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STRUCTURAL CONDITION INSPECTION REPORT

INCORPORATING LIMITED INTRUSIVE INVESTIGATION

AT

KELSON HOUSE

STEWART STREET

LONDON E14 3JQ

Project Number	6627
Document Ref:	D013-A
Revision	A
Prepared by	I D Isherwood
Date prepared	24 January 2018
Client	ONE HOUSING LIVING BETTER
Instructed by	***Hunters*** Building Consultancy Bob Forrest BSc (Hons)

kirksaunders associates CONSULTING ENGINEERS

Revision History

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A	SECOND ISSUE	8 Feb 2018	SH	TD

Project Reference: **6627**

Title: **KELSON HOUSE – STEWART STREET – LONDON E14 3JQ**

Client: ONE HOUSING LIVING BETTER

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

Date of Inspections and investigations: **November 27 2017 & December 1 2017**

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 25 storey residential block of flats. The flats are often described as scissors style maisonettes where each individual unit has split levels.

1.2 The structure appears to be cast in situ reinforced concrete, predominantly (possibly entirely) having walls providing both vertical support and lateral stability.

1.3 No archive record information relating to the original design or construction is held by the current building owners.

1.4 Anecdotal evidence indicates the building was constructed in the early 1960's.

1.5 No visible structural defects were apparent in the areas surveyed, however, access was only available to communal areas including the plant room at roof level and 2 void flats, nos. 15 and 51. Refer to section 3.1 of Constructive Evaluation report in Appendix Section 9 of this report for further details of specific areas / locations accessed.

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

1.7 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. It is considered that these 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.

1.8 The support and restraint of an external cladding panel was the subject of intrusive investigation in flat 16. The panel, a "spandrel" below a full width window was found to have reinforcing bars projecting from the end of the precast panel cast monolithically into an internal cross wall. The rebar exposed was in sound condition at this one location and there were no visible gaps or signs of distress in this or other locations in units 16 and 51.

1.9 Exposed aggregate panels to the flank walls have been subject to previous patch repairs; refer to images in Constructive Evaluation report appended to this report. No details of the reason(s), nature or date of these works are known, but they are likely to be due to spalling due to reinforcement corrosion. The eastern (river-facing) flank wall appears to have been subject to more repairs than elsewhere. These panels do not appear to be structural elements.

1.10 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 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.

Client Brief

2.5 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 and recommend any appropriate repairs or maintenance or necessary strengthening upgrades with associated allowable budget only cost proposals.

2.6 The investigations are to include the structural framing and carry out representative sample carbonation testing on exposed concrete. In addition precast concrete cladding panels are to be assessed for joint/connection integrity with the main structural frame.

2.7 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 25 storey residential block of flats constructed in the early 1960's.

3.2 The construction appears to be split level cast insitu reinforced concrete floors and crosswalls.

3.3 No archive records relating to the original building design or construction have been discovered

3.4 The block has had some external repair of unknown vintage to the exposed aggregate precast panels.

3.5 The block appears to have internal mains gas supply pipes although it is not known whether they are still in use.

4. Observations

4.1 No visible, significant or concerning signs of structural distress or movement were identified.

4.2 Exposure of the floor to internal wall joint revealed reinforcement in the walls linking with the floor rebar. No deleterious condition was observed.

4.3 The end of the cross walls link into to the exposed aggregate precast panels. Sample exposure of the connection revealed reinforcement tie back to the walls to be in good condition with no signs of rusting or decay.

4.4 Sampling for carbonation revealed the depth of carbonation is well within the concrete cover to reinforcement and would be considered normal for a construction of 50-plus years age.

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

4.6 The sampling was undertaken by Constructive Evaluation under our instruction and their report with detailed laboratory results is annexed within this report.

4.7 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 or disproportionate 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 standards, without detailed knowledge provided or available for the property.

5. Conclusions and Recommendations

5.1 The property has no indication of structural distress and we therefore consider no structural intervention is indicated. Some maintenance of / local repair to the precast panels is likely to be required but this does not affect overall stability considerations.

5.2 The property is more robust than the precast Large Panel System (LPS) forms of construction used for many tower blocks of this era and the joints are better constructed to resist adverse damage from accidental actions such as explosion. We would consider that the property is capable of resisting all normal loads and forces to which it may be subjected. This does not however include catastrophic accidental forces such as explosion from gas or other volatile substances.

5.3 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. The property as it stands at present would not be subjected to any mandatory regulations demanding wholesale strengthening.

5.4 We would consider that buildings of insitu concrete main frame and floors that have no current indications of damage or distress 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 notwithstanding that they may not comply with current regulation.

5.5 If there is demand for bringing the property up to current structural regulation then a very intrusive investigation, 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.

6. Further Inspections or Investigations

6.1 The possibility of recovering some more documentation from LBTH using their pre 2000 retrieval system. This is not guaranteed and takes some time to organise and visit. However it is worth trying if the client requires further comfort on the structural integrity.

7. Budget Costings

Note that it was not the scope of this survey or report to inspect the whole of the building to identify and quantify all structural defects that may be present, therefore any prediction of costs to subsequent repair will not be accurate. 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. On this basis and strictly subject 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

  £23,125

- Visual intrusive survey after five years, quantifying defects and subsequent repairs arising

  £65,000

- Subsequent five yearly visual and intrusive survey and subsequent repairs arising

  £80,000

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 - Guidance Notes for 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 KELSON HOUSE

constructiveevaluation
site investigation ● building pathology

Report Following Concrete Testing

at

Kelson House

Stewart Street

London

E14 3JN

for

One Housing Group

100 Chalk Farm Road

London

NW1 8EH

REF 17.9739/1

CONSTRUCTIVE EVALUATION

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Document Approval

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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 Kelson House on the Isle of Dogs.

1.2) Site work was completed by a 3-man technical team including building surveyor in November 2017 and comprised:

- Completing a walkover survey and inspection of condition of visibly exposed concrete to external faces, internal communal areas, void units, plant rooms and the like.
- Collecting graduated and 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 localised breakouts to determine fixing details between pre-cast cladding panels and reinforced concrete frame.
- Completing electromagnetic scanning to locate panel fixing details.
- Reinstating sample and breakout positions back to existing profiles using Rockbond acrylic modified mortar.

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

2.0) SITE WORK

2.1) Site work was completed over 5no days 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 of condition of visibly exposed concrete to external faces, internal communal areas, flats 16 and 51, plant rooms and the like

2.3) 19no bulk concrete dust samples and 18no graduated 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.

2.3.1) Graduation is from 5 to 25mm, 25 to 50mm and 50 to 75mm. The purpose of graduation is to try to gain an indication of chloride concentration through an element and thereby determine whether chlorides are cast-in or diffused into the concrete.

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) Internal breakouts were completed within void units in order to determine the presence and nature of fixings between pre-cast cladding units and the building frame. Further breakouts were completed to internal cross wall/ floor connection to expose reinforcement and determine the nature of the concrete.

2.8) A small external breakout was completed to determine the nature of external render material. Breakouts were completed following small bore slow speed drilling by the P402 qualified building surveyor to expose the substrate. Once the material had been identified, localised breakouts were completed to determine the nature of the render and presence of voids.

2.9) Reinstatement of breakouts and dust sample positions was completed using Rockbond acrylic modified mortar which cures to >50N at 28 days. Internal breakout positions were reinstated back to concrete/ screed profiles. 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.

KELSON HOUSE							
Sample	Floor	element	depth	cover	carbonation	chloride Ion (by mass)	Comments
ref.			profile	depth	depth	presuming 14% OPC	
				(mm)	(mm)	(%)	
1	ground	N side wing wall	5 to 25	44	20	0.24	timber pattern finish- in-situ
			25 to 50			0.11	
			50 to 75			0.11	
2	ground	E end wall	5 to 25	32	5	0.22	timber pattern finish- in-situ
			25 to 50			0.09	
			50 to 75			0.06	
3	ground	S side wing wall	5 to 25	45	20	0.17	timber pattern finish- in-situ
			25 to 50			0.07	
			50 to 75			0.05	
4	ground	stairwell wall	5 to 25	26	5	0.32	painted
			25 to 50			0.15	
			50 to 75			0.12	
5	ground	W end wall	5 to 25	38	5	0.14	painted
			25 to 50			0.05	
			50 to 75			0.02	
6	23	stair soffit	5 to 25	22	10	0.09	none
			25 to 50			0.09	
			50 to 75			0.03	

KELSON HOUSE							
Sample	Floor	element	depth	cover	carbonation	chloride Ion (by mass)	Comments
ref.			profile	depth	depth	presuming 14% OPC	
				(mm)	(mm)	(%)	
7	ground	plant room column	bulk	26	10	0.02	none
8	ground	plant rm slab soffit	bulk	20	5	0.09	low level slab, in-situ
9	1st ext.	W end render	bulk	20	15	0.11	stainless reinforced render on concrete
10	1st ext.	E end wall	bulk	50	10	0.20	shiplap pattern- in situ
11	1st ext.	N side panel	bulk	42	5	0.27	exposed aggregate spandrel, pre-cast
12	1st ext.	W end panel	bulk	60	20	0.18	exposed aggregate end wall, in-situ?
13	1st ext.	S side panel	bulk	22	5	0.23	exposed aggregate spandrel, pre-cast
14	10th	slab soffit	bulk	21	2	0.05	no void, presume R.C. slab, in-situ
15	9th	spandrel internal	bulk	25	5	0.06	exposed aggregate spandrel, pre-cast
16	roof	N side parapet	bulk	50	10	0.07	adjacent to crack- presumed thermal cracking
17	roof	S side parapet	bulk	45	15	0.04	between 2no repaired cracks
18	roof	wall by plant room	bulk	35	20	0.06	cross wall
19	3rd	cross wall	bulk	30	10	0.07	cross/ party wall
20	3rd	spandrel internal	bulk	20	2	0.06	exposed aggregate spandrel, pre-cast
21	3rd	floor slab	bulk	15	2	0.10	surface is rough suggesting in-situ
22	roof	slab soffit	bulk	25	15	0.10	black painted surface in poor condition
23	roof	cross wall	bulk	22	10	0.03	blistered paint
24	roof	slab soffit	bulk	30	15	0.07	blistered paint
25	roof	cross wall	bulk	28	10	0.12	blistered paint

3.2) All chloride Ion results 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) Within the graduated samples there is a marginal decrease in chloride Ion concentration with increased depth. This may be due to concentrated chloride following wetting, transfer of Ions and evaporation. Chlorides are presumed to be cast in.

3.4) 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.

3.4.1) 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.

3.5) The pre-cast (externally aggregate faced) cladding panels are attached to cross walls by 4no 6mm smooth mild steel (SMS) bars which appeared to be in fair condition where broken out. It is presumed that all other positions are similarly fixed however we are not able to confirm this. The bars are cast into the pre-cast planks and the walls (at connection point) must have been cast after the panels were put into position.

3.6) Cladding panels are 100mm thick with 10mm SMS reinforcement. Walls and floors contain 10mm and 12mm SMS reinforcement at various centres as shown in the scan reports overleaf. Party/ cross walls appear (from scan analysis) to be 150-200mm thick at upper floors. Externally exposed cast in-situ cross walls are 250mm thick at ground level. Measurement suggest upper floors to be approximately 180mm thick with screed above and plastered soffit. Panels are insulated with mineral wool.

3.7) Panels have a 50mm x 50mm nib located just below the 60mm thick sand and cement floor screed. The screed is reinforced with chicken wire. The slab concrete appeared to abut the nib very tightly suggesting the panel may have been used as formwork and the slab cast

afterwards. The slab concrete upper surface is very bumpy which is not usual for pre-cast planks suggesting the cross walls and floors are cast in-situ concrete.

3.8) 185mm x 45mm angle brackets are present towards the top of the panels which we presume were used to fix original Crittall/ metal framed glazing units. They are no longer fixed to anything but are embedded within concrete fill.

3.9) A breakout at the wall to floor junction showed floor reinforcement projecting into the wall. This also suggests the wall and floor were cast together in-situ.

3.10) The ceiling was drilled in several positions without hitting a void suggesting the slabs are unlikely to be of hollow core planks.

3.11) Electromagnetic scanning of the floor and ceiling showed reinforcement spanning in both directions which also minimises the likelihood of pre-cast plank floors being present.

3.12) The render coating to the West end lift/ stairwell core wall is a proprietary cementitious material with 3mm stainless steel mesh reinforcement (50mm grid). The render is 30mm thick, cast in 2no coats with 20mm cover to the mesh. The render is applied directly onto the concrete substrate. Repairs completed appear to be untidy and inspection from ground level suggests that repair work may be required at 11th and 21st floors to make the render watertight.

3.13) Cracking is evident to the inner faces of the large parapet walls. The crack pattern suggests thermal movement as the cause. The cracking does not appear to continue through the full thickness of the parapets however it must be recognised that the inspection of the parapets was completed from ground level through binoculars.

3.14) The decorative finishes to the rooftop plantroom roof and walls are generally disrupted/ blistered. There is evidence of localised water ingress although little evidence of spall or significantly affected concrete.

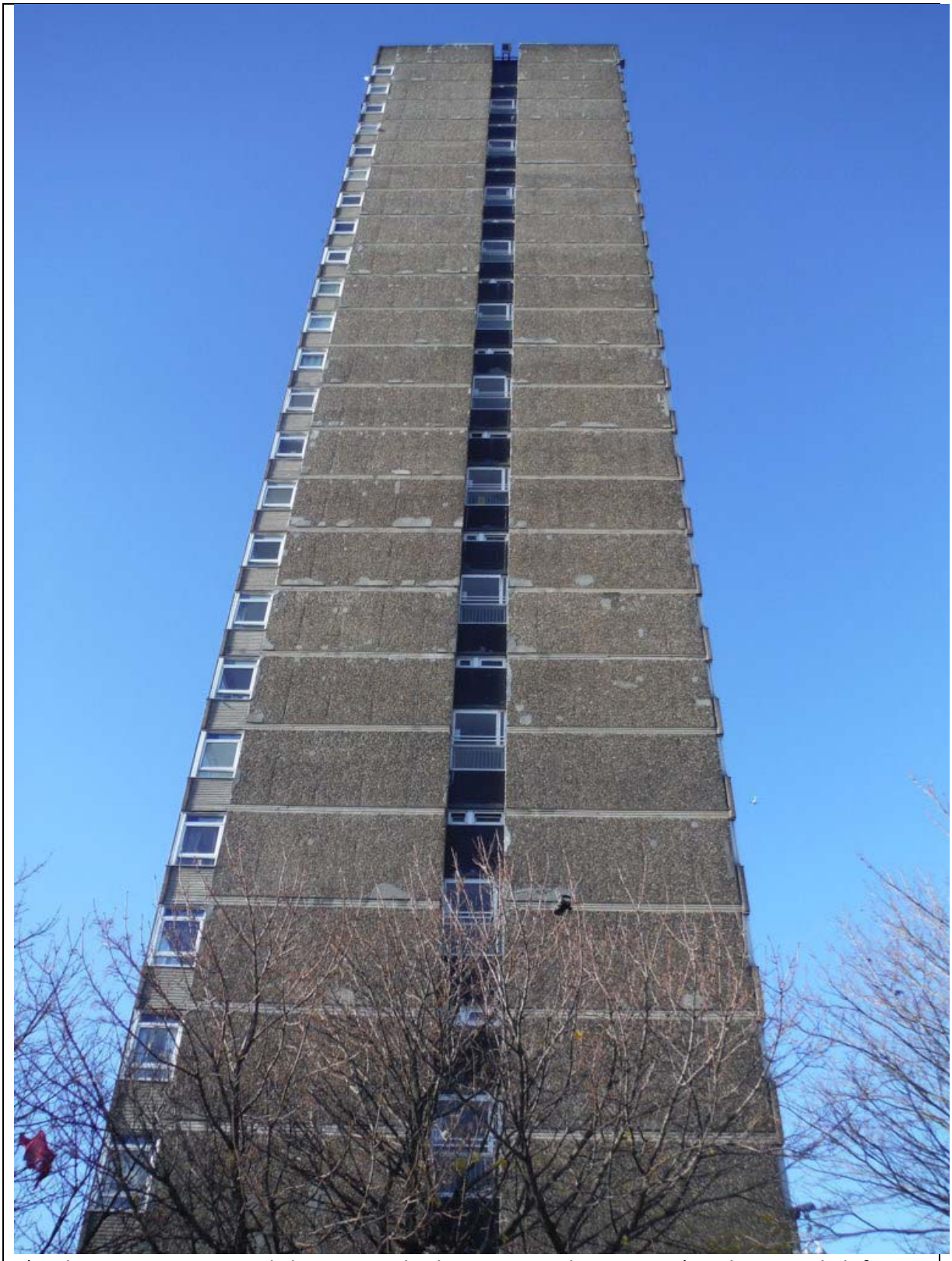
3.15) There are a significant number of repairs to the East end, exposed aggregate finished wall. The repairs are not square cut and therefore may be prone to early failure. There is evidence of cement washout (of the original material) due to water and (possibly) wind scour and the aggregate is therefore no longer as well bedded as it once was. There are also a number of vertical striations which are presumed to be the result of years of water running down the wall. There was no evidence of exposed reinforcement at striations although the inspection was completed from ground level through binoculars.

3.16) A visual inspection of the cladding/ spandrel panels suggests they are in visually fair condition with minor repairs evident.

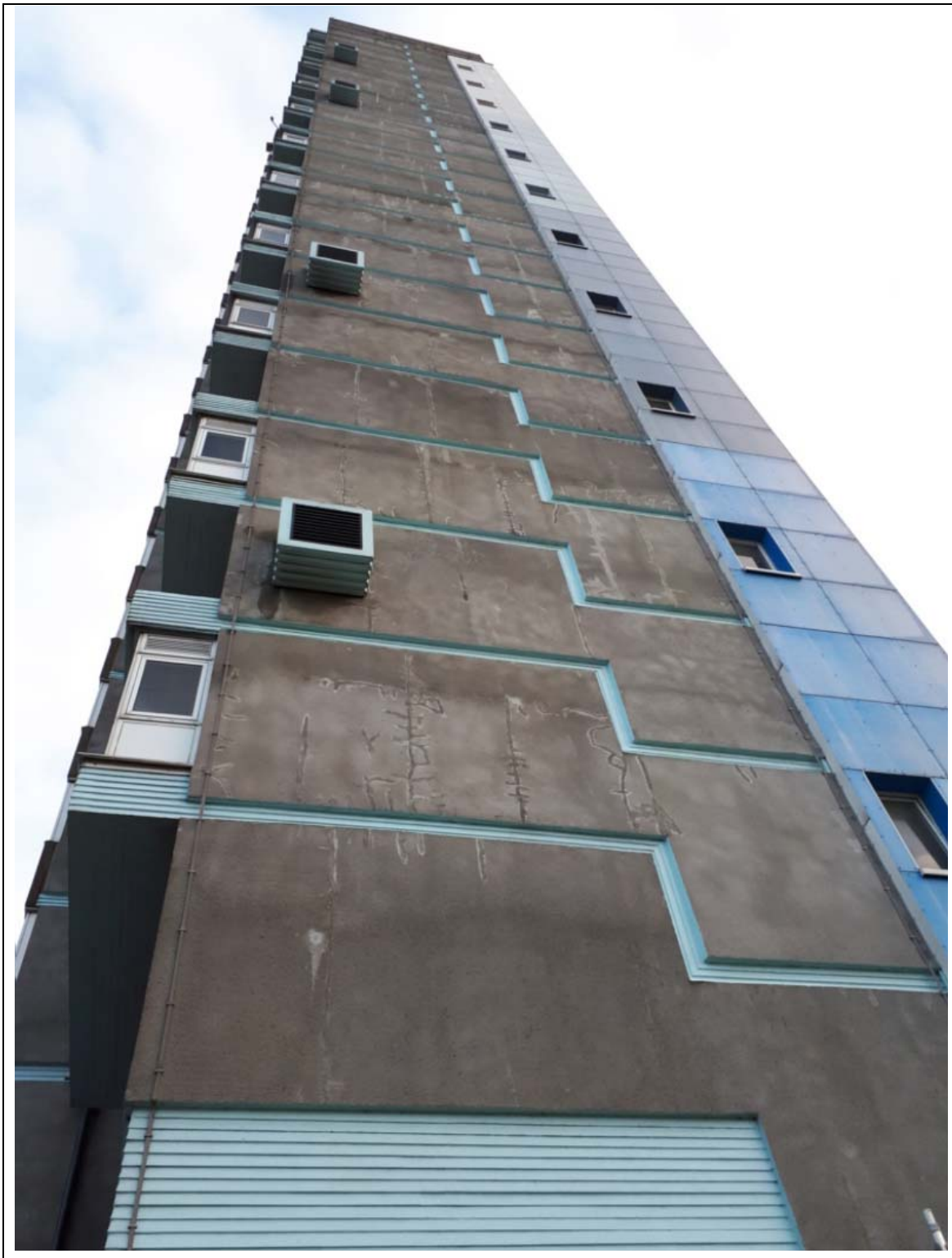
3.17) There is a roof mounted chimney cowl which is buckled and prone to excess movement in high winds. This should be fixed down or replaced.

1) Kelson House main entrance, North side with lift core to right hand side.

2) Kelson House South side. Lift core to the left



3) Kelson House, East end showing multiple repairs and striations (predominantly left side).



4) Kelson House West end showing shiplap pattern concrete (light blue) and grey render with multiple repairs.

5) junction of cladding and cross wall

6) 6mm bar connecting panel to cross wall. Wall reinforcement also evident

7) probable angle bracket for original metal frames windows

8) floor to cross wall junction showing floor reinforcement protruding into wall

9) West end render broken out revealing stainless mesh and concrete substrate

10) typical crack to parapet with failed repairs

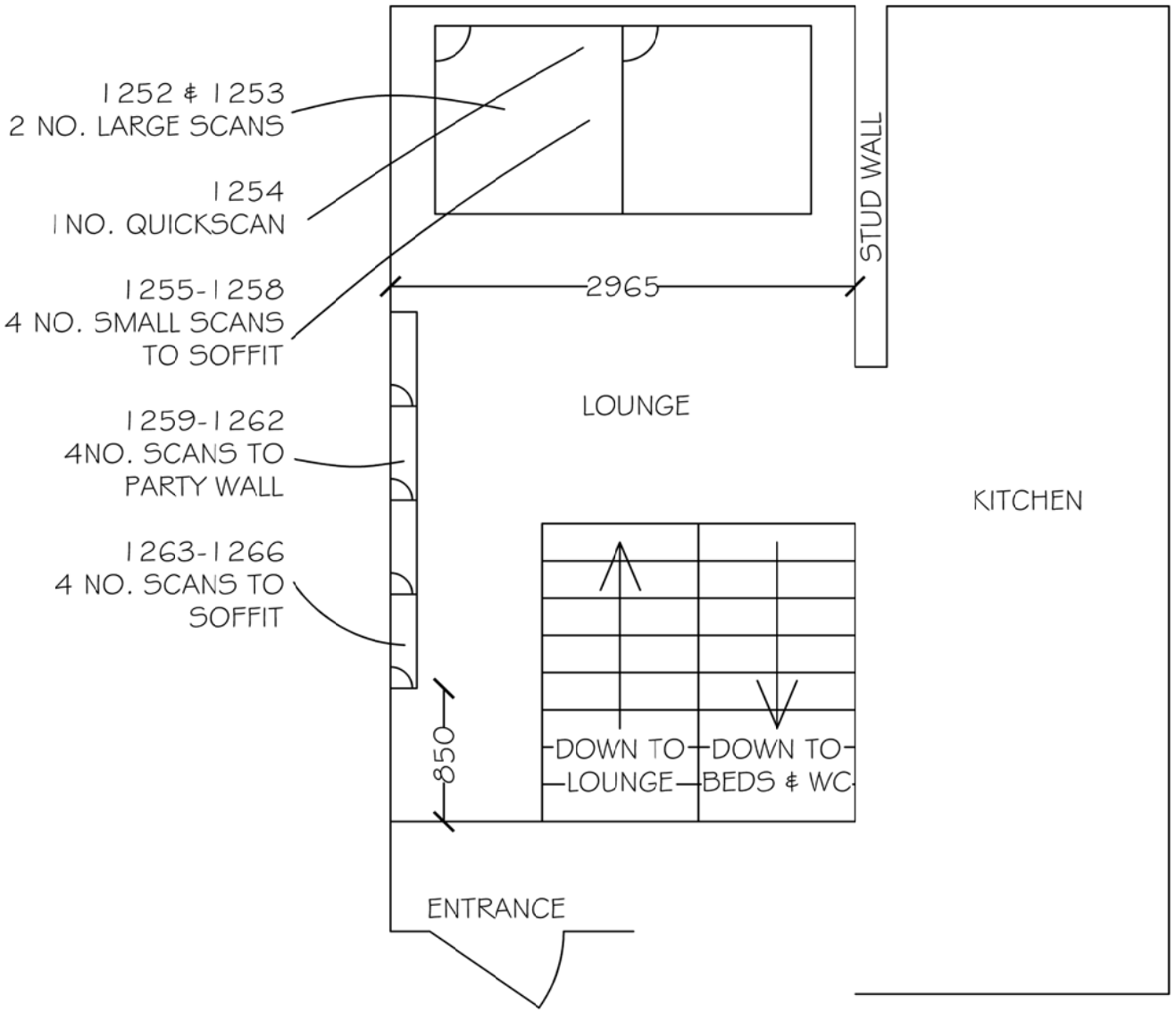
11) blistered paintwork to plantroom ceiling

12) repair to East end wall. Aggregate is very exposed due partly to cement wash out.

3.19) Scan data and location plans are presented on the following pages.

NOTES

1. Do not scale from this drawing Use figured dimensions only.
2. All dimensions must be checked on site prior to commencement of work.
3. Where applicable this drawing is to be read in conjunction with other consultants drawings.
4. This drawing is the copyright of Constructive Evaluation Ltd.



rev	date	amendment	check

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site investigation • building pathology
TEL-01243-533499 FAX-01243-531070
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Client.
Kirksaunders

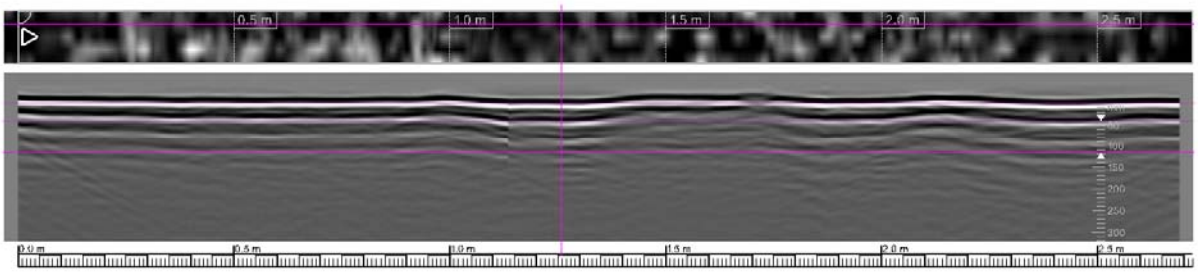
Project.
Kelson House, Isle of Dogs

Drawing.
SCAN LOCATION PLAN
scale
NTS

date DEC 17	drawn D.Y	checked
drawing number 17.973911		revision

Hilti PROFIS PS 1000 Report

Scan File:	RQ_316140004_001254
Scan Name:	-
Date / Time:	2017-11-28 13:39:01
Comment:	-



x: 1259 mm	y: 45 mm	z: 41 mm	Thickness: 75 mm
Concrete: 11.1		Method: Advanced	

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-slab
User:	-pg		
Comment:	-quick scan to East side floor adjacent to cladding. No obvious large deflections suggesting fixings.		

Hilti PROFIS PS 1000 Report

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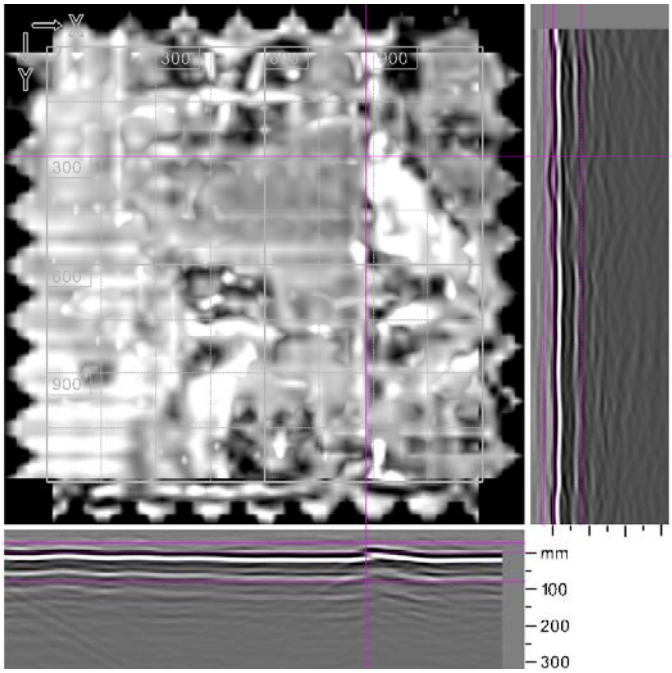
Date / Time:	2017-11-28 13:25:04
Comment:	-



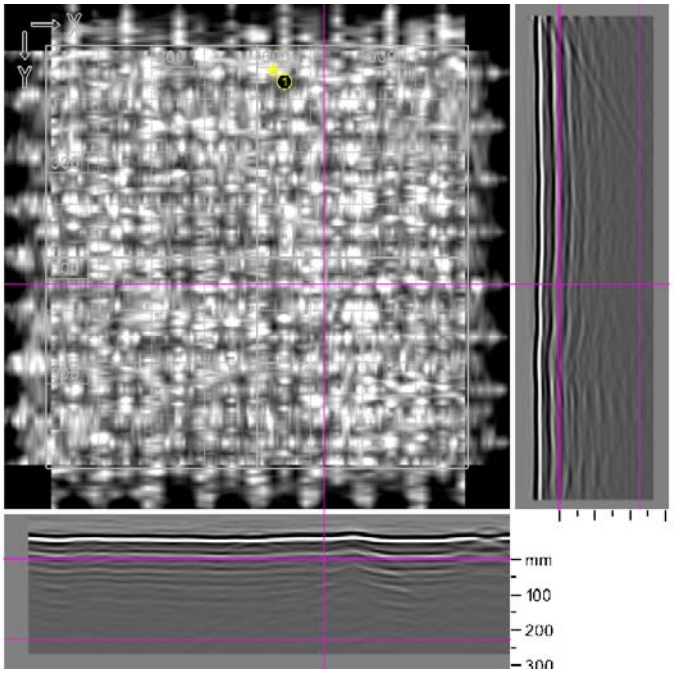
x: 880 mm y: 300 mm z: -25 mm Thickness: 105 mm

Concrete: 8.8 Method: Standard

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-slab
User:	-pg		
Comment:	-scan to East side adjacent to cladding panel. No obvious fixing evident although chicken wire In screed probably causing too much signal interference for effective scan.		

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001253
Scan Name:	-
Date / Time:	2017-11-28 13:35:08
Comment:	-



x: 789 mm y: 674 mm z: -4 mm Thickness: 230 mm

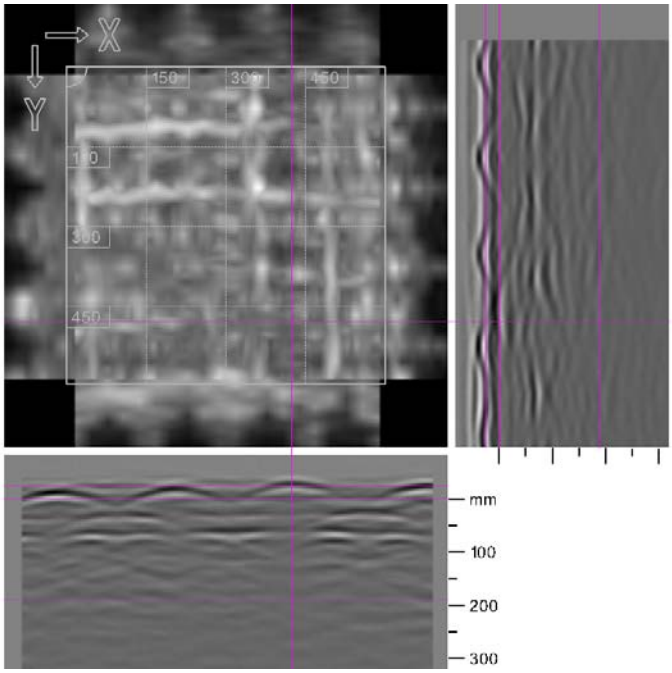
Concrete: 11.7 Method: Advanced

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-slab
User:	-pg		
Comment:	-scan to East side adjacent to cladding panel. No obvious fixing evident although signal significantly disturbed by chicken wire reinforcement within screed		

Marker:	x:	y:	z:	Comment:
1. Drillhole	645 mm	70 mm	0 mm	-

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001255
Scan Name:	-
Date / Time:	2017-11-28 13:48:23
Comment:	-



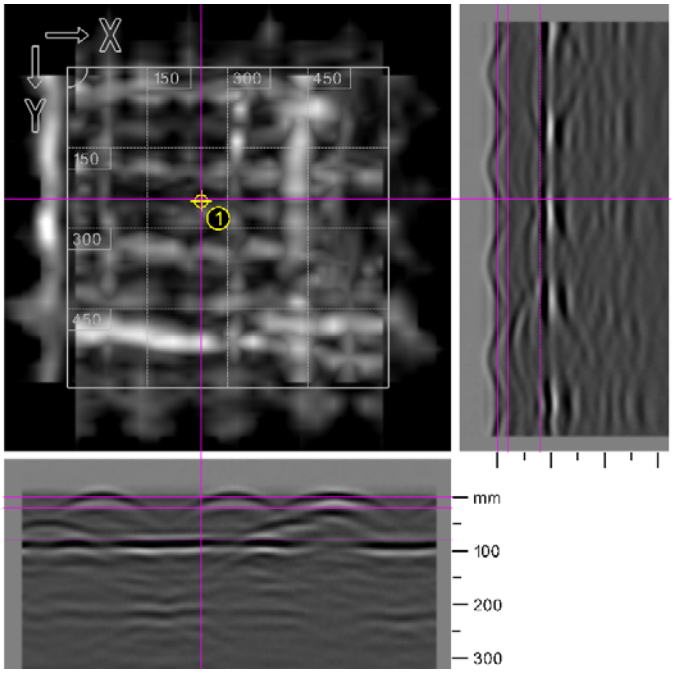
x: 424 mm y: 480 mm z: -26 mm Thickness: 215 mm

Concrete: 10.0 Method: Advanced

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-ceiling
User:	-pg		
Comment:	-scan to ceiling adjacent to East side windows. Bars in both directions at approximately 150mm centres. 2no layers. No clear evidence of cladding fixings.		

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001256
Scan Name:	-
Date / Time:	2017-11-28 13:54:50
Comment:	-



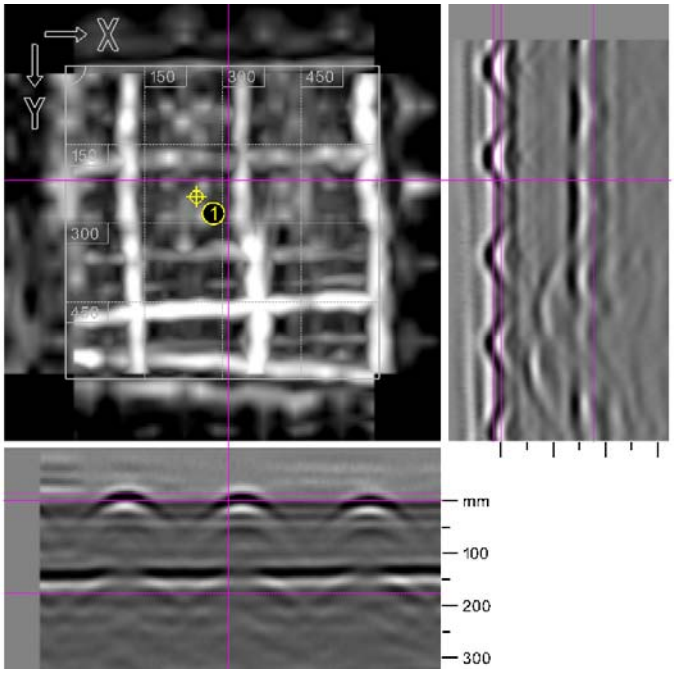
x: 250 mm	y: 246 mm	z: 20 mm	Thickness: 60 mm
Concrete: 7.9		Method: Advanced	

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-ceiling
User:	-pg		
Comment:	-scan to ceiling adjacent to East side windows. 2no layers of bars at approximately 150mm centres in both directions. Possible slab depth circa 250mm		

Marker:	x:	y:	z:	Comment:
1. Drillhole	250 mm	250 mm	0 mm	-

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001257
Scan Name:	-
Date / Time:	2017-11-28 13:57:29
Comment:	-



x: 311 mm y: 218 mm z: -14 mm Thickness: 190 mm

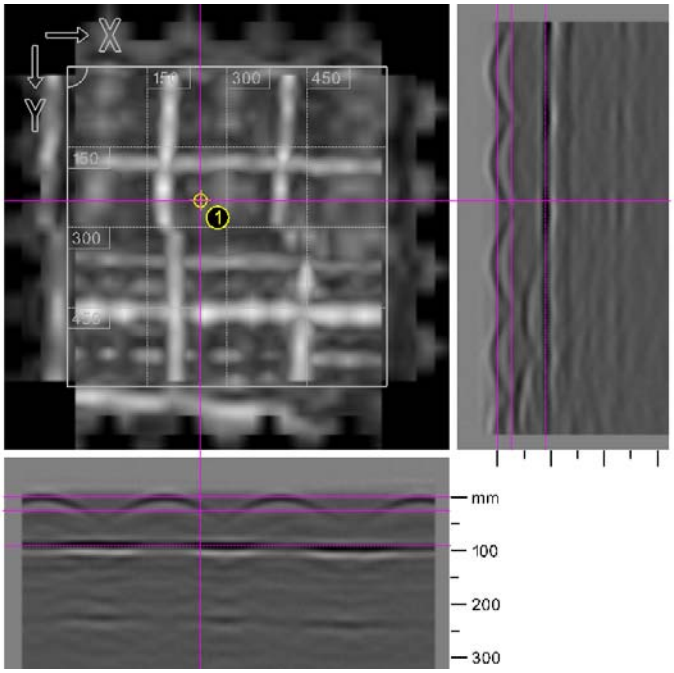
Concrete: 3.4 Method: Advanced

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-Ceiling
User:	-pg		
Comment:	-scan to East side ceiling adjacent to windows. 2no layers of bars at variable spacing. No clear evidence of fixing.		

Marker:	x:	y:	z:	Comment:
1. Drillhole	250 mm	250 mm	0 mm	-

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001258
Scan Name:	-
Date / Time:	2017-11-28 13:59:40
Comment:	-



x: 250 mm y: 250 mm z: 25 mm Thickness: 65 mm

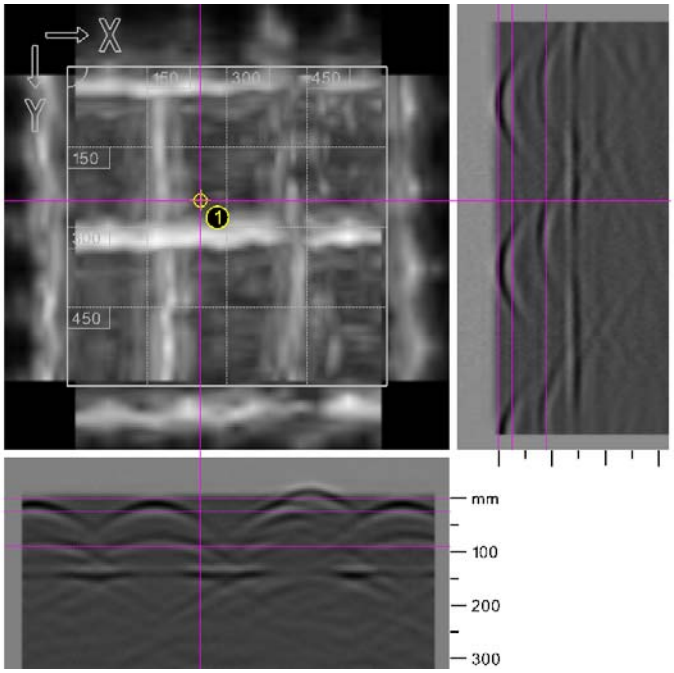
Concrete: 7.0 Method: Advanced

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-Ceiling
User:	-pg		
Comment:	-scan to East side ceiling adjacent to windows. 2no layers of bars at variable spacing. Possible slab depth circa 250mm		

Marker:	x:	y:	z:	Comment:
1. Drillhole	250 mm	250 mm	0 mm	-

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001259
Scan Name:	-
Date / Time:	2017-11-28 14:03:04
Comment:	-



x: 250 mm y: 250 mm z: 25 mm Thickness: 65 mm

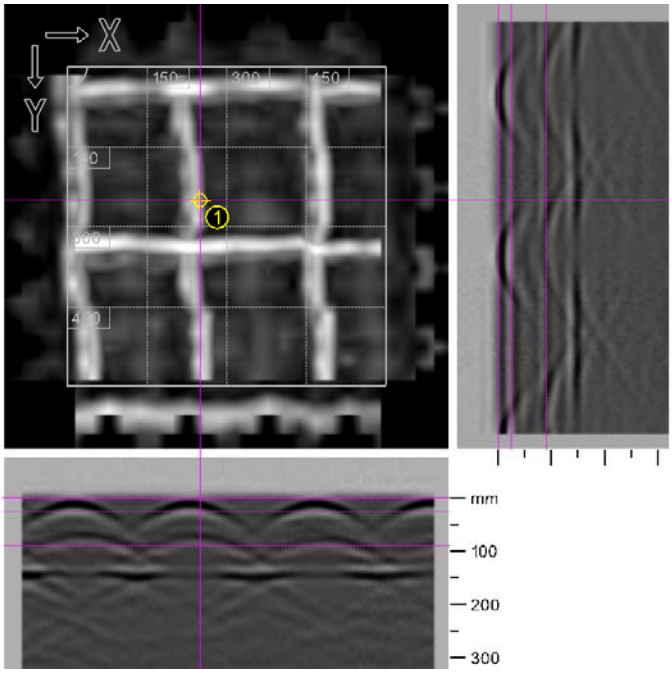
Concrete: 6.5 Method: Advanced

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-Wall
User:	-pg		
Comment:	-scan to party wall suggests 3no layers of reinforcement. 250mm thick walls at ground level.		

Marker:	x:	y:	z:	Comment:
1. Drillhole	250 mm	250 mm	0 mm	-

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001260
Scan Name:	-
Date / Time:	2017-11-28 14:06:14
Comment:	-



x: 250 mm y: 250 mm z: 25 mm Thickness: 65 mm

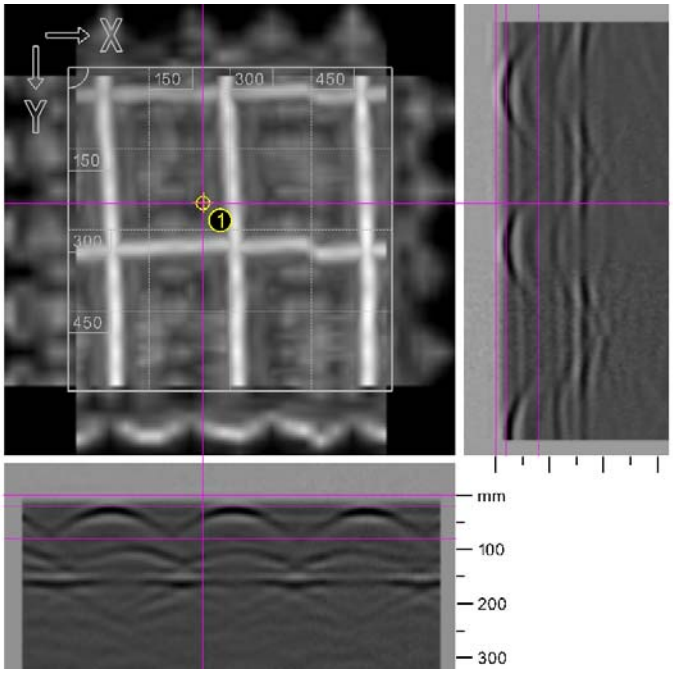
Concrete: 6.5 Method: Advanced

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-Wall
User:	-pg		
Comment:	-scan to party wall suggests 3no layers of bars. Possible wall thickness circa 150mm		

Marker:	x:	y:	z:	Comment:
1. Drillhole	250 mm	250 mm	0 mm	-

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001261
Scan Name:	-
Date / Time:	2017-11-28 14:10:59
Comment:	-



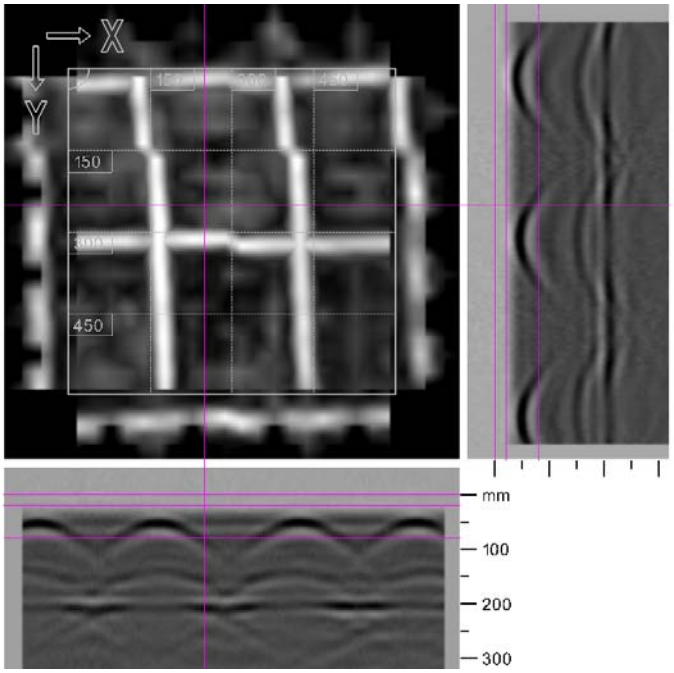
x: 250 mm y: 250 mm z: 20 mm Thickness: 60 mm
Concrete: 6.5 Method: Advanced

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-Wall
User:	-pg		
Comment:	-scan to wall suggests 2no layers of bars, 225mm vertical spacing, 300mm horizontal spacing. Wall possibly circa 150mm thick		

Marker:	x:	y:	z:	Comment:
1. Drillhole	250 mm	250 mm	0 mm	-

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001262
Scan Name:	-
Date / Time:	2017-11-28 14:14:30
Comment:	-

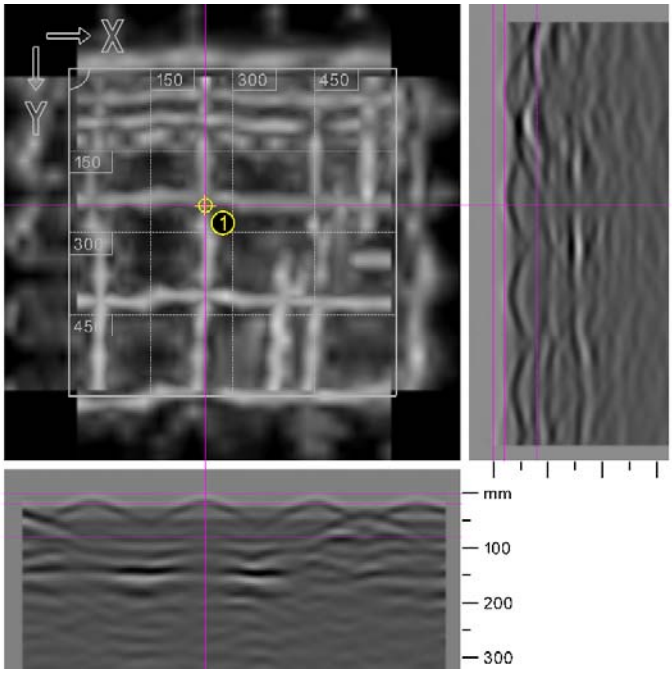


x: 250 mm	y: 250 mm	z: 20 mm	Thickness: 60 mm
Concrete: 4.8		Method: Advanced	

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-Wall
User:	-pg		
Comment:	-scan to party wall suggests 3no layers of reinforcement. Wall thickness circa 200mm		

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001263
Scan Name:	-
Date / Time:	2017-11-28 14:17:41
Comment:	-



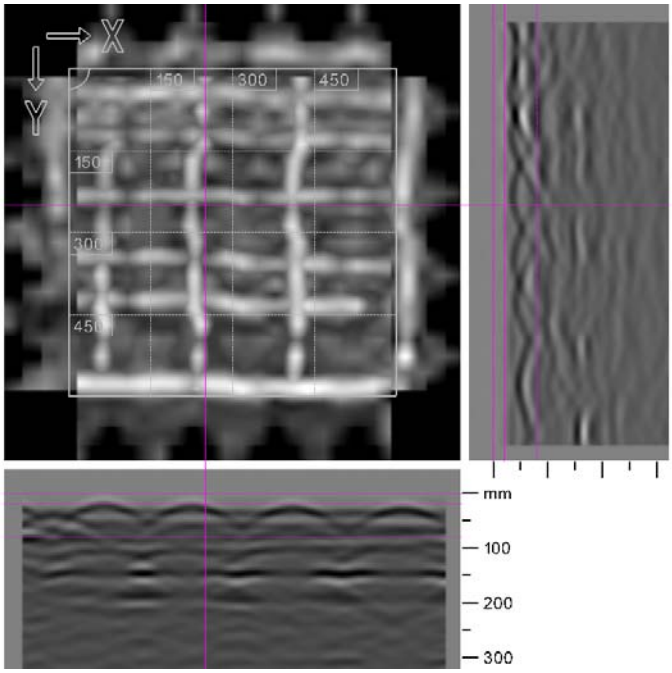
x: 250 mm y: 250 mm z: 20 mm Thickness: 60 mm
Concrete: 6.5 Method: Advanced

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-Ceiling
User:	-pg		
Comment:	-scan to ceiling adjacent to party wall. Possible tie/ starter bar at 400, 600 to 400, 350 suggesting in-situ construction.		

Marker:	x:	y:	z:	Comment:
1. Drillhole	250 mm	250 mm	0 mm	-

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001264
Scan Name:	-
Date / Time:	2017-11-28 14:21:29
Comment:	-

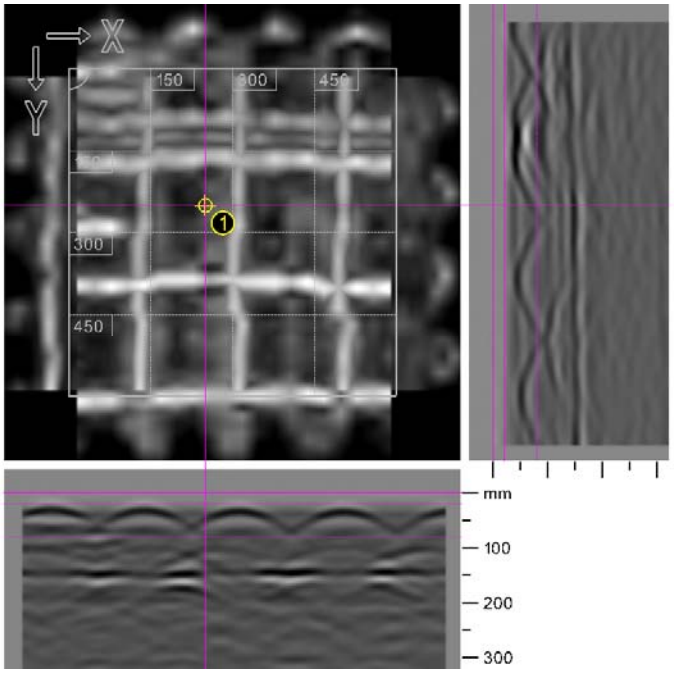


x: 250 mm y: 250 mm z: 20 mm Thickness: 60 mm
Concrete: 6.5 Method: Advanced

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-ceiling
User:	-pg		
Comment:	-scan to ceiling adjacent to party wall. E-W bars horizontal on image. No obvious connection detail evident		

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001265
Scan Name:	-
Date / Time:	2017-11-28 14:24:05
Comment:	-



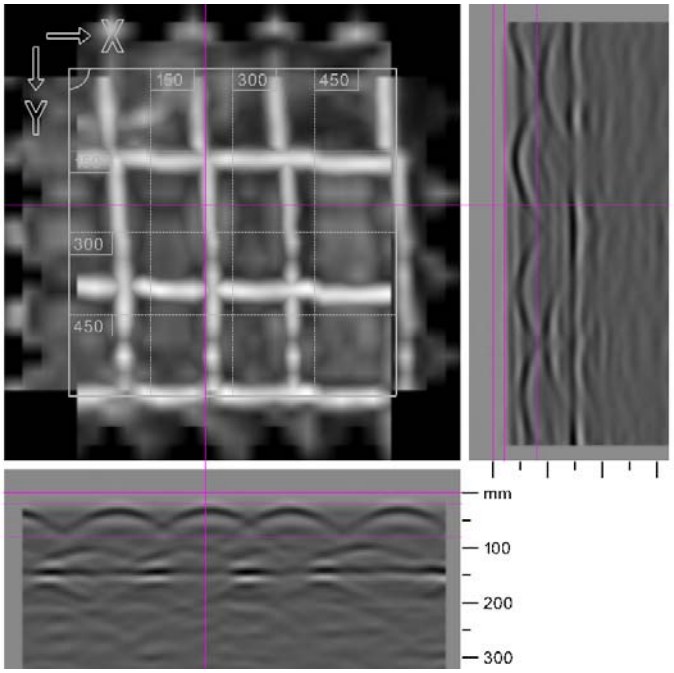
x: 250 mm y: 250 mm z: 20 mm Thickness: 60 mm
Concrete: 6.5 Method: Advanced

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-Ceiling
User:	-pg		
Comment:	-scan to ceiling adjacent to party wall. Analysis suggests 2no layers of bars. Slab thickness > 150mm. no obvious fixing/ tie detail evident.		

Marker:	x:	y:	z:	Comment:
1. Drillhole	250 mm	250 mm	0 mm	-

Hilti PROFIS PS 1000 Report

Scan File:	RS_316140004_001266
Scan Name:	-
Date / Time:	2017-11-28 14:27:40
Comment:	-



x: 250 mm y: 250 mm z: 20 mm Thickness: 60 mm
Concrete: 6.5 Method: Advanced

Project name:	Kelson House	Customer:	-One Housing
Location:	-London	Object:	-Ceiling
User:	-pg		
Comment:	-scan to ceiling adjacent to party wall. E-W bars horizontal on image. 2no layers of bars evident however no obvious tie/ link to wall evident.		

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]
4548/1	Kelson House: Sample 1	5 to 25	Test not required	0.034	0.24
4548/2		25 to 50	Test not required	0.016	0.11
4548/3		50 to 75	Test not required	0.015	0.11
4548/4	Kelson House: Sample 2	5 to 25	Test not required	0.031	0.22
4548/5		25 to 50	Test not required	0.013	0.09
4548/6		50 to 75	Test not required	0.008	0.06
4548/7	Kelson House: Sample 3	5 to 25	Test not required	0.024	0.17
4548/8		25 to 50	Test not required	0.009	0.07
4548/9		50 to 75	Test not required	0.007	0.05
4548/10	Kelson House: Sample 4	5 to 25	Test not required	0.045	0.32
4548/11		25 to 50	Test not required	0.021	0.15
4548/12		50 to 75	Test not required	0.016	0.12

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]
4548/13	Kelson House: Sample 5	5 to 25	Test not required	0.019	0.14
4548/14		25 to 50	Test not required	0.007	0.05
4548/15		50 to 75	Test not required	0.003	0.02
4548/16	Kelson House: Sample 6	5 to 25	Test not required	0.013	0.09
4548/17		25 to 50	Test not required	0.013	0.09
4548/18		50 to 75	Test not required	0.004	0.03
4548/19	Kelson House: Sample 7		Test not required	0.002	0.02
4548/20	Kelson House: Sample 8		Test not required	0.012	0.09
4548/21	Kelson House: Sample 9		Test not required	0.015	0.11
4548/22	Kelson House: Sample 10		Test not required	0.029	0.20
4548/23	Kelson House: Sample 11		Test not required	0.038	0.27
4548/24	Kelson House: Sample 12		Test not required	0.025	0.18

CONSTRUCTIVE EVALUATION LTD

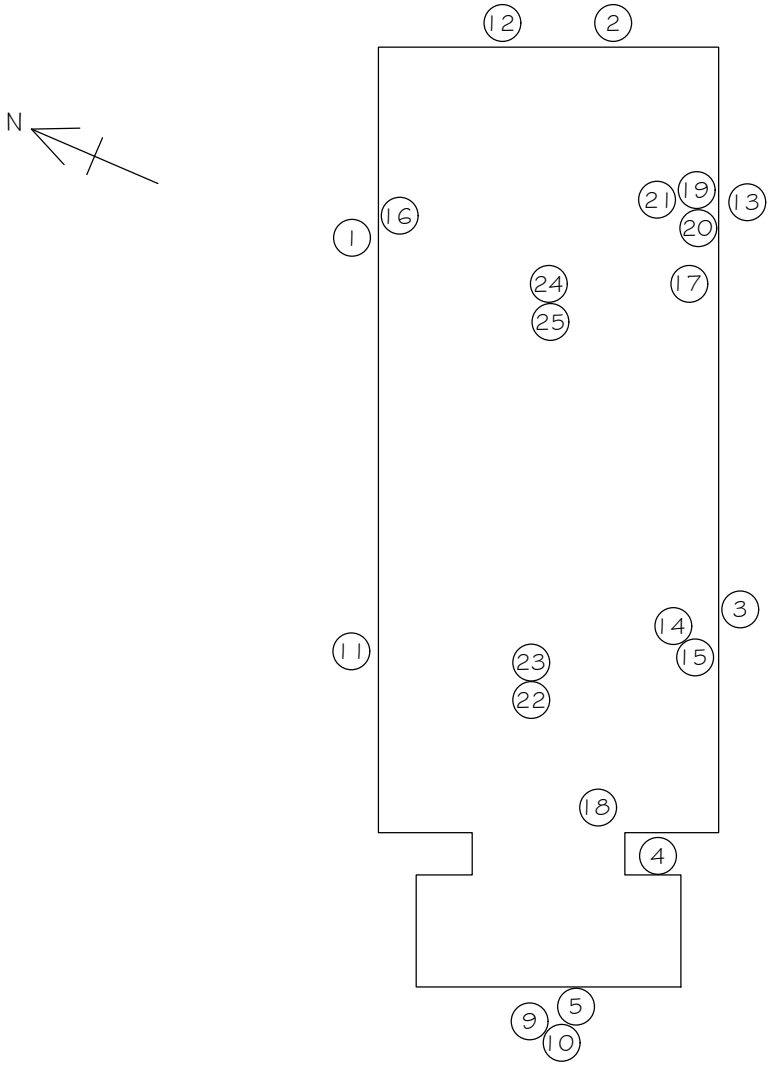
Lab Batch Ref: *HT/17-4548/CE*
Analyst: *O. Sheridan*

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]
4548/25	Kelson House: Sample 13		Test not required	0.032	0.23
4548/26	Kelson House: Sample 14		Test not required	0.007	0.05
4548/27	Kelson House: Sample 15		Test not required	0.009	0.06
4548/28	Kelson House: Sample 16		Test not required	0.010	0.07
4548/29	Kelson House: Sample 17		Test not required	0.005	0.04
4548/30	Kelson House: Sample 18		Test not required	0.009	0.06
4548/31	Kelson House: Sample 19		Test not required	0.010	0.07
4548/32	Kelson House: Sample 20		Test not required	0.009	0.06
4548/33	Kelson House: Sample 21		Test not required	0.014	0.10
4548/34	Kelson House: Sample 22		Test not required	0.014	0.10
4548/35	Kelson House: Sample 23		Test not required	0.004	0.03
4548/36	Kelson House: Sample 24		Test not required	0.010	0.07
4548/37	Kelson House: Sample 25		Test not required	0.017	0.12

10. Appendix - Block Plans



KELSON HOUSE

KELSON HOUSE							
Sample ref.	Floor	element	depth profile	cover depth (mm)	carbonation depth (mm)	chloride ion (by mass) presuming 14% OPC (%)	Comments
1	ground	N side wing wall	5 to 25	44	20	0.24	timber pattern finish- in-situ
			25 to 50			0.11	
			50 to 75			0.11	
2	ground	E end wall	5 to 25	32	5	0.22	timber pattern finish- in-situ
			25 to 50			0.09	
			50 to 75			0.06	
3	ground	S side wing wall	5 to 25	45	20	0.17	timber pattern finish- in-situ
			25 to 50			0.07	
			50 to 75			0.05	
4	ground	stairwell wall	5 to 25	26	5	0.32	painted
			25 to 50			0.15	
			50 to 75			0.12	
5	ground	W end wall	5 to 25	38	5	0.14	painted
			25 to 50			0.05	
			50 to 75			0.02	
6	23	stair soffit	5 to 25	22	10	0.09	none
			25 to 50			0.09	
			50 to 75			0.03	
7	ground	plant room column	bulk	26	10	0.02	none
8	ground	plant rm slab soffit	bulk	20	5	0.09	low level slab, in-situ
9	1st ext.	W end render	bulk	20	15	0.11	stainless reinforced render on concrete
10	1st ext.	E end wall	bulk	50	10	0.20	shiplap pattern- in situ
11	1st ext.	N side panel	bulk	42	5	0.27	exposed aggregate spandrel, pre-cast
12	1st ext.	W end panel	bulk	60	20	0.18	exposed aggregate end wall, in-situ?
13	1st ext.	S side panel	bulk	22	5	0.23	exposed aggregate spandrel, pre-cast
14	10th	slab soffit	bulk	21	2	0.05	no void, presume R.C. slab, in-situ
15	9th	spandrel internal	bulk	25	5	0.06	exposed aggregate spandrel, pre-cast
16	roof	N side parapet	bulk	50	10	0.07	adjacent to crack- presumed thermal cracking
17	roof	S side parapet	bulk	45	15	0.04	between 2no repaired cracks
18	roof	wall by plant room	bulk	35	20	0.06	cross wall
19	3rd	cross wall	bulk	30	10	0.07	cross/ party wall
20	3rd	spandrel internal	bulk	20	2	0.06	exposed aggregate spandrel, pre-cast
21	3rd	floor slab	bulk	15	2	0.10	surface is rough suggesting in-situ
22	roof	slab soffit	bulk	25	15	0.10	black painted surface in poor condition
23	roof	cross wall	bulk	22	10	0.03	blistered paint
24	roof	slab soffit	bulk	30	15	0.07	blistered paint
25	roof	cross wall	bulk	28	10	0.12	blistered paint