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CONSULTING ENGINEERS

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STRUCTURAL CONDITION INSPECTION REPORT

INCORPORATING LIMITED INTRUSIVE INVESTIGATION

AT

BOWSPRIT POINT

167 WESTFERRY ROAD

LONDON E14 8NU

Project Number	6627
Document Ref:	D007-A
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Prepared by	I D Isherwood
Date prepared	24 January 2018
Client	ONE HOUSING LIVING BETTER
Instructed by	***Hunters*** Building Consultancy Bob Forrest BSc (Hons)

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Project Reference: **6627**

Title: **BOWSPRIT POINT – 167 WESTFERRY ROAD – LONDON E14 8NU**

Client:

Instructed by: ***Hunters–*** Ref: Bob Forrest BSc (Hons) Associate Director - Building Consultancy

Date of Inspections and investigations: **November 2017 – January 2018**

Type: **Visual and locally intrusive where noted**

Author	**Reviewed**	**Authorised**
Ian Isherwood	Steve Hawkins	Reg Kirk
CEng MIStructE	AMIStructE	CEng MIStructE
Chartered Structural Engineer	Senior Structural Engineer	Managing Director

Contents

1. Executive Summary

1.1 The building comprises a 21 storey residential block of flats.

1.2 The structure appears to be cast in situ reinforced concrete, floors and cross walls, providing both vertical support and lateral stability.

1.3 Inspections were made of Building Control records at The London Borough of Tower Hamlets, on 30 October 2017. No material was discovered which showed conclusive depiction of the structural details of this building. However, as a result of the site investigations and the subsequent better familiarisation of the building, it may be worth re-examining the records.

1.4 Anecdotal evidence indicates the building was constructed in or around the period between 1968-1970.

1.5 The tower block has been subsequently overclad for, it is assumed, thermal insulation and / or aesthetic purposes. Again, no archive data for these works has been located. This covering completely encases and conceals the original external fabric of the building.

1.6 No visible structural defects were apparent in the areas surveyed, however, access was only available to communal areas including some plant rooms plus one void flat no. 74. Refer to section 3.1 of Constructive Evaluation report in Appendix Section 9 of this report for further details of specific areas / locations accessed.

1.7 A factual report by Constructive Evaluation on the results of their intrusive investigations is contained in the appendices.

1.8 In situ tests for carbonation and laboratory tests for chloride ion content on samples obtained from various locations indicate that there are no issues for concern at the present time. These general conditions are unlikely to significantly alter or deteriorate for some considerable time into the future and it is suggested that further testing could be deferred for at least 10 to 15 years. However, we would recommend that inspections of a general nature be carried out on a five year cycle. This is to assess whether any defect such as concrete cracking, or breaches in protective concrete can potentially lead to accelerated weathering and thus speed up any de-generative chloride ion and / or carbonation process.

1.9 A detailed assessment of the robustness of the existing structure is beyond the scope of our brief and this report. Whilst the construction appears to be monolithic cast in situ reinforced concrete as opposed to any form of precast panel / system build, and would therefore offer an inherently greater resistance to serious damage and potential catastrophic collapse in the event of an accidental event such as the 1968 Ronan Point gas explosion, it is not possible to determine the extent of compliance with modern-day design and construction standards, but it should be assumed that the structure would not meet the standards in certain respects.

2. Introduction

Scope and Limitation

2.1 This is a ***specific visual inspection*** report with some intensive inspections and tasks limited in its scope to the brief as noted below and any conditions and limitations of service which may be appended to the report. We have not investigated parts or problems that are not relevant to the task unless noted in the report.

2.2 Where an investigation element is included this is limited to the level of detail required to achieve the objectives of the task.

2.3 The report has been prepared for the client listed on the report title page and therefore any liabilities that may arise are restricted to the client. We are not to be held responsible for any action taken by others to whom this report may be made available. The opinions expressed and conclusions drawn are based on information gained on site, documents provided by the client and using our best engineering judgement from experience and technical knowledge gained over many years in professional practice.

2.4 Additionally, nothing contained in the report shall be construed as providing or implying any guarantee or warranty of design, workmanship, or materials for which such responsibility remains with the designer, manufacturer of the elements, their assigns or property owner.

2.5 Areas examined are noted in the Executive Summary and listed in the Appendices of this report.

Client Brief

2.6 kirksaunders Associates were instructed by ***Hunters - Building Consultancy*** on Behalf of ***One Housing*** to undertake visual and specific intrusive investigations into the existing structure. The aim being to identify and record any notable or significant structural defects within sample areas and recommend any appropriate repairs or maintenance or necessary strengthening upgrades with associated allowable budget only cost proposals. Note, that the surveys were only confined to areas that were made accessible, i.e. some communal areas and a small number of available voids. It was not the intention to locate, examine and record all structural defects throughout the whole of the building.

2.7 The investigations are to include the structural framing and to carry out representative sample carbonation testing on concrete. Investigations into external cladding panels to Bowsprit Point were not within the brief.

2.8 The report has been written, reviewed and authorised by the persons listed on page 2. It has undergone the KSA Ltd quality management inspection. Should you wish to discuss or require further assistance on any matters or information contained in the report please do not hesitate to contact us.

3. History, Type and Style.

3.1 The property is a 21 storey residential block of flats constructed around 1968/1970

3.2 From the inspections conducted the construction appears to be cast insitu reinforced concrete floors and crosswalls.

3.3 No archive records relating to the original build both of design and construction have been discovered, as mentioned in Paragraph 1.3.

3.4 The block has been overclad for assumed thermal insulation upgrade, however no details have been found or details advised. The insulation cladding completely covers the main structural fabric of the property.

4. Observations

4.1 From our limited visual inspection, no visible, significant or concerning signs of structural distress or movement were identified.

4.2 However access was limited to the communal areas, plant / tank rooms and void unit 74 where insitu tests for carbonation and laboratory tests for chloride ion content indicated that there are no current issues of concern with carbonation and chloride attack.

4.3 The depth of carbonation is well within the concrete cover to reinforcement and would be considered normal for construction of circa 50 years.

4.4 The calcium chloride content is within the current British Standard (BS5328) limit of 0.4% and well below the BRE (Building Research Establishment) trigger action level of 1%

4.5 The sampling was undertaken by Constructive Evaluation and their report is annexed within this report.

4.6 A detailed assessment of the robustness of the existing structure is beyond the scope of our brief and this report. Whilst the construction appears to be monolithic cast in situ reinforced concrete as opposed to any form of precast panel / system build, it would therefore offer an inherently greater resistance to serious damage and potential catastrophic or disproportionate collapse in the event of an accidental event. such as the 1968 Ronan Point gas explosion.

4.7 It is not possible to determine the extent of compliance with modern-day design standards, without detailed knowledge being provided or made available of the property.

4.8 Concrete cover to reinforcement where identified by cover meter scanning in the locations noted in Constructive Evaluation's report (See Appendix 9) meets and generally exceeds the requirements of the British Standards Code of Practice that would have been in force at the time of the original construction, namely BS CP114.

5. Conclusions and Recommendations

5.1 The property has no indication of structural distress and we therefore consider no structural intervention is indicated at this time.

5.2 The property is more robust than the Large Panel precast systems and the joints are better constructed to resist adverse damage from accidental actions such as explosion.

5.3 However the present regulations for disproportionate collapse apply to new build and any property undergoing or intending to undergo change of use as well as extension or structural alteration.

5.4 The property, as is, would not be subjected to any regulation demanding wholesale strengthening.

5.5 One of the main concerns since Ronan Point in 1968 has been the ability of wall to floor joints to adequately resist explosion and some LPC tower blocks did have strengthening to the joints.

5.6 The presence of gas leads to the potential for structure to be affected by explosion. Therefore, the management of any gas supply should be considered. Note that this is not part of the scope of this report.

5.7 We would consider that buildings of insitu concrete main frame and floors without showing any indications of damage due to structural movement should be allowed to remain as they have for the past 50 years and that it is reasonable to consider that the property would continue to perform a satisfactory function within reasonable expectations, notwithstanding that they may not comply with current regulation.

5.8 Note that the building would have been designed to structural codes relevant at the time. If there is demand for bringing the property up to current structural regulation then extensive intrusive investigations, floor by floor would be needed. This would almost certainly be followed by additional strapping at the joints and the decanting of occupiers two floors at a time would have to be considered in the costings.

5.9 We believe that elimination of risk is the way forward and to that end there may be merit in removal of any gas supply and banning any bottled LPG or Oxygen bottles from the rooms in the property. However, the management of gas supply and decisions around its presence would be the responsibility of others.

5.10 The minor cracking in the basement whilst not of any present concern should be monitored for 12 months with tell-tale gauges with readings quarterly.

5.11 The relevant compliance criteria is the comparison of the reinforcement cover found on site with what would be expected by the design standards at the time (Ref - Section 4.8). However, from the tests carried out on site, the depths of carbonation do not currently affect the reinforcement and are unlikely to significantly affect it in the reasonable future – subject to future inspections, which we recommend being carried out, confirming this.

6. Further Inspections or Investigations

6.1 The possibility of recovering some more documentation from LBTH using their pre 2000 retrieval system may be required. This is not guaranteed and takes some time to organise and visit.

6.2 We would recommend a simple visual inspection of structural elements be carried out on a yearly basis. This is to ensure that any loosened concrete becoming detached for any reason, can be addressed.

6.3 We would further recommend a more detailed inspection requiring access infrastructure to examine areas more closely is carried out on a five year cycle.

6.4 Further tests can be carried out on a ten or fifteen year cycle depending on the outcome of inspections

7. Budget Costings

Note that it was not the scope of this survey or report to inspect the whole of the building to quantify all the structural defects that may be present. Therefore, any prediction of costs for subsequent repair will be approximate.

A typical structural defect such as spalling or cracking of reinforced concrete could be caused by fissures allowing moisture to affect reinforcement leading to expansion etc., particularly where cover to reinforcement is low. Some isolated reinforcement cover values are likely to be found to be low, and on the basis that this could lead to spalling, the following has been estimated.

Subject strictly to bona fide quotation from suitably experienced and competent contractors we would consider that the following cost allowances would be appropriate.

- Initial visual inspections quantifying defects and subsequent repairs arising
  £17,500
- Visual intrusive survey after five years, quantifying defects and subsequent repairs arising
  £45,000
- Subsequent five yearly visual and intrusive survey and subsequent repairs arising
  £60,000

Subject to VAT

The above includes for access by abseil. Note, that a small additional allowance must be made as part of an annual overall maintenance budget for repairs of a reactive nature if and when reported that may have to be undertaken, for example, for safety reasons

8. Appendix - Structural Engineers Inspections

These notes are to be read in conjunction with any report to which they are appended.

1. A Structural Engineer's inspection of a property is intended to provide the information set out in either paragraphs (a) or (b) below. Our reports will indicate the exact nature of the brief.

(a) Specific advice on any structural problems or matter which have been brought to the attention of the Engineer and which may be the sole basis for commissioning the report. Examples are cracks or gapping to walls, previous repairs such as underpinning etc.

Or

(b) To provide a general overview of the condition of the principal loadbearing structural elements of the property with a view to advising whether the property is suffering from any deficiencies such as subsidence, heave or landslip, structural instability or failure/potential failure of structural components

2. The inspection is not a full "Building Survey" as defined by the Royal Institution of Chartered Surveyors, this type of survey deals with many of the non-structural aspects of the property condition. Other than general comments the inspection has not included the testing of any services to the property. Neither will it consider the presence of any hazardous or deleterious materials such as asbestos nor any invasive vegetation such as Japanese knotweed etc.

3. Inspections can only be made in those areas which are freely accessible. Unless arrangements have been made prior to attending the property no inspection can be made of the foundations or areas buried beneath the structure or behind cladding neither can any comment be made upon areas that are obscured by fitted carpets or fixed covering. In the event that further inspection is advisable then this will be referred to in the report. However, whilst using all best endeavours, there is always the possibility that there are hidden defects which cannot reasonably be established from a standard Structural Engineer's report

4. The contents and information in the report are for the use of the person in direct contract with ***kirksaunders Associates***. No responsibility is accepted for the action of others, including Insurers, to whom this report may be made available.

5. The report is not to be construed as an implied warranty in relation to the structure. ***kirksaunders Associates will*** not be held liable to any third parties for any loss, consequential or otherwise as a result of information provided in the report.

6. Clients should always obtain legal advice on matters involving the purchase or sale of a property. Our reports do not address legal issues.

7. It must be remembered that the condition of any property is a constantly changing variable and with the passage of time new defects can arise and existing ones worsen. The report can only be taken as a guide record of the condition of the property at the time of inspection. As a general rule it is recommended that a re-inspection is carried out every two years or as defined in the report where defects have been identified whether or not repair or remedial work is carried out. In this way the early warning signs of any recurrence of a problem or the onset of new problems can be given. Advice given can in general terms lead to an overall cost saving providing the remedial works or maintenance items recommended are carried out.

Acceptance of our report will imply acceptance and understanding of the foregoing notes.

9. Appendix - Constructive Evaluation Report - BOWSPRIT POINT

constructiveevaluation
site investigation ● building pathology

Report Following Concrete Testing

at

Bowsprit Point

Westferry Road

London

E14 8NU

for

One Housing Group

100 Chalk Farm Road

London

NW1 8EH

REF 17.9739/4

CONSTRUCTIVE EVALUATION

UNIT 15 & 16 FORD LANE BUSINESS PARK

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Document Approval

Report Author(s)	Report approved by
 Paul Gatland (Associate Director)	 Paul Moore (Director)
Email: paul.gatland@theconstructivegroup.com	Email: paul.moore@theconstructivegroup.com
Date: January 2018	Date: January 2018

Context
This report is written in the context of an agreed scope of work between Constructive Evaluation Limited and the Client and should not be used in a different context. In light of additional information becoming available, improved practices and changes in legislation amendment or re-interpretation of the report in whole or part may be necessary after its original submission.

Professional Interpretation
The recommendations made and opinions expressed in the report are based on the conditions revealed by the site works together with an assessment of the data from the insitu and laboratory testing. No responsibility can be accepted for conditions that have not been revealed by the research, site works and testing. It is not possible to assess areas which are inaccessible or where access is not granted and CE accept no liability for risks subsequently identified therein.

CONTENTS **PAGE**

1.0) INTRODUCTION

1.1) Constructive Evaluation Limited were instructed by Kirksaunders, on behalf of their client, One Housing Group, to complete a suite of testing to determine the condition of concrete elements at Bowsprit Point on the Isle of Dogs.

1.2) Site work was completed by a 3-man technical team including building surveyor over a single day in November 2017.

1.3) Site work comprised;

- Completing a walkover survey of condition of visibly exposed concrete to external faces, internal communal areas, flat 74, plant rooms and the like.
- Collecting bulk concrete dust samples from exposed concrete elements.
- Measuring the depth of concrete cover to reinforcement using Proceq electromagnetic cover meter equipment at sample positions.
- Measuring the depth of carbonation at sample positions.
- Completing breakouts to determine the nature of the rendered external walls.
- Reinstating sample positions back to existing profiles using Rockbond acrylic modified mortar.
- Reinstating breakouts back to render profiles using Rockbond acrylic modified mortar.

1.4) The following factual report provides a copy of the data obtained.

2.0) SITE WORK

2.1) Site work was completed over a single day by a 3-man technical team including building surveyor. Sample positions were selected by the surveyor to be representative of the elements identified.

2.2) The building surveyor completed a walkover and visual survey and inspection of condition of visibly exposed concrete to external faces, internal communal areas, flat 74, plant rooms and the like

2.3) 11no. bulk concrete dust samples were collected using rotary percussive drilling techniques. Samples were collected into sealable plastic bags, provided unique identification and later forwarded to the laboratory for analysis to determine chloride Ion concentration.

2.4) The depth of carbonation was measured at each dust sample position using phenolphthalein solution as an indicator; phenolphthalein remains clear on carbonated concrete and turns pink on non-carbonated concrete.

2.5) The depth of concrete cover to reinforcement was also measured at each dust sample position using Proceq electromagnetic cover meter equipment.

2.6) Sample positions were reinstated back to existing profiles with Rockbond acrylic modified mortar which sets to >50N at 28 days.

2.7) Small external breakouts were completed to determine the nature of external cladding and render materials. Breakouts were completed following small bore slow speed drilling by the P402 qualified building surveyor to expose insulation type. Once the material had been identified, localised breakouts were completed to determine the nature of substrate and presence of voids.

2.8) Reinstatement of breakouts and dust sample positions was completed using Rockbond acrylic modified mortar which cures to >50N at 28 days. External repairs were completed back to render profiles.

3.0) RESULTS

3.1) A précis of results of in-situ testing and laboratory analysis is presented in the following tables. Chemical analysis test reports may be referred to in appendix 1.

BOWSPRIT POINT							
Sample	Floor	element	depth	cover	carbonation	chloride Ion (by mass)	Comments
ref.			profile	depth	depth	presuming 14% OPC	
				(mm)	(mm)	(%)	
1	roof	lift motor room wall	bulk	45	5	0.07	covered by metal framed roof
2	roof	slab edge	bulk	25	10	0.10	covered by metal framed roof
3	roof	lower slab edge	bulk	20	10	0.06	covered by metal framed roof
4	19	party wall	bulk	30	5	0.14	S side, flat 74
5	19	W.C. wall	bulk	44	10	0.03	drainage riser, internal wall
6	20	stairwell wall	bulk	60	5	0.05	painted
7	ground	internal wall	bulk	35	10	0.11	exposed
8	ground	plant room column	bulk	65	10	0.01	exposed
9	ground	plant room end wall	bulk	60	10	0.03	end wall clad externally in brickwork
10	ground	plant room pier	bulk	25	10	0.05	exposed
11	ground	plant room soffit	bulk	25	10	0.05	exposed

3.2) All chloride Ion levels are below the BS5328 level of 0.4% for concrete with embedded metal made with cement conforming to BS12, 146, 1370, 4246, 6588, 6610, 7583. This suggests that corrosion due to chloride ion is not likely to be a widespread issue at present.

3.3) The depth of concrete cover to reinforcement exceeds the depth of carbonation at all sample positions. This means that corrosion of reinforcement due to atmospherically induced carbonation effect is unlikely to be a widespread issue at present. It should however be borne in mind that carbonation will be to full crack or pore depth where such imperfections exist.

3.3.1) Note: Carbonation is the effect of weak carbonic acid (moisture and carbon dioxide) on highly alkaline concrete. High alkalinity protects embedded reinforcement creating a “pacifying” layer around the metal. The carbon dioxide tends to diffuse into concrete, mixes with pore water forming carbonic acid which neutralises the alkalinity thus disrupting the pacifying layer and leaving reinforcement prone to corrosion in the presence of moisture and oxygen.

3.4) The block is rendered externally with render on mineral wool insulation which is fixed directly to the original concrete substrate with no formed void evident. Due to the render it is not possible to comment on the general condition of the external frame or cladding elements.

3.4.1) There are some areas of infill within the stairwells (evident by internal timber panels) which are enclosing presumed previous areas of glazing. These are filled with lightweight blockwork, mineral wool insulation and plasterboard on a timber frame.

3.5) Concrete roof members including plant room walls etc. are over-clad by a pitched metal framed roof structure.

3.6) Internal concrete elements appeared to be cast in-situ (where seen) and in fair condition.

1) general view showing rendered external surfaces

2) Rendered end wall. Pitched roof also evident.

3) internal view of metal framed pitched roof

4) tank room roof and walls of in-situ concrete

5) Mineral wool insulation between concrete and brick façade at 1st floor level

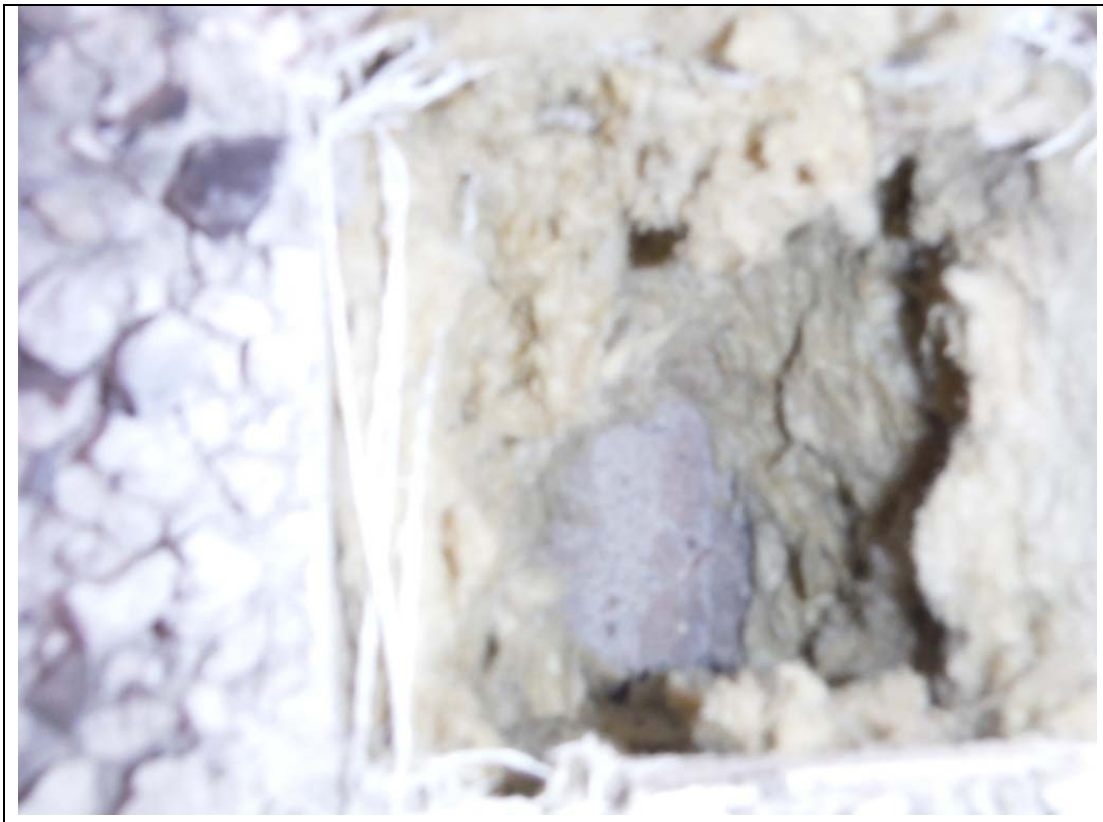
6) Insulated render cladding to upper storey cross wall to balcony

7) mineral wool insulation fully filling behind render to balcony cross wall

8) Wall panel to upper floor stairwell similar to other “point” blocks

9) mineral wool batts partially filling void presumed to be originally glazed

10) mineral wool insulation behind aggregate faced render



11) mineral wool fully filling between original substrate and facing render

12) mineral wool filling behind render at render panel boundary

APPENDIX 1

LABORATORY ANALYSIS REPORT

CONSTRUCTIVE EVALUATION LTD

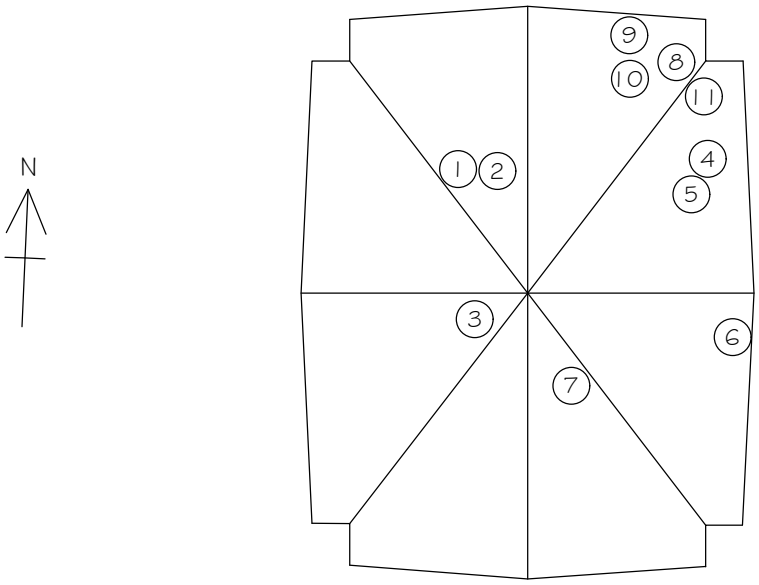
Lab Batch Ref: *HT/17-4548/CE*
Analyst: *O. Sheridan*

Order Ref: PG/17.9739
Batch Details: ISLE OF DOGS TOWER BLOCKS

TEST RESULTS

LABORATORY SAMPLE REF	SAMPLE DETAILS	DEPTH PROFILE SAMPLED *mm*	HIGH ALUMINA CEMENT (H.A.C.) *(B.R.E. SPECIAL DIGEST SD3: 2002*	% CHLORIDE ION BY MASS OF WHOLE SAMPLE	% CHLORIDE ION IN CEMENT *(by mass)* [ASSUMING 14 % CEMENT]
4548/56	Bowsprit Point: Sample 1		Test not required	0.010	0.07
4548/57	Bowsprit Point: Sample 2		Test not required	0.015	0.10
4548/58	Bowsprit Point: Sample 3		Test not required	0.008	0.06
4548/59	Bowsprit Point: Sample 5		Test not required	0.004	0.03
4548/60	Bowsprit Point: Sample 6		Test not required	0.007	0.05
4548/61	Bowsprit Point: Sample 7		Test not required	0.015	0.11
4548/62	Bowsprit Point: Sample 8		Test not required	0.002	0.01
4548/63	Bowsprit Point: Sample 9		Test not required	0.005	0.03
4548/64	Bowsprit Point: Sample 10		Test not required	0.007	0.05
4548/65	Bowsprit Point: Sample 11		Test not required	0.008	0.05
4551/14	Bowsprit Point: Sample 4			0.020	0.14

10. Appendix – Block Plans



BOWSPRIT POINT

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