

Broadwater Farm Estate

Peer Review

Curtins Ref: B068256

Revision: 00

Issue Date: 19 June 2018

Client Name: Homes for Haringey

Client Address: 108 Gloucester Road, London, N17 6GZ

Site Address: Broadwater Farm Estate, Haringey, London, N17 6GZ


Curtins
3 Cwrt-y-Parc, Earlswood Road
Cardiff, CF14 5GH
Tel: 029 2068 0900
www.curtins.com



CIVILS & STRUCTURES • TRANSPORT PLANNING • ENVIRONMENTAL • INFRASTRUCTURE • GEOTECHNICAL • CONSERVATION & HERITAGE • PRINCIPAL DESIGNER
Birmingham • Bristol • Cambridge • **Cardiff** • Douglas • Dublin • Edinburgh • Glasgow • Kendal • Leeds • Liverpool • London • Manchester • Nottingham

Rev	Description	Issued by	Checked	Date
00	Review Report B068256-CUR-00-XX-RP-S-001-V00_Report	JC	DW	19/06/2018

This report has been prepared for the sole benefit, use, and information for the client. The liability of Curtins Consulting Limited with respect to the information contained in the report will not extend to any third party.

Author	Signature	Date
John Conway Director		19/06/2018


Reviewed	Signature	Date
M J Carey BSc, CEng, MICE, MIStructE Senior Engineer		19/06/2018

Table of contents

1.0 Executive Summary 1

2.0 Introduction 2

3.0 Report Limitations..... 3

4.0 Review of Ridge and Partners' Reports and Calculations,
Findings and Discussion4

Appendices

Appendix A Bibliography

1.0 Executive Summary

- Curtins were appointed by Homes for Haringey in March 2018 to undertake a peer review of survey work and reporting carried out by Ridge and Partners on various Large Panel System (LPS) dwelling blocks on the Broadwater Farm Estate.
- Several reports with associated calculations have been provided by Ridge and Partners for our review and comments (please refer to Section 4.0 for details). Our most recent correspondence to Ridge and Partners is dated 14 June 2018 with only minor observations.
- Notwithstanding this we are of the opinion that Ridge and Partners have carried out a thorough assessment of the Large Panel System (LPS) dwelling blocks under consideration on the Broadwater Farm Estate and we would confirm that we concur with their overall findings. The assessment has been undertaken using the BRE Report 511, 2012 'Handbook for the Structural Assessment of Large Panel System (LPS) Dwelling Blocks for Accidental Loading'. The structural elements have been checked for the forces associated with accidental overpressure values of 17 kN/m² (without a piped gas supply) and 34 kN/m² (with a piped gas supply) and the design codes utilised are British Standards in lieu of Eurocodes, to which we have no objection.
- A brief summary of the main findings is as follows;

Kenley (no piped gas) -	generally satisfactory but some beams require strengthening
Northolt (no piped gas) -	unsatisfactory, strengthening required
Tangmere (piped gas) -	unsatisfactory, remove piped gas and strengthening required
Manston - 6 storey block (piped gas) -	generally satisfactory but remove piped gas
4 Storey Wings (piped gas) -	generally satisfactory but flank walls require strengthening and remove piped gas

2.0 Introduction

- Curtins were initially approached by Ridge and Partners on 6 February 2018 regarding the structural appraisal of Larsen Nielsen LPS properties on the Broadwater Farm Estate that they were undertaking.
- From the evidence of their intrusive investigations and subsequent calculations it appeared that there were concerns that, in some instances, the building system may not be suitable to withstand loadings from a potential gas explosion (reference the recommendations made following the Ronan Point collapse in 1968).
- Accordingly, we were requested to carry out a review of their survey work and reporting and we submitted our fee proposal to Homes for Haringey on 5 March 2018. This was accepted later on the same day.

3.0 Report Limitations

- This report is based upon our review of material provided to us by Ridge and Partners together with a brief inspection of the intrusive investigations undertaken on some of the buildings.
- We have not carried out any exploratory work of our own nor taken any dimensions of the buildings on site.
- Calculations prepared by Ridge and Partners have been checked by ourselves using the basic data as provided.

4.0 Review of Ridge and Partners' Reports and Calculations, Findings and Discussion

- Our review commenced with a visit to the Broadwater Farm Estate to view the intrusive investigations being undertaken on the buildings. Our Mr James Withey met with Mr James McCulloch of Ridge and Partners on 14 March 2018 and inspected the exploratory works at Northolt and Tangmere blocks.
- This was followed by a meeting at Ridge and Partners' offices in Winchester on 23 March 2018 attended by Messrs John Conway and Mark Carey of Curtins and Mr James McCulloch of Ridge and Partners. The survey methodology and findings were discussed and various interim reports were presented for our perusal.
- Subsequent to our meeting a copy of Ridge and Partners' interim report dated March 2018 (Structural Robustness Assessment) was forwarded to ourselves. This was followed by the report on Tangmere, Version 1.1 dated 11 April 2018, together with relevant calculations and also the report on Kenley and Northolt, Version 1.1 dated 11 April 2018, again with relevant calculations. Calculations only for Manston were then received in April 2018.
- The aforementioned reports and calculations were then reviewed by ourselves and we responded to Ridge and Partners by email on 30 April 2018 with various comments/queries and requests for further information. This email was sent again on 18 May 2018 and we subsequently received a reply on 23 May 2018. This response addressed the majority of our queries and also included amended calculations in line with our comments. In addition, various relevant floor plans with dimensions as requested in our email of 30 April 2018 were received by 17 May 2018.
- Having undertaken a review of the updated information from Ridge and Partners, as noted above, we have replied on 14 June 2018 with some minor observations.
- Notwithstanding this we are of the opinion that Ridge and Partners have carried out a thorough assessment of the Large Panel System (LPS) dwelling blocks under consideration on the Broadwater Farm Estate. The assessment has been undertaken using the BRE Report 511, 2012 'Handbook for the Structural Assessment of Large Panel System (LPS) Dwelling Blocks for Accidental Loading'. The structural elements have been checked for the forces associated with accidental overpressure values of 17 kN/m² (without a piped gas supply) and 34 kN/m² (with a piped gas supply) and the design codes utilised are British Standards in lieu of Eurocodes, to which we have no objection. Please refer to Ridge and Partners Interim Report dated March 2018 page 4 for explanation of the various LPS Criteria and Consequence Classification.

- Salient points are summarised as follows;
 - Kenley (no piped gas)
 - floor slabs are robust for 17 kN/m² overpressure up and down.
 - flank walls satisfactory.
 - horizontal ties adequate.
 - vertical ties have limited strength.
 - downstand beam across hall needs strengthening.
 - Northolt (no piped gas)
 - floor slabs not proven for 17 kN/m² overpressure.
 - cross wall and flank wall panels unreinforced, not robust enough to withstand 17 kN/m² overpressure.
 - joint at base of cross walls is weak with very little shear resistance.
 - flank wall joints, chemical anchor bolts weak and unreliable.
 - no effective vertical tie in joints.
 - may be possible to strengthen floor slabs and cross walls with external plate bonding but this would not work for flank walls; high cost and disruptive.
 - strengthening of joints required but would be difficult and disruptive.
 - Tangmere (piped gas)
 - floor slabs fail under 17 kN/m² overpressure up and down.
 - flank wall panels near the top of the building fail under 17 kN/m² overpressure.
 - cross wall panels satisfactory for 17 kN/m² loading.
 - joints between loadbearing elements have effective horizontal tie but insufficient vertical tie in the cross wall joints.
 - water penetration from the many flat roofs and terraces has been identified as a problem, the risk of corrosion and deterioration of packing in joints may be high.
 - remove piped gas.
 - strengthening works required; high cost and disruptive.

- Manston - 6 storey block (piped gas)
 - loadbearing elements not robust enough to withstand 34 kN/m² overpressure but satisfactory for 17 kN/m².
 - joints between loadbearing components have effective horizontal tie but insufficient vertical tie (vertical ties not continuous so have limited value).
 - remove piped gas.

- 4 Storey Wings (piped gas)
 - similar construction to 6 storey blocks but flank walls vulnerable with risk of damage spreading.
 - flank wall detail identified on site shows poor grouting with low strength and variable compaction.
 - remove piped gas.
 - flank wall panels fail with 17 kN/m² overpressure, strengthening required.

Appendices

Appendix A

Bibliography

- Ridge and Partners Report dated March 2018;
'Broadwater Farm Estate, Structural Robustness Assessment, Interim Report'
- Ridge and Partners Report Version 1.1 dated 11 April 2018;
'Broadwater Farm Estate, Structural Robustness Assessment, Tangmere (6 storey Ziggurat) Report'
- Ridge and Partners Report Version 1.1 dated 11 April 2018;
'Broadwater Farm Estate, Structural Robustness Assessment, Kenley and Northolt Report'
- Building Research Establishment Report 511, 2012
'Handbook for the Structural Assessment of Large Panel System (LPS) Dwelling Blocks for Accidental Loading'
- Building Research Establishment Digest 526
'Structural Assessment of Existing Large Panel System (LPS) Dwelling Blocks for Accidental Loads'
- Building Research Establishment Report 1985
'The Structure of Ronan Point and other Taylor Woodrow – Anglian Buildings'
- "Tower Block – Modern Public Housing in England, Scotland, Wales and Northern Ireland"
Glendinning and Methesius – Yale 1994

Our Locations

Birmingham
2 The Wharf
Bridge Street
Birmingham
B1 2JS
T. 0121 643 4694
birmingham@curtins.com

Bristol
Quayside
40-58 Hotwell Road
Bristol
BS8 4UQ
T. 0117 302 7560
bristol@curtins.com

Cambridge
50 Cambridge Place
Cambridge
CB2 1NS
T. 01223 631 799
cambridge@curtins.com

Cardiff
3 Cwrt y Parc
Earlswood Road
Cardiff
CF14 5GH
T. 209 2068 0900

Douglas
Varley House
29-31 Duke Street
Douglas
Isle of Man
IM1 2AZ
T. 01624 624 585
douglas@curtins.com

Dublin
39 Fitzwilliam Square
Dublin 2
Ireland
T. 00353 1 507 9447
dublin@curtins.com

Edinburgh
1a Belford Road
Edinburgh
EH4 3BL
T. 0131 225 2175
edinburgh@curtins.com

Glasgow
Queens House
29 St Vincent Place
Glasgow
G1 2DT
T. 0141 319 8777
glasgow@curtins.com

Kendal
28 Lowther Street
Kendal
Cumbria
LA9 4DH
T. 0153 9724 823
kendal@curtins.com

Leeds
Rose Wharf
Ground Floor
Leeds
LS2 8EE
T. 0113 274 8509
leeds@curtins.com

Liverpool
51-55 Tithebarn Street
Liverpool
L2 2SB
T. 0151 726 2000
liverpool@curtins.com

London
40 Compton Street
London
EC1V 0BD
T. 020 7324 2240
london@curtins.com

Manchester
Merchant Exchange
17-19 Whitworth Street West
Manchester
M1 5WG
T. 0161 236 2394
manchester@curtins.com

Nottingham
56 The Ropewalk
Nottingham
NG1 5DW
T. 0115 941 5551
nottingham@curtins.com