

RWA LONDON

Bridge House
142 Lower Marsh
London
SE1 7AE

Phone: 020 7593 0088
Fax: 020 7593 0080
E-mail: engineers@rwalondon.co.uk

STRUCTURAL APPRAISAL OF PLANNING SCHEME AT 147 KENTISH TOWN ROAD LONDON



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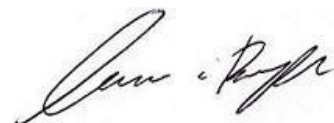
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Revision History

Rev	Date	Purpose/Status	Document Ref.	Comments
A	25-11-14	Revised for planning		Construction methodology and foundation commentary added

Prepared by:
Michael Davenport
CEng MICE

Reviewed by:
Conor O'Boyle
CEng IStructE



1 Executive summary

This report reviews the 147 Kentish Town Road site development scheme planning application produced by DWA Architects and presents information obtained from restricted internal building inspections and the review of Site Analytical Services Ltd site investigation report dated 30th May 2013 and BIA report dated 28th August 2014. This report also addresses items raised by the GEA planning Audit issued 18th November 2014.

The scheme involves the retention of the masonry facades considered worthy of preservation by the Local Planning Authority to Castle Road and Kentish Town Road and the demolition of the existing building. The demolition will include internal structure, timber floors and basement masonry internal walls. It is proposed to replace the internal building with a freestanding steel framed structure to accommodate the mixed use development.

Preliminary designs for the temporary façade retention structures are based on established design and construction techniques but have been prepared without the benefit of full building access or building exposures. A conservative appraisal of foundation loading for a temporary façade structure including kentledge confirm a maximum loading of 90 kN/m² (sls) bearing approximately 0.6 m below the existing basement floor in stiff, becoming very stiff, sandy silty clay. This is considered acceptable with nominal settlement and is less than the original building foundations constructed at similar depth.

During the demolition phase of the project, the existing basement floor slabs and highway boundary retaining walls will be maintained throughout the work to ensure all adjoining structures, including public footpaths and highways, are safeguarded. A number of masonry walls will require lateral shoring and propping. The design of the temporary works will require further investigation works during initial demolition to finalize the detailed design and support fixings to the retained structures.

Appropriate demolition processes will be required to minimise noise, vibration and dust including the installation of a robust protection hoarding to safeguard the adjoining areas.

To safeguard the Highway during the work, temporary structures, and the permanent works, will all require technical approval (formal TA submission) from the Camden Council Highway Department. Enclosed sketches show the sequence of façade retention and demolition. The demolition operation will be progressed on completion of the façade retention structure with any built in floors and wall construction carefully separated and safeguarded to minimise disturbance.

The formation of a new basement to the existing pub beer garden area will be achieved by locally underpinning the existing boundary or party masonry walls and by the introduction of new inner construction and minor lateral shoring of existing site boundary footpath and highway retaining structures. Trial pits have shown the existing foundation of the single boundary property wall adjoining the proposed basement has bearing on made ground resting on superficial head deposits to a depth of 2.4 m below ground. The excavated material and replacement with concrete pins will not significantly increase the loading and therefore the risk of possible heave of the underlying stiff, becoming very stiff, sandy silty clay is considered acceptable.

During demolition an on-going investigation will be undertaken to fully survey and probe the substrata to finalize the detailed design of the foundations and sub-structures.

The proposed building will be constructed on a conventional raft with thickened ribs at structural column positions, and at boundaries, with foundations taken down below the made ground at basement floor level and placed in stiff, becoming very stiff, sandy silty clay. The basement floor will be composite with the raft. A conservative appraisal of new building foundation loading confirm a maximum loading of 110 kN/m² (sls) bearing approximately 0.6 m below the existing basement floor in London Clay. This magnitude of loading is considered acceptable with nominal initial and long term settlement and in accordance with established practice.

Based on a borehole investigation, the specialist geotechnical site report confirms the site is underlain with competent London Clay comprising of stiff becoming very stiff mottled silty clay. Ground water flow is expected to be nominal within cohesive soils of low permeability.

Beneath Kentish Town Road passes the London Underground Northern Line tunnels. Any construction within the tunnel influence zones will require design approval and also the approval of the build operation, as shown on attached London Underground asset plan.

The replacement buildings will have a conventional steel frame of hot rolled beams and columns, with bolted or welded connections and reinforced concrete floors cast on cold formed metal decking. New facades will be formed with traditional masonry infill with specialist glazing and all fixed to the new steelwork frame.

2 Introduction

RWA London Civil and Structural Engineers have reviewed the survey and proposed DWA Architects planning application documents and have inspected the buildings.

The scheme involves the retention of key street scene period facades of the Old Castle Tavern and the demolition of the inner structure and site development to form commercial space to the basement and ground with residential accommodation on the upper floors.

The new building will have an independent structure with new foundations to avoid the adjoining properties. To safeguard adjoining buildings traditional underpinning will be installed to existing foundations where necessary. The adjoining highways and retained facades will be safeguarded with temporary works during demolition.

The existing basement will be retained with a new addition proposed on the site of the existing beer garden. The new basement will be formed with reinforced concrete retaining walls. The aim is to minimise the inherent risk of using shared, existing and new, foundations and also to reduce construction and movement joints between retained and new buildings.

This report has been prepared by Michael Davenport, a chartered Civil Engineer (CEng) and Member of the Institution of Civil Engineers (MICE) with over 25 years of experience of all aspects of the structural engineering industry including foundation design, design and erection of temporary structures and also the repair and alteration of listed buildings. Experience has also included the management of site operations for a number of major civil engineering projects in London.

This report has also been prepared in conjunction with Conor O Boyle, a chartered Structural Engineer (CEng) and Member of the Institution of Structural Engineers (IStructE) with over 25 years of experience of the structural engineering industry.

3 Existing structure

The existing Victorian pub building is constructed of traditional load bearing masonry with timber floors and roof. Steel beams are present to the main open plan ground floor bar area. The basement highway retaining walls are constructed of solid masonry with buttressing piers and walls. During demolition the buildings will be investigated to establish if the existing party wall is structurally separated or share load bearing elements.

Site investigation has confirmed the foundations of the building are formed of corbelled masonry on concrete base (possible late underpin) on natural stiff mottled silty clay. The party wall is formed of solid masonry with deep concrete underpin which extends to more than 1.0 m below the existing basement floor. A drainage survey has confirmed the site does not contain common drains.

Passing beneath Kentish Town Road is a Northern Line tube train tunnel. The design team will liaise with London Underground to safeguard the asset and ensure suitable and appropriate measures are undertaken.

4 Load analysis assumptions

The new building will be assessed using BS6399: part 1: 1996 design loading values.

- Office to basement and ground floor to be 4kN/m² + 1.0kN/m² for partitions
- Loading to the residential upper floors: 1.5kN/m² + 1.0kN/m² for partitions.
- Mechanical plant areas including water storage to be 5.0kN/m² or specific for equipment or tanks.
- Residential roof terrace imposed load to be 1.5kN/m²
- The flat roof's imposed load is assumed to be 0.75kN/m² (Snow and maintenance access only).

Any proposed vehicle traffic areas (basement light wells) and specific mechanical plant areas will be individually appraised in accordance with design codes.

5 Design and build commentary including temporary works

Commentary for key construction elements for the project is as follows:

- The proposed scheme retains the facades to Castle Road and Kentish Town Road as identified by the Local Authority Planning Department. The construction of the retained facades has been investigated and temporary steelwork frames have been engineered to enable the buildings to be demolished. The façade retention structures will be formed with steel portalised and braced frames located within the site and behind a site hoarding.
- The preliminary design for the temporary façade retention structures is based on established design and construction techniques but has been prepared without the benefit of full building access or building exposures. Early site investigations will be required to confirm the presence of services, concealed construction and substrata performance for the bases of the temporary structures.
- Floor demolition or building disturbances adjoining the retained façades may require localised strengthening to safeguard the façade prior to the erection of the temporary works. Refer to enclosed sketches for further details.
- The demolition involves a traditionally constructed building formed with masonry walls, timber floors and rafter roofs. The demolition process will utilize a top down reverse construction methodology with full height scaffold access and using hand tools. Demolition of floors and walls will require careful assessment to ensure overall stability of buildings and associated elements is maintained and temporary propping and bracing during the construction phase is anticipated.
- **The substratum of the old pub beer garden is formed of made ground resting on superficial head deposits to a depth of 2.4 m below ground. As a result of the findings the underpin blocks to retain the adjoining owner will be of nominal depth and increase in loading and therefore the risk of heave will not be exceptional for this type of construction.** The excavation will be undertaken with an excavator with material removed via tipper lorry. The public highway will be safeguarded with steel sheet piles and back propping. Refer to section 6 for further details.
- The design intent is to support all new structures on new foundations and where possible transfer the loading of the retained buildings to new foundations via traditional underpinning techniques. The aim of this approach is to minimise the inherent risk of using shared, existing and new, foundations and also to reduce construction and movement joints between retained and new buildings.

- Based on the ground and groundwater conditions encountered in the boreholes and trial pits of the site investigation, it will be possible to support the proposed new development on **conventional RC spread** foundation taken down below the made ground at basement floor level and placed in stiff becoming very stiff sandy silty clay. Any soft or loose superficial soils encountered should be removed and replaced with well compacted granular material.
- **A spread foundation positioned along column alignments and perimeter boundaries would incorporate a fully suspended RC basement floor installed on proprietary clay master heave board to accommodate the risk of heave as identified in the Phase 1 Preliminary Risk Assessment and Basement Impact Assessment.**
- **The new basement will be formed of conventional RC spread foundations with suspended RC floor. The highway retaining wall will be formed of RC with spread foundations that also act as the building foundation.**
- **To monitor and manage the construction the adjoining party walls, highway structures and new construction will be monitored to identify any early heave or ground movement or building disturbance. The monitoring will be continued during the build and extend for 6 months after full building loads have been achieved.**
- With the presence of firm uniform clay of infinite thickness a reinforced concrete spread foundation approach has been selected to minimise the depth and consequent volume of excavation. The construction is well understood and established building technique in London Clay. Piled foundations have been considered but the presence of underground tunnels, poor access for specialist equipment and the limited site area would impact on the overall build programme.
- The proposed upper structure will be formed with conventional structural steel framework with PMF type in-situ concrete floor construction. The retained facades will be secured to new steelwork framework incorporating suitable connections to allow for differential building movements.

6 Basement Extension Assessment and Construction

- The proposed scheme involves extending the existing basement (refer to Architects plans). To address the requirements of Camden Council Planning policy DP27, refer to Site Analytical Services Ltd Basement Impact report. The following is noted:
- A desk top study and review of “*Floods in Camden – Report of the floods scrutiny panel; London Borough of Camden, June 2003*”, has highlighted the historic risk of localised flooding of basements caused by blocked or inadequate road gullies and sewers unable to deal with the volume of surface water runoff. Records of the flooding of 2002 and 1975 show Castle Road and the adjoining area of Kentish Town Road avoided standing water flooding, probably due to the raised ground profile surrounding the site.
- The specialist geotechnical investigation which included bore holes and trial pits, confirms the site is underlain with competent London clay. Ground water flow is expected to be nominal within the cohesive soils of low permeability. Published topographical surveys of the area show the site is located on raised ground with falls to Camden Town centre. *Due to the presence of clay soils with its low permeability and the site topography we consider the proposal will have an insignificant impact on groundwater flow.*
- The area of the proposed basement extension is covered with impervious tarmac with surface drainage to public drains. *We consider the existing site contributes little towards the storage of surface water or any natural soak-away facility, the proposal will therefore have a nominal impact on the existing hydrological capability of the site.*

- The existing retained basement perimeter walls support public footpath and highways, they are constructed of traditional solid masonry and are over 100 years old. The condition of the masonry is fair with little visual evidence of significant long term water ingress, ground movement or distress.
- The new basement structure will be a reinforced concrete, ground bearing box. The below ground structure will be designed to be sufficiently stiff to distribute lateral and vertical dead and imposed loads, keeping the bearing stresses below within acceptable levels. Refer to RWA 3396 T04 & 05 for details.
- *The party walls to the perimeter of the proposed basement structure will be repaired and restrained as necessary, in structural terms they will be retained in their current state. The new perimeter liner walls will be designed to accommodate any lateral pressure that is exerted from the foundation of the party walls.*
- The new basement retaining walls will be formed with reinforced concrete with specialist manufactured waterproofing additive. The new walls will be structurally significantly stronger than the retained basement walls and provide a superior barrier to water ingress. The design will allow for surface flooding to the surrounding area and include duty and standby pumps to deal with internal or external water issues. *We consider the proposed reinforced concrete walls incorporating waterproofing will be robust and structurally adequate to accommodate the impact of flooding to the surrounding area.*
- The proposed spread foundation has been principally chosen to minimise the impact of the London Underground subterranean structures by the risk of piling operations. Dialogue with London Underground will be on-going throughout the design development process and include the submission of detailed information.

7 Sequence of work and outline method statements (refer to sketches in the Appendix)

- Scaffolding will be erected to the building facades with protection wrap sheeting to the upper levels. Hoarding will be erected to all boundaries including the removal and safe storage of architectural features.
- Surveys will be undertaken to investigate the presence of asbestos, findings will be removed from site by specialist contractors.
- Surveys will be undertaken to confirm building construction to all properties to be demolished.
- Existing windows will be removed and openings to the facades secured with tight fitting timber work with plywood insert boarding.
- The foundations for the temporary steelwork façade retention structures will be excavated by mini excavator or by hand with spoil removed by skips positioned in the side court yard and removed via Castle Road. Concrete will be delivered and pumped from Castle road.
- The existing floors will be locally back propped to provide safe access. Localised holes will be formed in the timber floors to accommodate the temporary façade retention steelwork.
- The roof covering and localised areas of roof structure will be removed for access requirements.
- The primary temporary steelwork façade retention members will be installed by mobile crane positioned in Castle Road with a temporary road closure. The secondary steelwork will be erected from within the building with lifting winches.
- The solid masonry façade will be secured to the temporary retention structure with chemical anchors solid steel threaded bars, timber chocks, waler beams or other established fixing methods.
- The inner building will be demolished with traditional top down sequence with scaffold access and hand operated tools. Debris will be transferred to skips at the ex-beer garden for removal via Castle Road.
- The basement extension adjoining the public footpath will be constructed as follows:
 - A measurement survey will be undertaken of adjoining properties and highways to establish the datum condition. Regular surveys will be undertaken during the construction to monitor the ground profiles, levels and structures.

- The building forecourt will be excavated 0.5 m deep with mini excavator. Lightweight interlocking steel trench sheeting will be installed to the face of the excavation by specialist contractor to safeguard the public footpath and highway.
- The excavation and trench sheeting will be progressed together with the sheeting braced with temporary waler and props.
- The reinforced concrete ground bearing floor slab will be constructed with bent up retaining wall starter bars to provide a composite structure.
- With the floor base constructed, the lower waler is removed and the wall construction progressed. The operation is repeated in sections. The top section of the reinforced concrete wall will be restrained with temporary propping and maintained until the reinforced concrete forecourt and ground floor construction is completed.
- The new building will be constructed with reinforced concrete spread foundations, similar to the existing building. The foundations and the temporary façade foundations will be coordinated to avoid clashes. The new foundation will be excavated by mini excavator with spoil transferred to skips and then removal via Castle Road.
- The upper structure will be formed of framed steelwork with the ground and 1st floor erected with specialist on-site lifting equipment. The upper floors will be erected with a mobile crane positioned in Castle Street with a temporary road closure by established fabricator erection method.
- All floors will be formed of in-situ concrete with permanent metalwork decking. Facades will consist of traditional brickwork supported on proprietary metalwork ledger plates, all constructed by bricklayers from the scaffold. Windows and large element will be lifted into position with pulley winches via scaffold lifting beams without the need of crane lifts.

8 London Underground tunnels.

To confirm the proposed scheme is acceptable to the tunnel operators the following is noted:

- Dialogue with London Underground Asset Manager has confirmed the proposed development avoids the subterranean structures and the required clearance zones.
- The proposed spreader and raft building foundation has been principally chosen to minimise the impact of the subterranean structures and to avoid the risk from piling operations.
- Dialogue with London Underground will be on-going throughout the design development process and include the submission of detailed information.

9 Appendix

Copy of Site Analytical Services Ltd Ground investigation report dated May 2013

RWA 3396-T01: Façade retention stage 1.

RWA 3396-T02: Façade retention stage 2.

RWA 3396-T03: Fore court construction.

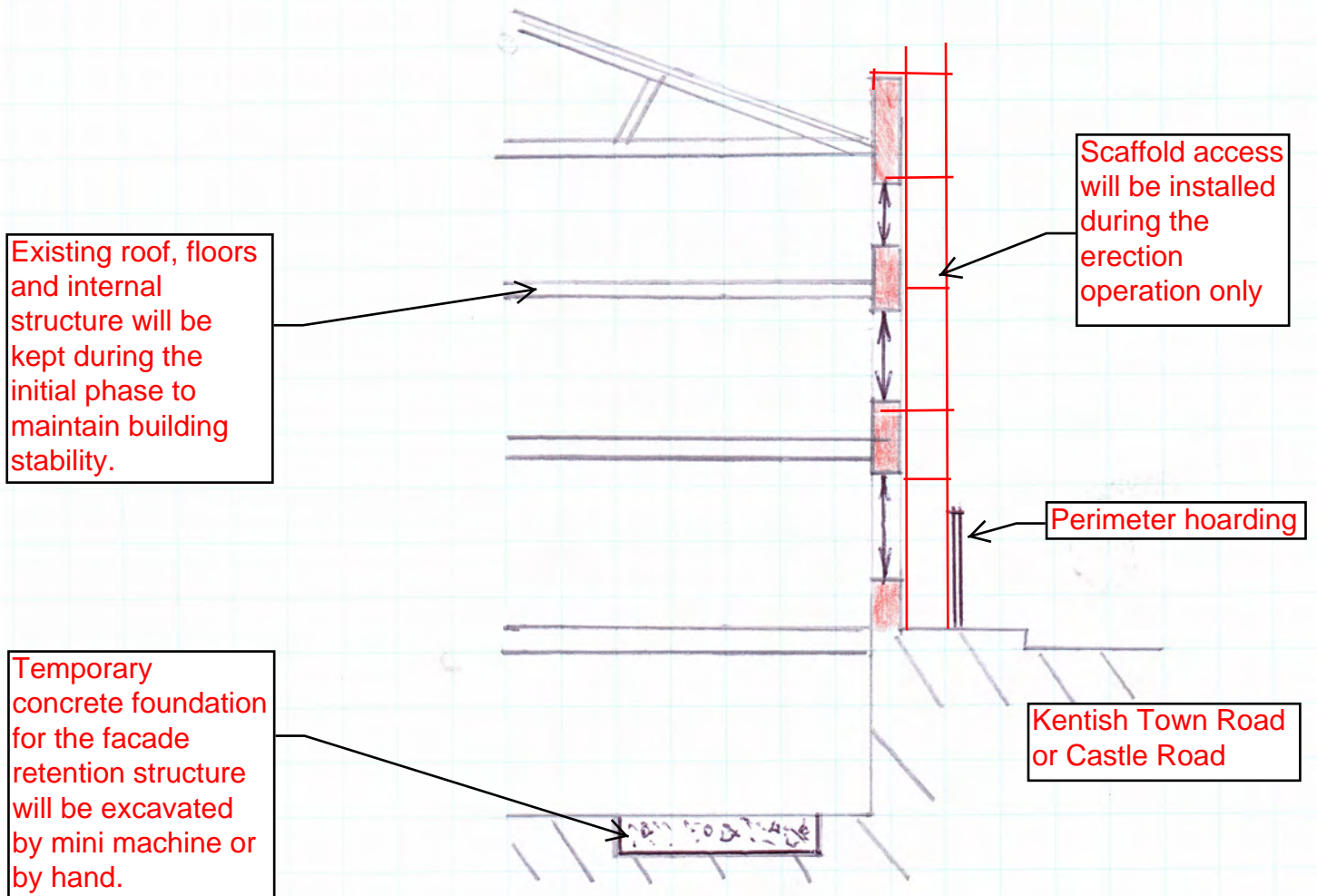
RWA 3396-T04: New basement section commentary.

RWA 3396-T05: Section commentary.

London Underground Map

Demolition sequence and retention of masonry facades: 147 Kentish Town Road and Castle Road

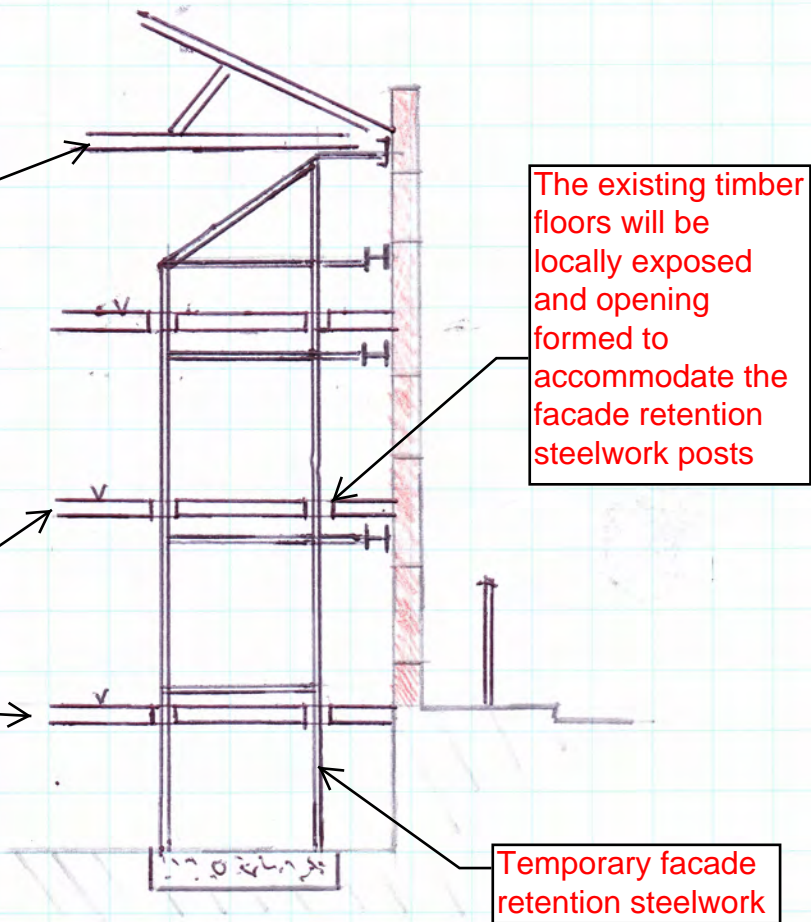
- 1: A 2.4 m high perimeter hoarding will be erected to the boundaries to public areas, all to be approved by Camden Council Highways Department.
- 2: Scaffold will be erected to retained facades as shown and incorporating full protection wrap sheeting.
- 3: Existing windows will be carefully removed and openings framed and propped with tight fitting timber work with plywood boarding.
- 4: The temporary foundation bases for the facade retention structure will be excavated by mini excavator or by hand and formed with reinforced concrete.



- 5: Localized holes will be formed in timber floors to accommodate facade retention steelwork. Back propping of floor and bracing of internal walls will also be undertaken.
- 6: The existing roof covering and roof structure will be locally removed, strengthening will be undertaken as necessary.
- 7: The primary temporary facade steelwork members will be erected with mobile crane positioned in Castle Road with temporary road closure. The secondary steelwork will be erected with lifting winches.
- 8: The solid masonry facade will be secured to the temporary structure with chemical anchored solid steel threaded bars, timber chocks, waler beams or other established fixing methods.
- 9: The inner building structure will be demolished with traditional top down sequence with scaffold access and hand operated tools. Debris will be transferred to skips in ex beer garden for removal via Castle Road.

The roof covering and timber common rafters and ceiling joists will be locally removed to allow for steel erection. Temporary timber propping and metalwork ties may require installing, all subject to inspection.

On completion of the temporary facade structure, the internal building will be taken down by traditional top down sequence with hand operated tools and scaffold access.



The existing timber floors will be locally exposed and opening formed to accommodate the facade retention steelwork posts

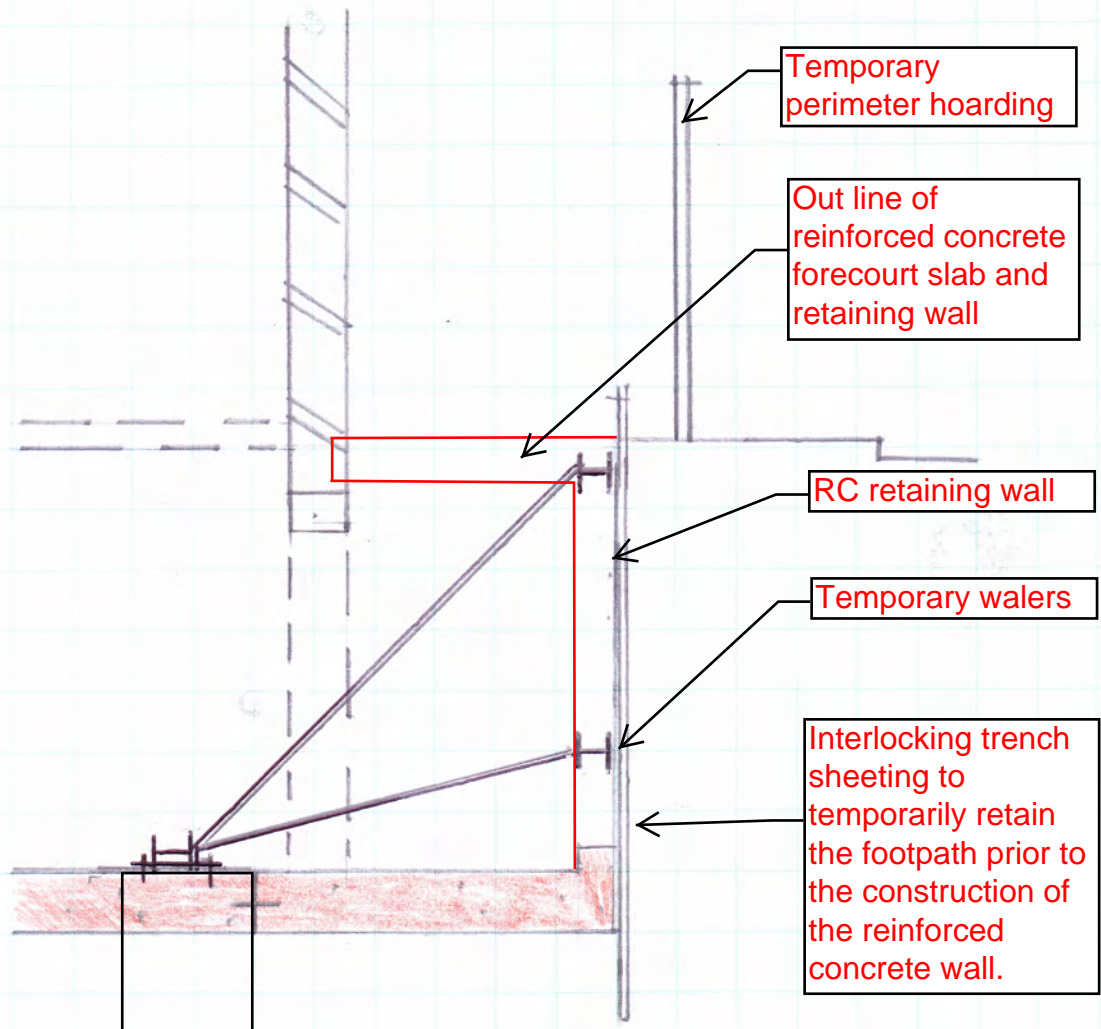
Temporary facade retention steelwork

Construction of proposed light well - Sequence of work undertaken after the facades have been retained and the internal building fabric demolished.

1: Note - The perimeter hoarding is erected, all to be approved by the Camden Council Highways Department.

2: The building forecourt is excavated 0.5 m deep with mini excavator. Lightweight interlocking trench sheeting will be installed by specialist contractor to safeguard the public footpath and highway. The trench sheeting will be progressed with the excavation and braced with temporary walers and props.

3: The basement ground bearing floor will be formed with reinforced concrete and will be continuous with the new perimeter wall.



4: With the floor base constructed, the lower waler is removed and the wall construction progressed. The operation is repeated. The top section of the reinforced concrete wall will be restrained with temporary propping and maintained until the reinforced concrete forecourt construction is completed.

New highway retaining wall constructed of RC. All utility services will be identified and either rerouted or made safe as necessary. The footpath will be locally excavated to 0.5 m depth. Lightweight interlocking trench steel sheeting will be installed with continuous temporary restraint provided by walers and propping. Excavation will proceed by machine from inside the site. The RC raft floor will be initially constructed followed by the RC retaining wall in sections with support maintained to the steel sheeting. Footpath temporary and permanent works will require approval by the Local Authority Highways Department

Permanent RC spread foundations will be tied together with suspended floor (after steel erection and facade fully restrained where applicable). Maximum bearing 110 kN/m2 (sls).

RWA -3396-T04
Basement
commentary
25-11-2104

E	21/11/14	CYCLE GULLEY ADDED TO STAIRS	AH
D	06/11/14	LAYOUT AMENDED	DW
C	28/08/14	REDLINE OMITTED	DW
B	20/08/14	LAYOUT AMENDED	SHOW
A	11/08/14	LAYOUT AMENDED	SHOW
Rev.	Date	Description	Init.

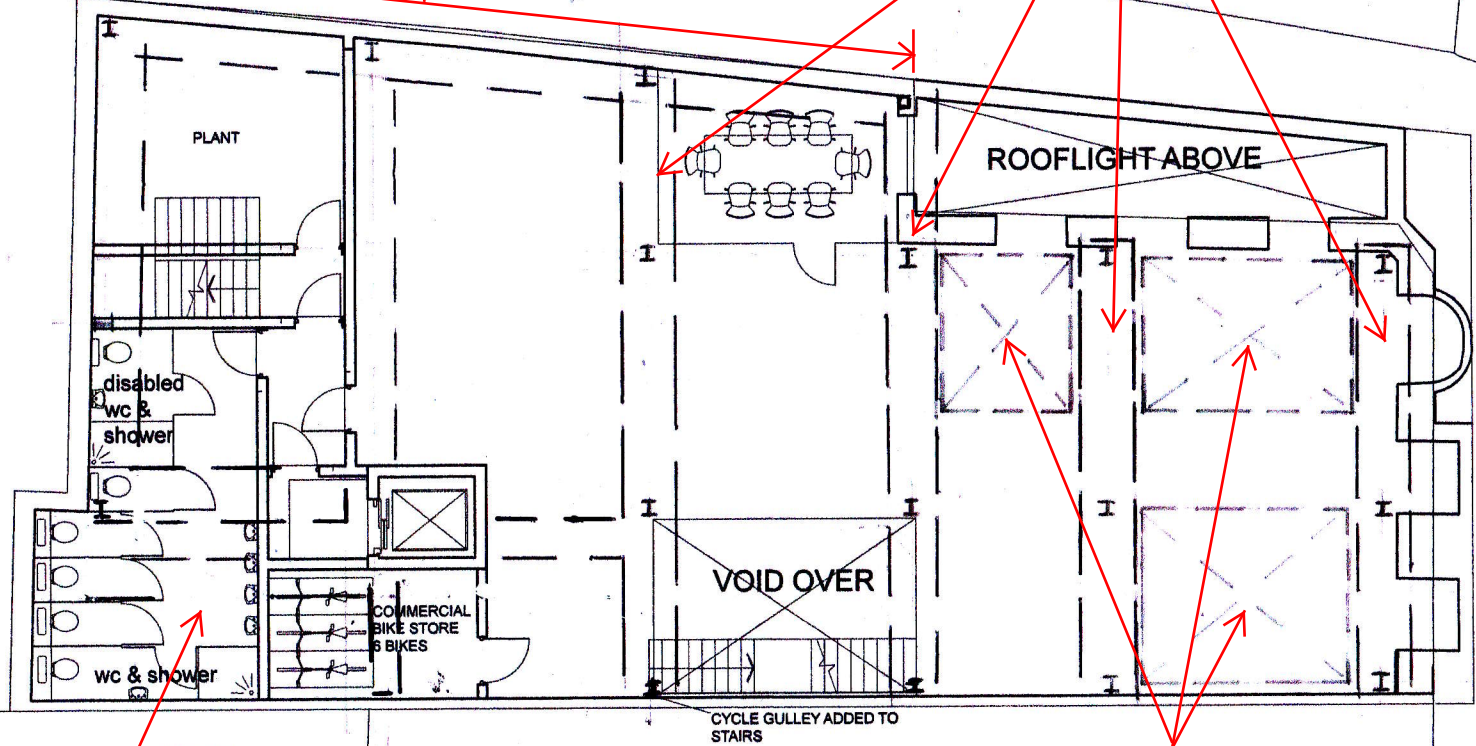
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147 Kentish Town Ltd.
Project Title
147 Kentish Town Road
Drawing Title
Proposed Basement

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Drawn by	Drawing Date	Approved by
-	July 2014	DW
Project No.	Drawing No.	Revision
1344	GA_P_-1	E

DARIA WONG ARCHITECTS
MAGDALEN HOUSE
148 TUCKLEY STREET
LONDON
SE1 2TU
M : 07801 803421
T : 01923 840077

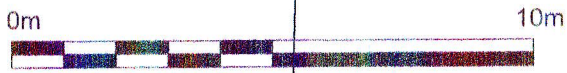
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PLANNING ISSUE

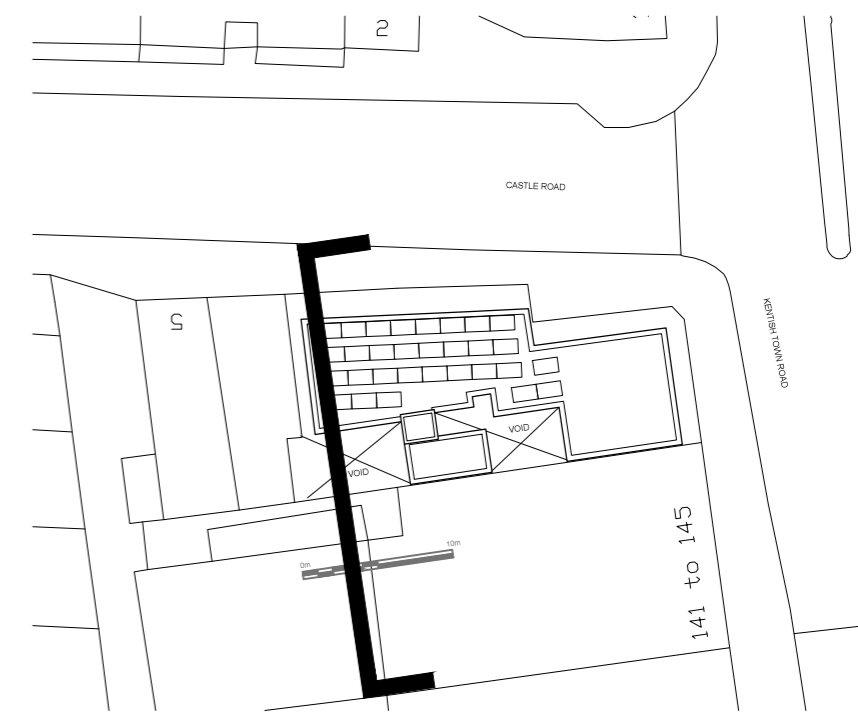


Basement and ground floor building with glazed roof to minimize foundation load

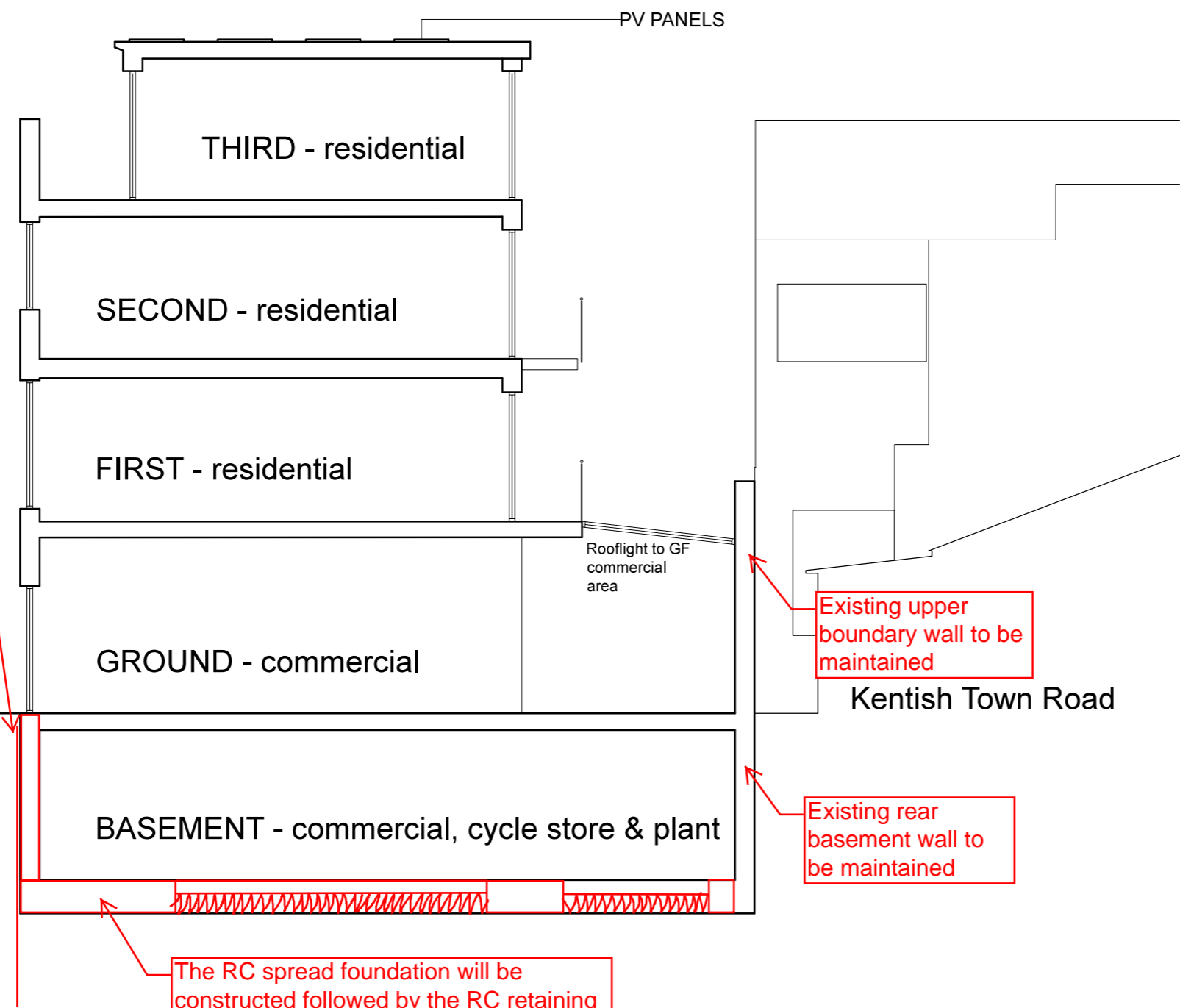
Temporary mass concrete pad foundation for facade retention structure. Maximum bearing 90 kN/m2 (sls) - Includes kentledge loading



15



RC spread foundation incorporating RC wall to highway. The footpath will be locally excavated to 0.5 m depth. Lightweight interlocking trench steel sheeting will be installed with continuous temporary restraint provided by walers and propping. Excavation will proceed by machine from inside the site.



Existing upper boundary wall to be maintained

Existing rear basement wall to be maintained

The RC spread foundation will be constructed followed by the RC retaining wall. Footpath temporary and permanent works will require approval by the Local Authority Highways Department

Refer to site investigation report by SAS for substrata formation

RWA - 3396 - T05
Section commentary
25-11-14

Rev.	Date	Description	Init.
D	14/11/11	PV Panels annotated	EHG
C	14/10/27	PV's Removed following revisions by L.A	AH
B	14/10/17	PV'S Added	AH
A	14/08/28	Key plan added	DW

Client
147 Kentish Town Ltd.

Project Title
147 Kentish Town Road

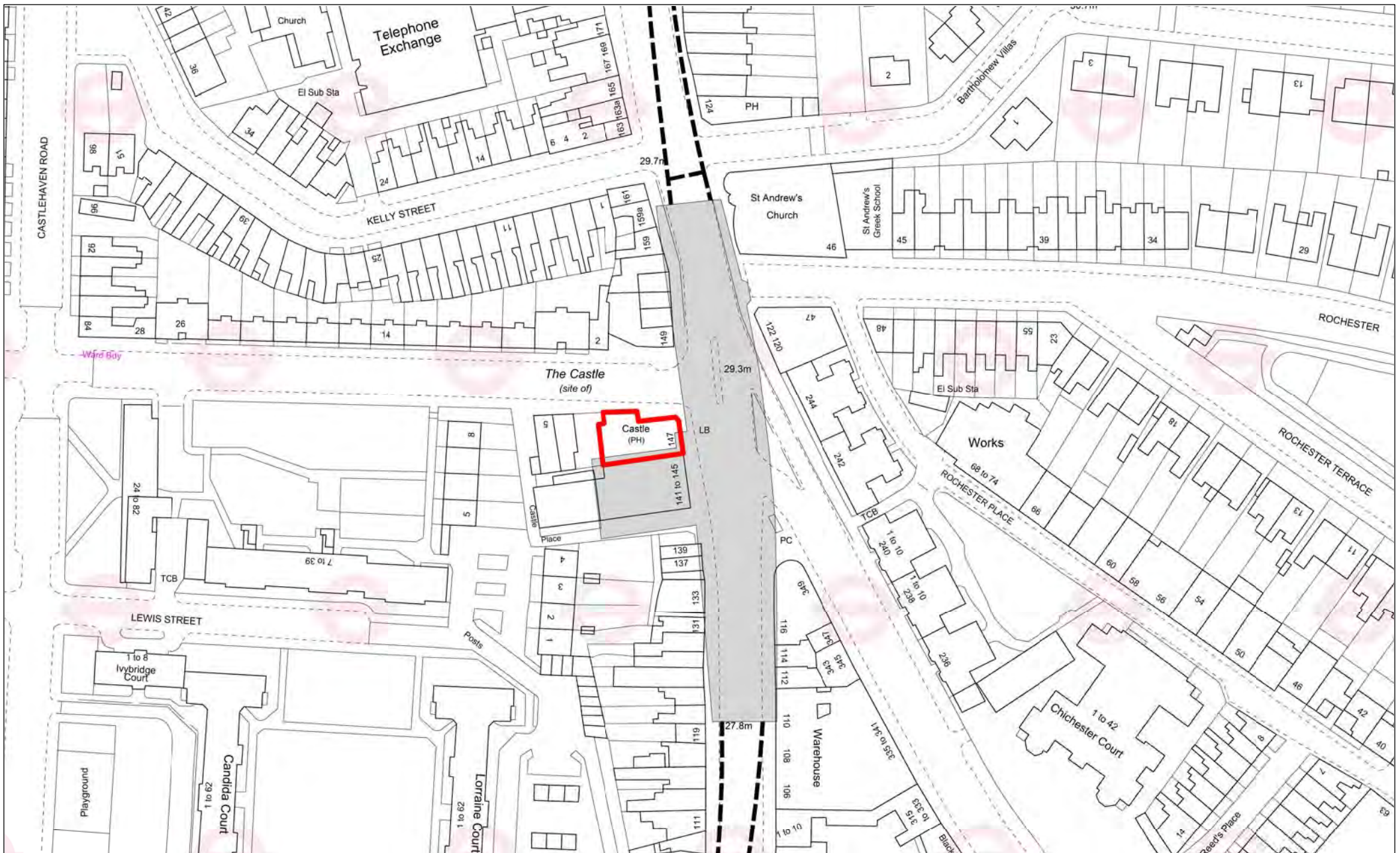
Drawing Title
Proposed Section through Castle Road

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Drawn by	Drawing Date	Approved by
-	July 2014	DW
Project No.	Drawing No.	Revision
1344	GA_S_01	D

DARIA WONG ARCHITECTS
MAGDALEN HOUSE
148 TOOLEY STREET
LONDON
SE1 2TU
M : 07801 803421
T : 01923 840077

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London Underground Limited
 Infrastructure Protection
 3rd Floor Albany House, 55 Broadway,
 London, SW1H 0BD
 Tel: 0207 918 0016
 (auto: 40016)
 Email: Shahina.Inayathusein@tube.tfl.gov.uk



Date	02 April 13
LCS Code	W002
Drawn by	S.Inayathusein
Scale	1:1250 at A4

1. All dimensions and LUL asset locations are approximate
2. This drawing must be read in conjunction with the accompanying letter sent by LUL
3. This drawing is for planning purposes only
4. For more accurate tunnel location information a survey will need to be undertaken.

147 Kentish Town Road,
 London
 NW1 8PD