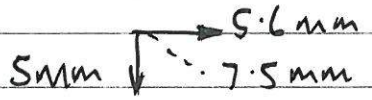


$\frac{1.78}{7000} \times 100 = 0.0254\%$



Deformation for horizontal and vertical components

At A



tensile strain on diagonal

$\frac{7.5}{15600} \times 100 = 0.048\%$

tensile strain on horizontal

$\frac{(1.78+5.6)}{7000} \times 100 = 0.105\%$

Originator SH	Checked NLT	Title Estimate of tensile strain in masonry
Sheet number		Date: September 2015

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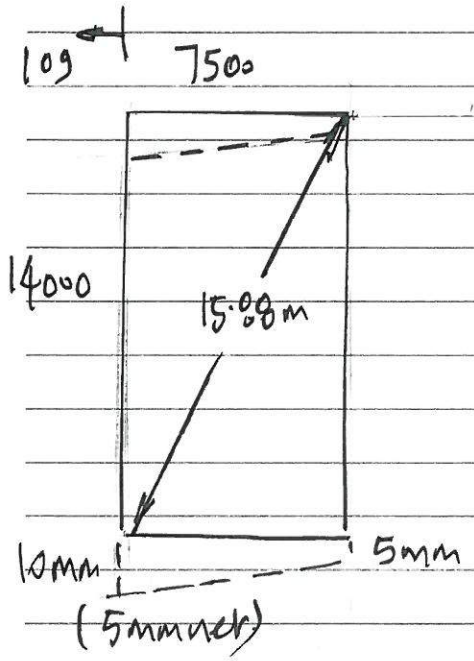
Consider elevation of N° 107

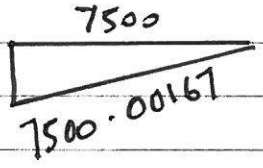


Deformation for vertical component only.

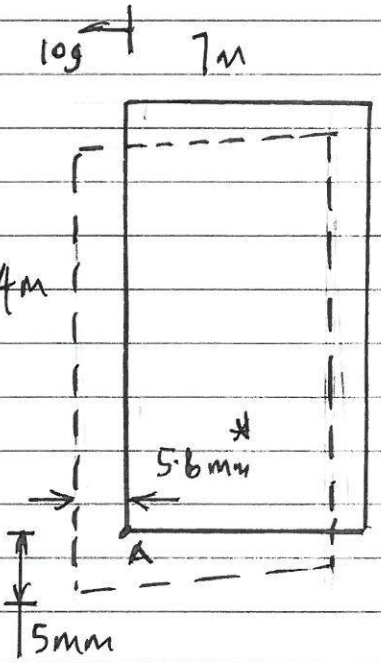
tensile strain on the diagonal

$= \frac{5}{15880} \times 100 = 0.031\%$

tensile strain on horizontal

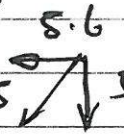


$\frac{1.67}{7500} \times 100 = 0.022\%$



* Refer report paragraph 5.2.2

Deformation for horizontal and vertical components at A



tensile strain on diagonal

$= \frac{7.5}{15880} \times 100 = 0.047\%$

tensile strain on horizontal

$\frac{(1.67+5.6)}{7500} \times 100 = 0.096\%$

Originator SH	Checked NLT	Title Estimate of tensile strain in masonry
Sheet number		Date: September 2015

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Tensile strain in horizontal direction considering horizontal and vertical components of predicted movements exceeds Burlands category 1 damage (exceeds 0.075% strain)

Determine amount of horizontal movement which would reduce damage to category 0 or 1

Consider № 107 only.

Horizontal (inward yielding movement) limit for Burland category 0

$$\frac{(1.67 + x)}{7500} \times 100 = 0.05\%$$

$$x = 2\text{mm}$$

for Burland category 1

$$\frac{(1.67 + x)}{7500} \times 100 = 0.075\%$$

$$x = 4\text{mm}$$

Monitor inward yield movements to less than 4mm by adjustable propping to compensate.

Date 13 March 2015

Our Ref 20878-NG-4-130315

Your Ref STM3092B

To Rachel Brown

soiltechnics

Rachel.Brown@soiltechnics.net

London Underground Limited

Hello Rachel,

109 King Henry's Road, London NW3 3QX.

Thank you for your communication of 12th March 2015.

I can confirm that London Underground has no assets within 50 metres of your site as shown on the plan you provided.

However, there are Network Rail assets close to this site.

Please contact the following to query what affect if any your proposals will have on the railway:

Asset Protection Anglia Route
Network Rail
Floor 11
One Stratford Place
Stratford
London
E20 1EJ

Telephone number 0203 356 2510

Email: AssetProtectionAnglia@networkrail.co.uk

Should you have any further enquiries, please do not hesitate to contact me.

Nicole Gaskin
Assistant Information Manager
LUL Infrastructure Protection
E-mail: Locationenquiries@tube.tfl.gov.uk
Tel: 020 7027 8535