

Clive Fussell

From: Clive Fussell
Sent: 11 October 2012 11:21
To: 'Kyte KatieJane'
Cc: Lau William; Lousley Steve
Subject: RE: Consolidated Developments - queries
Attachments: PT-12062-DBF-BP-01pdf.pdf; Halcrow drawings.pdf; S062-002P2.pdf; S062-008P4.pdf

Katie-Jane,

Please find attached the DRAFT construction programme for the basement works as requested.

Further to a telephone conversation with William Lau today, we respond to the comments below as follows:

1. In the Agreement the proposed construction sequence is shown in Buro Happold drawing S062-002/P2, which shows that the oversite development basement construction would follow directly on from the construction of the escalator box and without the need for any temporary backfill. A compressible void former is provided between the oversite development basement and the permanent fill to the escalator box to prevent load transfer. This construction sequence would not change the loading on the escalator box, however during the development of the design for the Consolidated Piles it became clear that it was unlikely that the basement construction would follow directly after the escalator box construction due to programme issues relating to planning, occupation of the works site by LUL and the construction of the Crossrail tunnels. As a result it was decided (in a meeting with London Underground - Ralph Freeston) to temporarily backfill the excavation and remove the props to reduce the risk of degradation to the propping system prior to the oversite basement construction. The revised construction sequence was submitted with the final version of the Conceptual Design Statement for the construction of the Consolidated Piles and is shown on Buro Happold drawing S062-008/P4.

At our meeting on 1st June 2012 the option of not temporary backfilling the excavation above the permanent backfill was discussed with LUL, who confirmed (email 2nd August 2012) that they would proceed with the temporary backfill. The excavation above the escalator box will therefore remove the some of the temporary backfill that was placed in the summer of 2012, and is in line with the backfilling and excavation sequence shown on Buro Happold drawing S062-008/P4 (issued 20/10/2008). During the detailed design stage we will make a full 3d assessment of predicted movements during construction.

Assuming a worst case scenario of a 'green field' site with no interaction with adjacent structures, preliminary calculations would give an immediate and short term heave movement of 20mm associated with removing the temporary backfill at the maximum depth of excavation. The adjacent structures including the escalator box, secant piled wall and Consolidated Piles will reduce the movement that the escalator box experiences and we would anticipate a vertical movement in the order of 5-10mm (perhaps ever so slightly less). This would be a best estimate prediction without any significant degree of conservatism.

It is noted that there will also be a long term vertical movement of the box associated with heave due to both the excavation and construction of the box itself and the removal of the temporary backfill. As designers of the escalator box, Halcrow should be able to comment on this. We would anticipate that this long term heave would be at least as large as the elastic movements associated with the removal of the temporary backfill.

Finally, is it possible to obtain monitoring information of the vertical movements experienced by the escalator box during the backfilling operation, as these would provide useful background information.

2. There is an ambiguity in the Agreement with regard to basement level. It was understood that the basement floor level would be at +116m with a 2m zone for construction of foundations, drainage etc so

that the basement construction would not go below +114m. This is why the tunnel sleeve transfer drawing shows the ownership transferring at +114m and the Halcrow RIBA Stage E drawings (HAG-N105-8742-STR-D-SEC-X-02512/01) that were appended to final version of the Conceptual Design Statement shows the top of the permanent fill (and the demarcation layer) at the lesser of +114m or 2.0m above the top of the escalator slab.

During the development of the oversite design the structural zone required for the basement slab (including drainage) has been reduced to 1200mm with a 100mm allowance for site preparation. In order to maximise the usable space the basement slab level has been reduced to +115.3m without affecting the ownership or interface with the permanent fill below.

Notwithstanding the ambiguity noted above, we understand that there are technical issues with constructing the basement structure above the lesser of +114m or 2.0m above the top of the escalator slab.

Best regards
Clive.

Clive Fussell MEng (Oxon) MSt (Cantab) CEng MStructE
Director

engenuiti

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+44 (0)79 2049 7494 mobile
+44 (0)20 7089 5763 direct
+44 (0)20 7089 5760 office

clive.fussell@engenuiti.com

3b Maltings Place, 169 Tower Bridge Road, London SE1 3JB

www.engenuiti.com
@engenuiti

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Registered in England & Wales, Reg No. OC370374

From: Kyte KatieJane [<mailto:KatieJaneKyte@tfl.gov.uk>]
Sent: 27 September 2012 10:22
To: Clive Fussell
Cc: Lau William; Lousley Steve
Subject: RE: Consolidated Developments - queries

Hi Clive

In addition to the below, would it be possible to have some visibility of the programme of works for the development.

Please don't hesitate to call me if you have an queries.

Regards

Katie-Jane Kyte | PM Support & Document Control, Tottenham Court Road Station Upgrade
Capital Programmes Directorate | 3rd Floor | 19-23 Oxford Street | London W1D 2DN
Tel: 0207 1860593 | Auto: 0593 | Email: KatieJaneKyte@tfl.gov.uk

From: Kyte KatieJane
Sent: 25 September 2012 09:45
To: 'Clive Fussell'
Cc: Lau William; Lousley Steve
Subject: Consolidated Developments - queries

Hi Clive

I have spoken to our structural engineer again, William Lau who was in the original meeting with myself and Steve Lousley, and he has a few queries he would like answered prior to the submittal of the planning application if possible.

- 1) As has been raised before, in your design drawings you will be excavating for your basement 2m above our escalator decline. Can you advise what the predicted movements are due to your works and demonstrate how you intend to ensure that the escalators are not adversely affected based on the programme of escalator installation.
- 2) On the Development Agreement the "Tunnel Sleeve transfer" drawing which appears on pages 93 & 210, the "available space for OSD basement construction" is defined as extending to 116.0m AOD. The engenuiti drawing 029_SK046 Section A shows the proposed basement extending to 114m. Please can you clarify.

Thanks and kind regards

Katie-Jane Kyte | PM Support & Document Control, Tottenham Court Road Station Upgrade
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Tel: 0207 1860593 | Auto: 0593 | Email: KatieJaneKyte@tfl.gov.uk

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WARNING: The design of an unauthorised and its inclusion in a copyright work may result in a claim for damages and criminal prosecution.

A1 MICROFILM REF. 0 1 2 3 4 5 6 7 8 9 10

SECTION AAA

REF: DRG: HAG-N105-8742-STR-D-PLX-02510-02510-02510-02510-02510

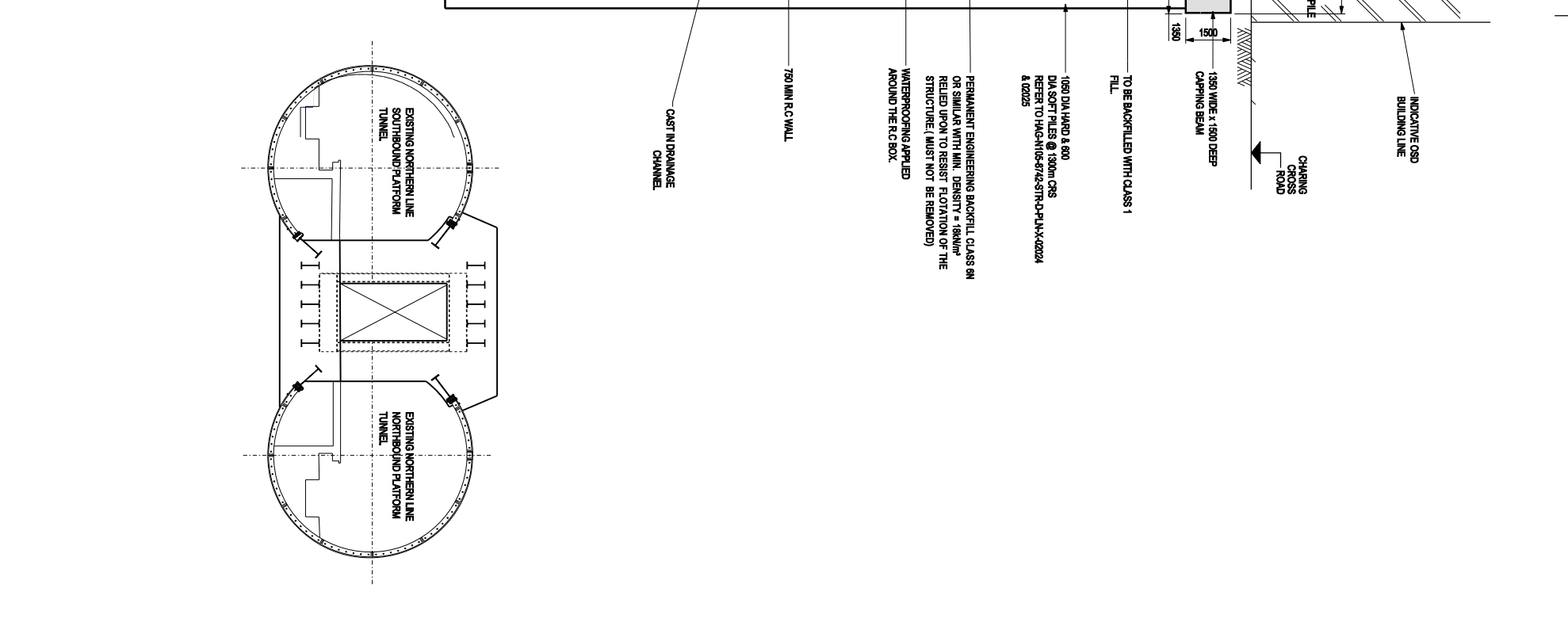
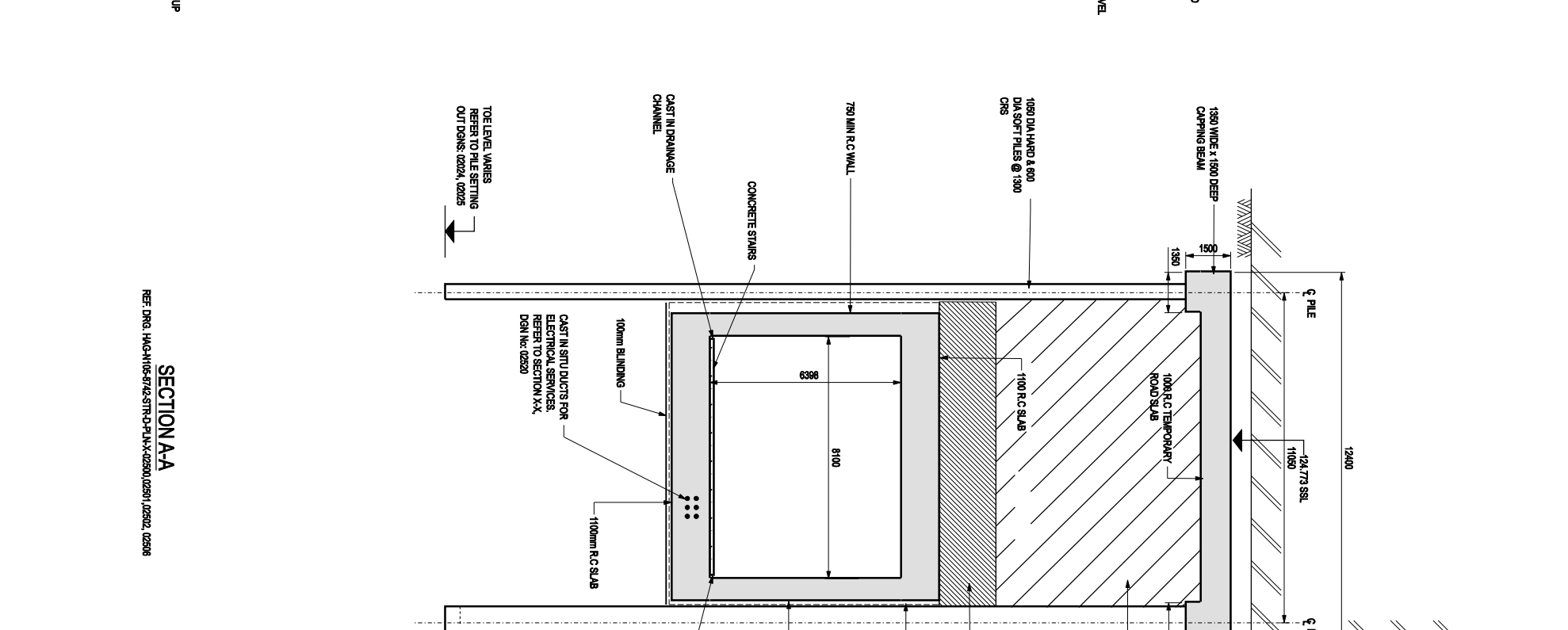
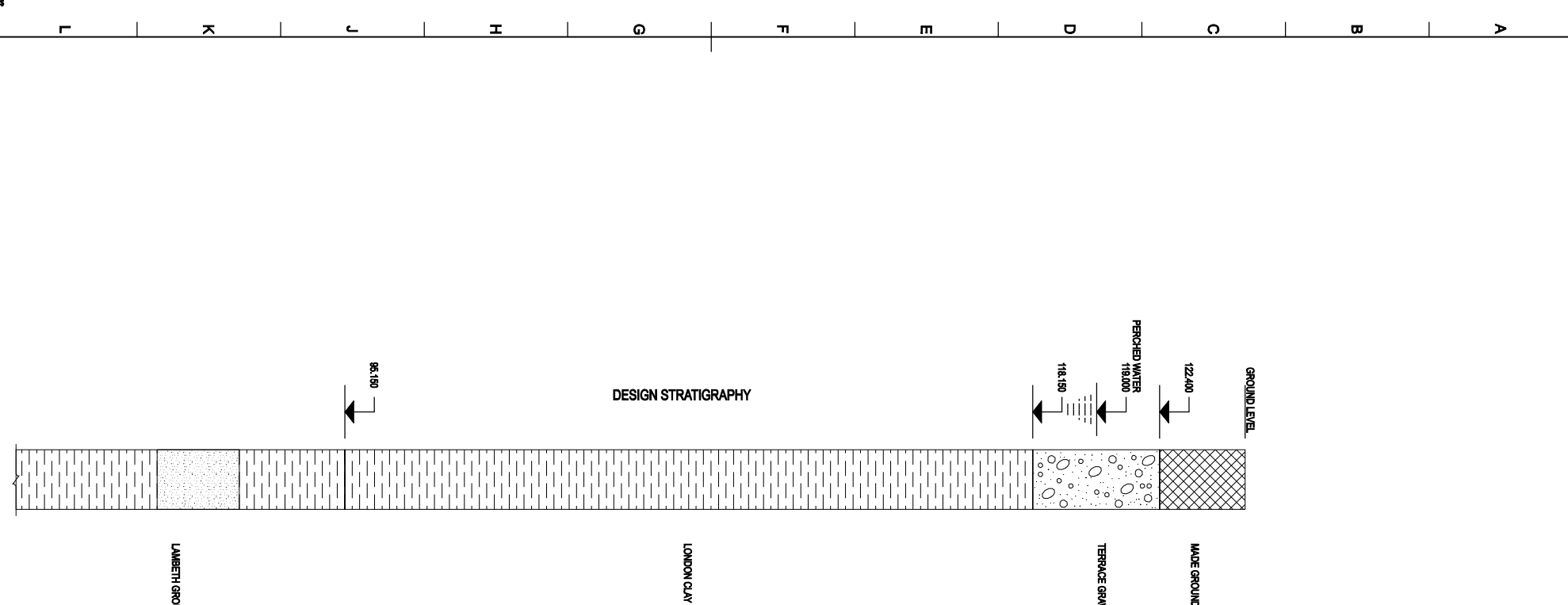
DRAFT

SCALE 1:100

METERS

CAD DRAWING CHANGE ON CAD ONLY

A1



KEY HEALTH & SAFETY RISKS:

- WORKING AT HEIGHT
- DEEP EXCAVATION
- BURIED SERVICES
- EXISTING STRUCTURES & TUNNELS
- TRAFFIC

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND THE SPECIFICATION.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. ALL LEVELS ARE IN METRES AND RELATIVE TO ORDNANCE DATUM. THE TOTTENHAM DATUM IS SET AT 100m BELOW OS DATUM AT NEWTON.
4. NO TRACKED PLANT/MACHINERY TO OPERATE ON TOP OF ROAD SLAB. E.R.C. SLAB TO BE PROTECTED FOR USE WITH TRACK PLANT AND MACHINERY.
5. ALL LEVELS ARE STRUCTURAL SLAB LEVELS (S.S.) UNLESS OTHERWISE NOTED.

Rev.	By	Reason	Date
01	JN	DETAIL DESIGN ISSUE	28/05/08
00	JN	FIRST ISSUE	16/11/07

London Underground Limited

Halcrow

Project: RIBA STAGE E
STRUCTURAL ENGINEERING - HALCROW

Line: NORTHERN / CENTRAL

Station: TOTTENHAM COURT ROAD

Sub-Station: TOTTENHAM COURT ROAD STATION UPGRADE

Section: NORTHERN LINE ESCALATOR SECTION AAA

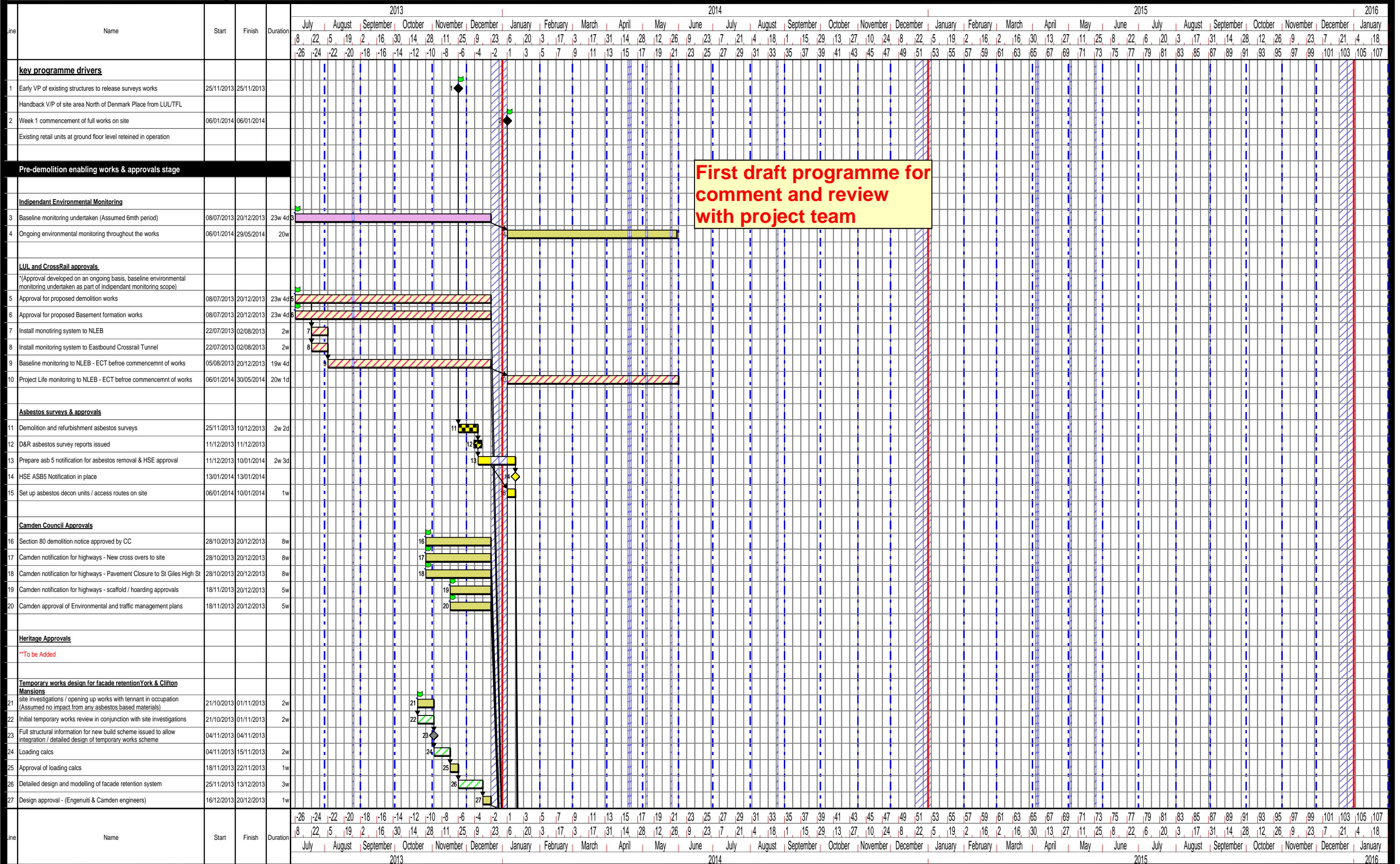
Date	By	Date	By
28/05/08	JN	28/05/08	SV
	SV		MR
	MR		PER

Scale: 1:100

Drawing No: HAG-N105-8742-STR-D-SEC-X-02510

Rev: 01

St Giles Circus Demolition & Basement formation



First draft programme for comment and review with project team

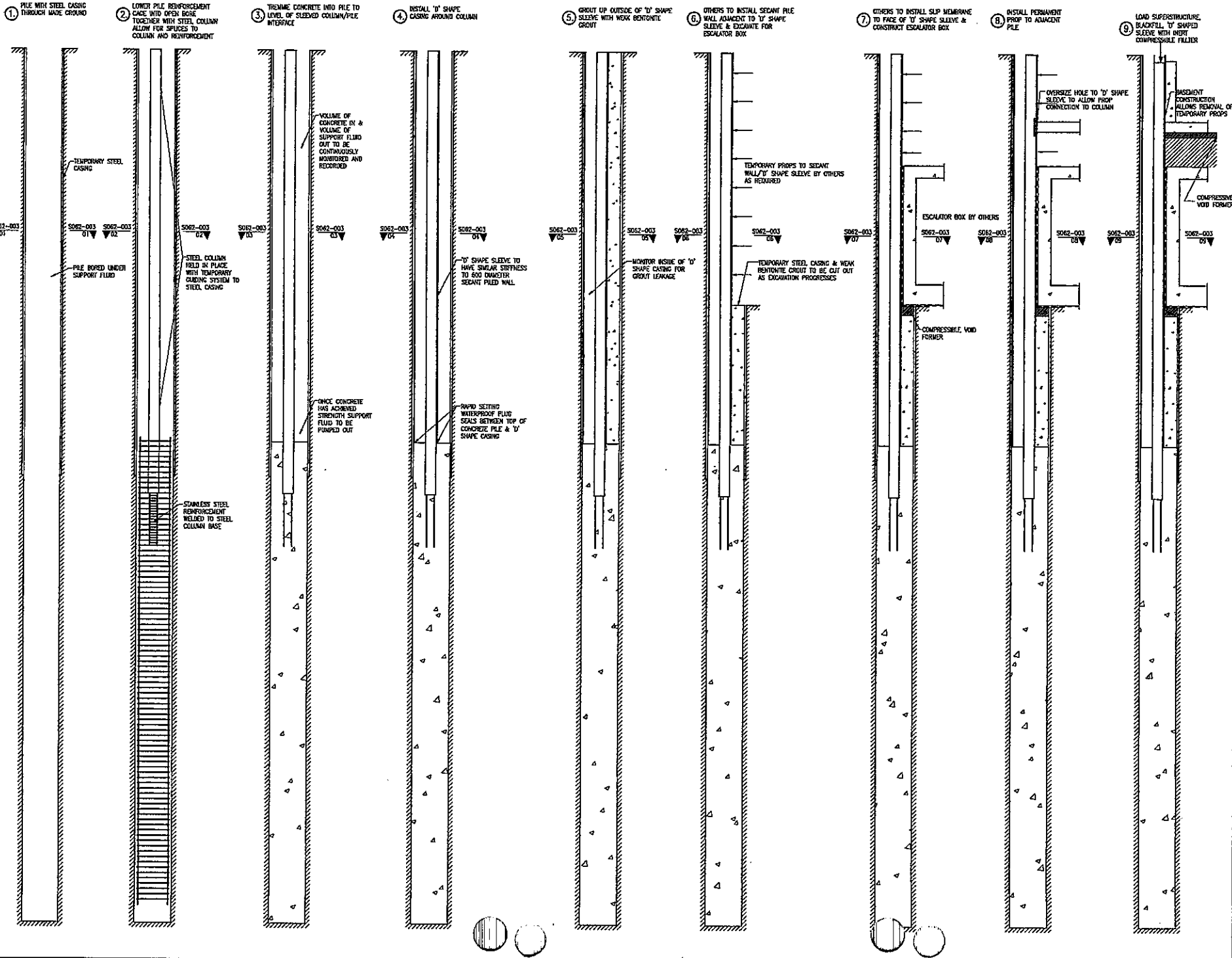
Keltbray Ltd
Wentworth House
Dormay Street
London
SW18 1EY

Tel: 0207 643 1000
Fax: 0207 643 1001
Email: demolition@keltbray.com
Web: www.keltbray.com
Programmed by: MBC

Notes:
First draft for review.

Prog No: PT 12062-DBF-BP-01
Status:
Issue Date: 03/07/2012

Rev: N/A
Revision Date: 07/08/2012
Filter: None



DO NOT SCALE DIMENSIONS.
 Notes:
 REFER TO DRAWING S060-002

THIS DRAWINGS SHOWS THE SUGGESTED CONSTRUCTION SEQUENCE. CONTRACTOR TO BE RESPONSIBLE FOR CONFIRMING THEIR OWN CONSTRUCTION SEQUENCE & METHOD STATEMENT WHICH MUST BE ISSUED FOR COMMENT

P2 ISSUE FOR INFORMATION	30.11.06	WJH	CF
P1 ISSUE FOR COMMENT	27.10.06	XK	AK
Rev Description	Date	By	CHK

INFORMATION

17 Newman Street
 London
 W1T 1PD
 UK

Tel: +44 (0)20 7493 8100
 Fax: +44 (0)20 7493 8101
 Email: info@burohappold.com
 Web: www.burohappold.com

Buro Happold
 Consulting Engineers

Author: Foster & Partners
 Project: DENMARK PLACE
 City/Town: SUGGESTED CONSTRUCTION SEQUENCE

Reviewed: EDC
 Drawn by: WH
 Checked by: AK
 Date: 08/10/2006

Job No: 003942
 Drawing No: S062-002
 Rev: P2

STAGE (14) SEANT PILE WALL INSTALLED TO LU ENGINEER'S DESIGN ADJACENT TO PILE & EXCAVATE FOR ESCALATOR BOX. OUTER CIRCULAR CASING CUT BACK AND CONCRETE BETWEEN OUTER CASING AND D-SHAPED CASING REMOVED AS SPECIFIED PILE CUT OFF LEVEL.

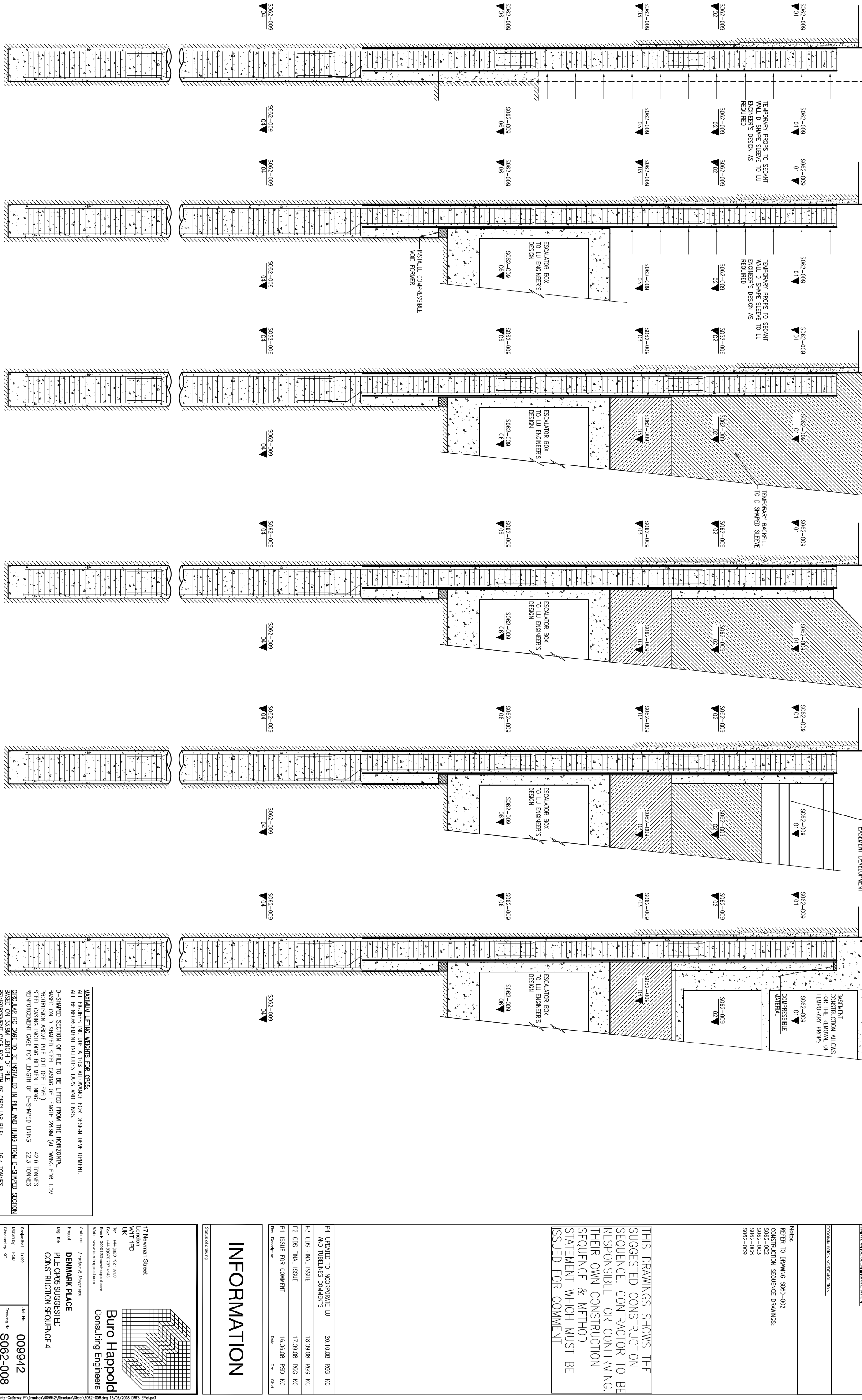
STAGE (15) REPAIR SIP MEMBRANES REQUIRED TO FACE OF D-SHAPED STEEL & CONSTRUCT ESCALATOR BOX OFF LEVEL.

STAGE (16) BACKFILL EXCAVATION WITH FILL TO LUL DESIGN

STAGE (17) FUTURE WORK TO BE CARRIED OUT AS PART OF OSD DEVELOPMENT
INSTALL PERMANENT RETAINING WALL

STAGE (18) EXCAVATE FOR BASEMENT PROPPING RETAINING WALL

STAGE (19) COMPLETE BASEMENT CONSTRUCTION. LOAD SUPERSTRUCTURE



MAXIMUM LIFTING WEIGHTS FOR CPG05:
ALL FIGURES INCLUDE A 10% ALLOWANCE FOR DESIGN DEVELOPMENT.
ALL REINFORCEMENT INCLUDES LAPS AND LINKS.

D-SHAPED SECTION OF PILE TO BE LIFTED FROM THE HORIZONTAL BASED ON D SHAPED STEEL CASING OF LENGTH 28.9M (ALLOWING FOR 1.0M PROTRUSION ABOVE PILE CUT OFF LEVEL) 42.0 TONNES
STEEL CASING INCLUDING BRITUMEN LINING: 22.3 TONNES
REINFORCEMENT CAGE FOR LENGTH OF D-SHAPED LINING: 22.3 TONNES

CIRCULAR RC CAGE TO BE INSTALLED IN PILE AND LIFTED FROM D-SHAPED SECTION BASED ON 33.8M LENGTH OF PILE: 16.4 TONNES
REINFORCEMENT CAGE FOR LENGTH OF CIRCULAR PILE: 16.4 TONNES

HEALTH AND SAFETY INFORMATION
THESE DRAWINGS ARE THE PROPERTY OF BUREAU HAPPOLD CONSULTING ENGINEERS AND SHOULD NOT BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF BUREAU HAPPOLD CONSULTING ENGINEERS.

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NOTES
REFER TO DRAWING S060-002
CONSTRUCTION SEQUENCE DRAWINGS:
S062-002
S062-003
S062-008
S062-009

Rev	Description	Date	By	Chk
P4	UPDATED TO INCORPORATE LU AND TUBELINESS COMMENTS	20.10.08	RGK	KC
P3	CDS FINAL ISSUE	18.09.08	RGK	KC
P2	CDS FINAL ISSUE	17.09.08	RGK	KC
P1	ISSUE FOR COMMENT	16.06.08	PSD	KC

INFORMATION

Status of drawing

17 Newman Street
London
W1T 1PD
UK

Tel: +44 (0)20 7527 9700
Fax: +44 (0)20 757 4145
Email: 009942@burohappold.com
Web: www.burohappold.com

Authorised: Foster & Partners
Project: DENMARK PLACE
Bp Title: PILE CPG05 SUGGESTED CONSTRUCTION SEQUENCE 4

Schedule: 1:00
Drawn by: PSD
Checked by: KC

Rev No: 009942
Drawing No: S062-008
Rev: P4

Buro Happold
Consulting Engineers

Clive Fussell

From: Lau William [WilliamLau@tfl.gov.uk]
Sent: 26 November 2012 17:47
To: Clive Fussell
Cc: Kyte KatieJane; Lousley Steve
Subject: Consolidated Developments - queries
Attachments: Ground Movement Contours (12 10_Oct 29)_Ground Studs (STG).pdf; STG Movement Site Wide.pdf

Clive,

Further to our telephone conversation on 8 November 2012, our further comments are as follows :-

1. During detailed design apart from making full assessment of predicted movements the following are also required (*LU Guidance G0023, 3.24*) :-
 - Proposals for limiting the effects of the proposed works. The new escalators can tolerate movements of up to about 5mm, main concerns are twisting and differential movements.
 - Design check certificates for the design work associated with assessing ground movements.
 - Proposals for carrying out inspections and condition surveys of the LU substructures.
 - Proposals for monitoring effects of the works on LU substructures before, during and after construction. Scope of monitoring should be similar to what is currently being done for the existing escalators at TCRSU.

Regarding monitoring information of vertical movements experienced by the escalator box during backfilling operation, unfortunately instrumentation provided in the box consisted of inclinometers in the secant piles and strain gauges on the temporary props none of which recorded vertical movements. Backfilling above the box was carried out between November 2011 and August 2012. Results of vertical movements obtained from the ground surface studs are attached but these would have been heavily influenced by the adjacent excavation of the Northern Line lower concourse which began in January 2012.

2. Having consulted with our operational property & commercial development team, we have no further comment on this.

Best Regards
William

From: Clive Fussell [<mailto:clive.fussell@engenuiti.com>]
Sent: 11 October 2012 17:18
To: Kyte KatieJane
Cc: Lau William; Lousley Steve
Subject: Consolidated Developments - queries

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Director



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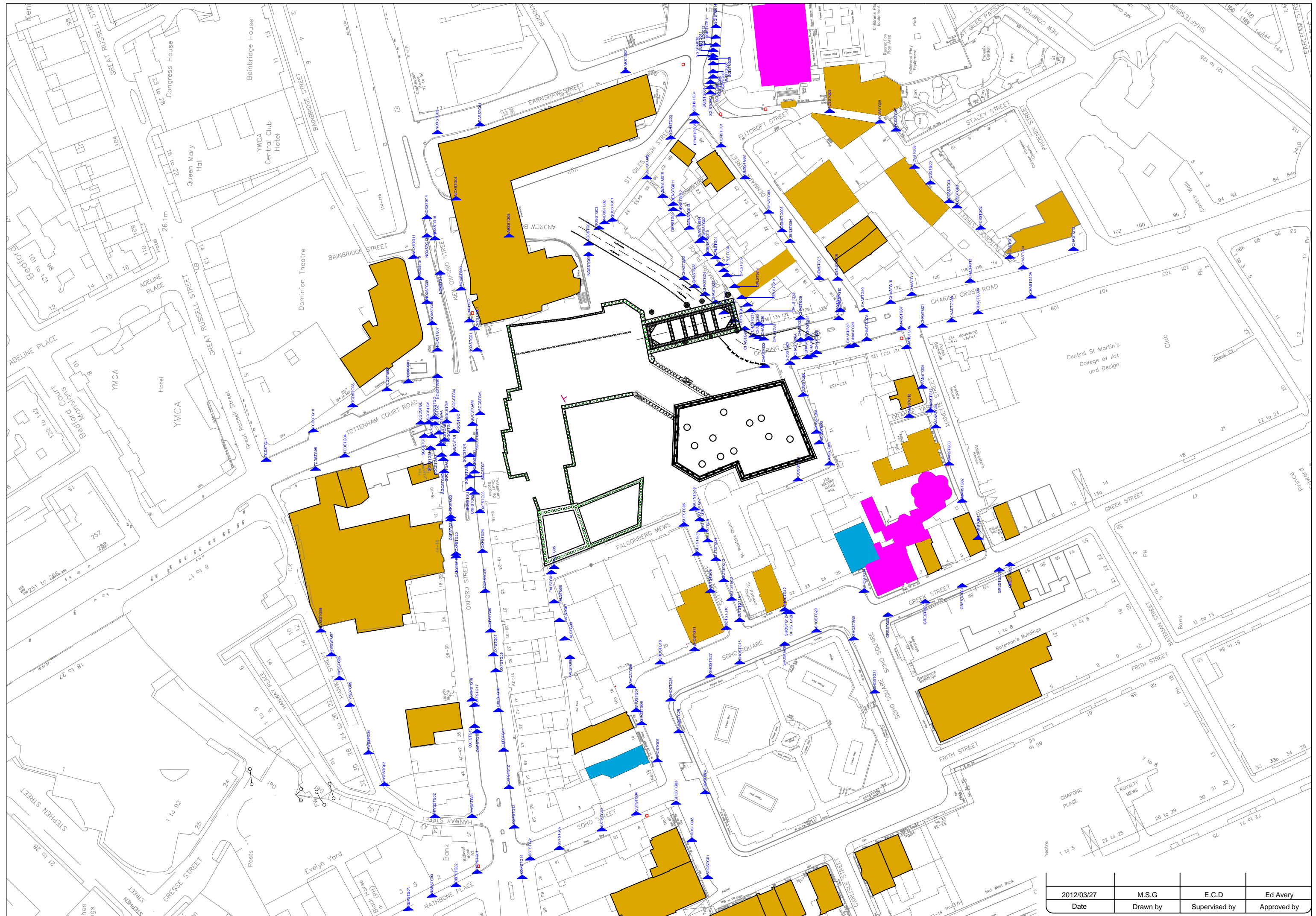
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Tel: 0207 1860593 | Auto: 0593 | Email: KatieJaneKyte@tfl.gov.uk



2012/03/27	M.S.G	E.C.D	Ed Avery
Date	Drawn by	Supervised by	Approved by

NAME OF THE SITE:
TOTTENHAM COURT ROAD STATION UPGRADE

DRAWING TITLE:
OVERGROUND INSTALLATION – AUTOMATIC TOTAL STATION SYSTEM – C26

ROUTE:
 Z:\TCR\Technical Document\As-built\Overground Installation\

SCALE 1/150	DATE: 2012/03/27	CONTRACT NUMBER: S0810
	DRAWING NUMBER: SDL-N105-8742-806-D-1-00001-23	PAGE...19...DE..23.

Clive Fussell

From: Clive Fussell
Sent: 29 November 2012 12:24
To: 'Lau William'
Cc: Kyte KatieJane; Lousley Steve
Subject: RE: Consolidated Developments - queries [Filed 29 Nov 2012 12:23]

William,

Thank you for your email, we will pick up the points you raise in your email during detailed design which will commence after the planning process (the submission is due to be made in December).

Best regards

Clive

Clive Fussell MEng (Oxon) MSt (Cantab) CEng MIStructE
Director

engenuiti

IMAGINE + CREATE + ENGINEER



+44 (0)79 2049 7494 mobile
+44 (0)20 7089 5763 direct
+44 (0)20 7089 5760 office

clive.fussell@engenuiti.com

3b Maltings Place, 169 Tower Bridge Road, London SE1 3JB

www.engenuiti.com
@engenuiti

Engenuiti is the trading name of The Engenuiti Partnership LLP,
Registered in England & Wales, Reg No. OC370374

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Please find attached the DRAFT construction programme for the basement works as requested.

Further to a telephone conversation with William Lau today, we respond to the comments below as follows:

1. In the Agreement the proposed construction sequence is shown in Buro Happold drawing S062-002/P2, which shows that the oversite development basement construction would follow directly on from the construction of the escalator box and without the need for any temporary backfill. A compressible void former is provided between the oversite development basement and the permanent fill to the escalator box to prevent load transfer. This construction sequence would not change the loading on the escalator box, however during the development of the design for the Consolidated Piles it became clear that it was unlikely that the basement construction would follow directly after the escalator box construction due to programme issues relating to planning, occupation of the works site by LUL and the construction of the Crossrail tunnels. As a result it was decided (in a meeting with London Underground - Ralph Freeston) to temporarily backfill the excavation and remove the props to reduce the risk of degradation to the propping system prior to the oversite basement construction. The revised construction sequence was submitted with the final version of the Conceptual Design Statement for the construction of the Consolidated Piles and is shown on Buro Happold drawing S062-008/P4.

At our meeting on 1st June 2012 the option of not temporary backfilling the excavation above the permanent backfill was discussed with LUL, who confirmed (email 2nd August 2012) that they would proceed with the temporary backfill. The

excavation above the escalator box will therefore remove the some of the temporary backfill that was placed in the summer of 2012, and is in line with the backfilling and excavation sequence shown on Buro Happold drawing S062-008/P4 (issued 20/10/2008). During the detailed design stage we will make a full 3d assessment of predicted movements during construction.

Assuming a worst case scenario of a 'green field' site with no interaction with adjacent structures, preliminary calculations would give an immediate and short term heave movement of 20mm associated with removing the temporary backfill at the maximum depth of excavation. The adjacent structures including the escalator box, secant piled wall and Consolidated Piles will reduce the movement that the escalator box experiences and we would anticipate a vertical movement in the order of 5-10mm (perhaps ever so slightly less). This would be a best estimate prediction without any significant degree of conservatism.

It is noted that there will also be a long term vertical movement of the box associated with heave due to both the excavation and construction of the box itself and the removal of the temporary backfill. As designers of the escalator box, Halcrow should be able to comment on this. We would anticipate that this long term heave would be at least as large as the elastic movements associated with the removal of the temporary backfill.

Finally, is it possible to obtain monitoring information of the vertical movements experienced by the escalator box during the backfilling operation, as these would provide useful background information.

2. There is an ambiguity in the Agreement with regard to basement level. It was understood that the basement floor level would be at +116m with a 2m zone for construction of foundations, drainage etc so that the basement construction would not go below +114m. This is why the tunnel sleeve transfer drawing shows the ownership transferring at +114m and the Halcrow RIBA Stage E drawings (HAG-N105-8742-STR-D-SEC-X-02512/01) that were appended to final version of the Conceptual Design Statement shows the top of the permanent fill (and the demarcation layer) at the lesser of +114m or 2.0m above the top of the escalator slab.

During the development of the oversite design the structural zone required for the basement slab (including drainage) has been reduced to 1200mm with a 100mm allowance for site preparation. In order to maximise the usable space the basement slab level has been reduced to +115.3m without affecting the ownership or interface with the permanent fill below.

Notwithstanding the ambiguity noted above, we understand that there are NO technical issues with constructing the basement structure above the lesser of +114m or 2.0m above the top of the escalator slab.

Best regards

Clive.

Clive Fussell MEng (Oxon) MSt (Cantab) CEng MStructE
Director

engenuiti

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+44 (0)79 2049 7494 mobile

+44 (0)20 7089 5763 direct

+44 (0)20 7089 5760 office

clive.fussell@engenuiti.com

3b Maltings Place, 169 Tower Bridge Road, London SE1 3JB

www.engenuiti.com

@engenuiti

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From: Kyte KatieJane [<mailto:KatieJaneKyte@tfl.gov.uk>]

Sent: 27 September 2012 10:22

To: Clive Fussell

Cc: Lau William; Lousley Steve

Subject: RE: Consolidated Developments - queries

Hi Clive

In addition to the below, would it be possible to have some visibility of the programme of works for the development.

Please don't hesitate to call me if you have an queries.

Regards

Katie-Jane Kyte | PM Support & Document Control, Tottenham Court Road Station Upgrade
Capital Programmes Directorate | 3rd Floor | 19-23 Oxford Street | London W1D 2DN
Tel: 0207 1860593 | Auto: 0593 | Email: KatieJaneKyte@tfl.gov.uk

From: Kyte KatieJane
Sent: 25 September 2012 09:45
To: 'Clive Fussell'
Cc: Lau William; Lousley Steve
Subject: Consolidated Developments - queries

Hi Clive

I have spoken to our structural engineer again, William Lau who was in the original meeting with myself and Steve Lousley, and he has a few queries he would like answered prior to the submittal of the planning application if possible.

1. As has been raised before, in your design drawings you will be excavating for your basement 2m above our escalator decline. Can you advise what the predicted movements are due to your works and demonstrate how you intend to ensure that the escalators are not adversely affected based on the programme of escalator installation.
2. On the Development Agreement the "Tunnel Sleeve transfer" drawing which appears on pages 93 & 210, the "available space for OSD basement construction" is defined as extending to 116.0m AOD. The engenuiti drawing 029_SK046 Section A shows the proposed basement extending to 114m. Please can you clarify.

Thanks and kind regards

Katie-Jane Kyte | PM Support & Document Control, Tottenham Court Road Station Upgrade
Capital Programmes Directorate | 3rd Floor | 19-23 Oxford Street | London W1D 2DN
Tel: 0207 1860593 | Auto: 0593 | Email: KatieJaneKyte@tfl.gov.uk

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