



REGENTS GATE, READING

Reading, RG1 2SN

FLOOD RISK ASSESSMENT

Project No	26-243-60
Revision No	03
Issue date	17/04/26

Control Sheet

This report has been prepared by Calibro Consultants Ltd for the sole benefit and use of the Client. Calibro Consultants Ltd offer no liability for the information contained within the report to any third party.

Prepared by	Signature	Date
Patrick Goodey BSc MSc Head of Flood Risk & Hydrology		17/04/2026

Reviewed by	Signature	Date
Kath Fuller BSc MSc MCIWEM C.WEM Associate Flood Risk Consultant		17/04/2026

Approved for issue by	Signature	Date
Patrick Goodey BSc MSc Head of Flood Risk & Hydrology		17/04/2026

CONTENTS

1	INTRODUCTION	3
2	EXISTING SITE AND HYDROLOGY CHARACTERISTICS	4
3	FLOOD RISK	7
4	IMPACT ON LOCAL DRAINAGE	13
5	SUMMARY	14

Tables

Table 4-1	Flood Zone Classification	7
Table 4-2	Flood Risk Vulnerability	12

Figures

Figure 2-1	Site Location	4
Figure 2-2	Topography – 0.5m Contours	5
Figure 2-3	Undercroft Parking (Crown Street on the left of the image)	6
Figure 3-1	RoFSW + 20% Climate Change Extents	8

Appendices

Appendix A	Topographic Survey
Appendix B	Existing Site Layout and Proposals

1 INTRODUCTION

1.1 Background

1.1.1 Calibro has been appointed to undertake a Flood Risk Assessment (FRA) for renovation and conversion of the existing Regents Gate office building for residential use.

1.1.2 The National Planning Policy Framework (NPPF) requires that the planning system takes full account of flood risk. This requires that:

- Within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
- The development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;
- It incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;
- Any residual risk can be safely managed;
- Safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

1.1.3 Footnote 63 of the NPPF states that a site-specific FRA will be required for proposals:

- a) that are greater than 1 hectare in area within Flood Zone 1;
- b) that are located in Flood Zones 2 and 3;
- c) in an area within Flood Zone 1 which has critical drainage problems;
- d) in an area within Flood Zone 1 identified in a Strategic Flood Risk Assessment (SFRA) as being at flood risk now or in the future;
- e) in an area in Flood Zone 1 that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

1.1.4 The site falls within Flood Zone 1 but within areas predicted to be at risk from surface water flooding and therefore, to adopt a precautionary approach, this FRA has been produced.

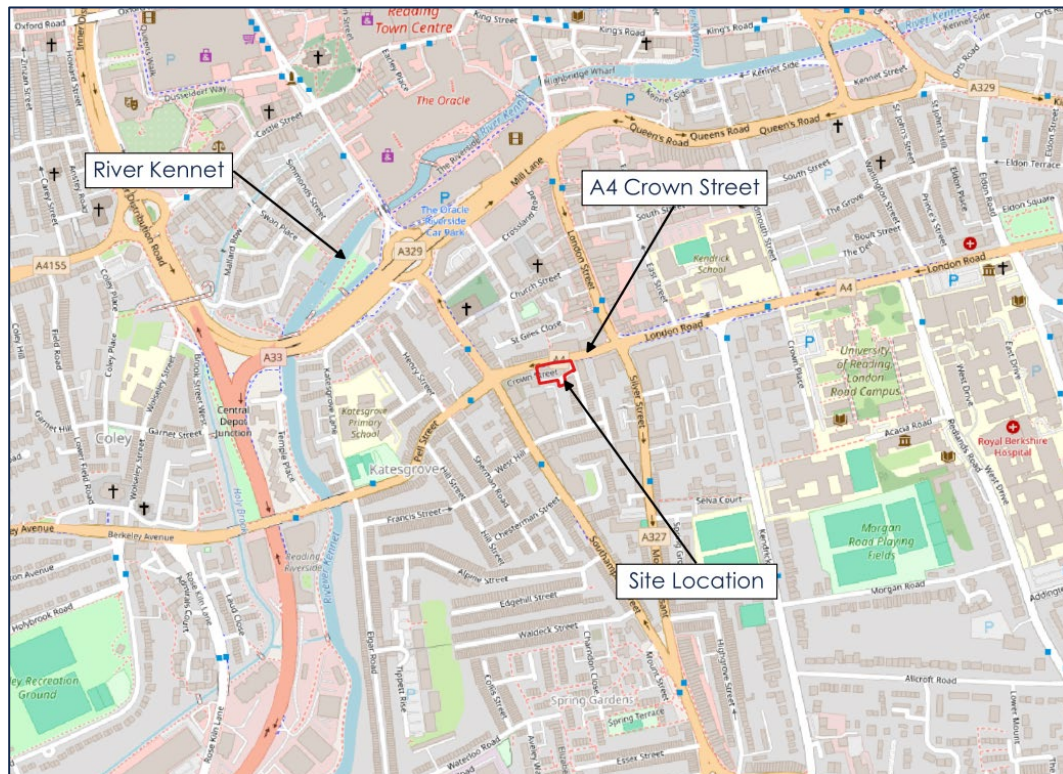
1.1.5 This assessment focusses on the risk from surface water flooding but considers the risks of all types of flooding to the site for the lifetime of the development. It assesses if there would be an impact of flooding to third parties, recommending mitigation if a risk is identified.

2 EXISTING SITE AND HYDROLOGY CHARACTERISTICS

2.1 Site Description

- 2.1.1 The site is located in central Reading on the A4 Crown Street. The approximate coordinates at the centre of the site are 47178, 172840 and the closest postcode is RG1 2PQ. Figure 2-1 shows site location.

Figure 2-1 Site Location



- 2.1.2 The site is currently occupied by the existing Regents Gate building, which comprises a three-storey office building with undercroft parking.

- 2.1.3 The site is located in a dense urban setting.

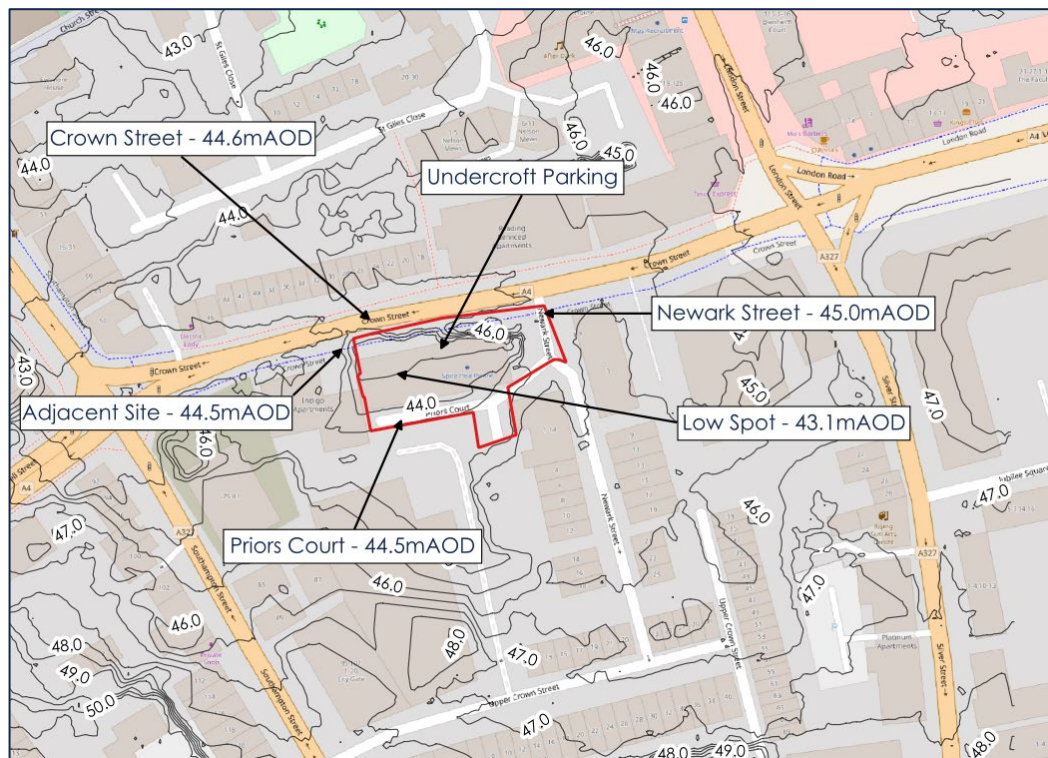
2.2 Hydrology and Topography

- 2.2.1 The River Kennet is located approximately 350m north of the existing building. There are no other known watercourses within the vicinity of the site.

- 2.2.2 The site and surrounding areas are likely to be served by an extensive drainage network, evidenced by the presence of manhole covers in Crown Street and gullies shown on the topographic survey of the site, provided in Appendix A.

- 2.2.3 The topographic survey has been augmented by LiDAR topographic data, shown in Figure 2-2.
- 2.2.4 The site and surroundings are relatively level, with a gentle fall to the west and north (i.e. towards the River Kennet). However, the defining feature of the topography is the undercroft parking which is in a depression compared to surrounding levels. The topographic survey shows the levels of the ground beneath the undercroft to vary but their lowest levels to be approximately 43.3mAOD
- 2.2.5 Levels around the site are 44.6mAOD to the north (Crown Street), 44.5mAOD to the west (adjacent site), 45.0mAOD to the east (Newark Street) and 44.5mAOD to the south (Priors Court).

Figure 2-2 Topography – 0.5m Contours



- 2.2.6 The sunken nature of the undercroft parking is demonstrated in Figure 2-3.

Figure 2-3 Undercroft Parking (Crown Street on the left of the image)



- 2.2.7 As shown in the topographic survey and demonstrated in Figure 2-3, the ground floor level of the building is at approximately 46.54mAOD so is elevated above surrounding areas. Access to the building is either stepped or ramped from Crown Street.

2.3 Geology and Soils

- 2.3.1 Geological data held by the British Geological Survey (BGS) shows that the site and surrounding area is underlain by 'Lambeth Group – Clay, silt and sand' bedrock and 'Taplow Gravel Member – Sand and Gravel' superficial deposits.
- 2.3.2 The BGS Hydrogeology aquifer classification (625k) records the bedrock geology under the site and immediate surrounding areas being a 'Low Productivity Aquifer'.

2.4 Site Proposals

- 2.4.1 The proposals, provided in Appendix B, are for the conversion of the existing three-storey building to provide 29no. Class C3 dwellings.
- 2.4.2 The undercroft would be retained as parking for some residents. The units themselves would be from the ground floor and above. Access to the site would remain as existing.
- 2.4.3 Given the renovation nature of the proposals, there would be no alteration to the footprint of the site, its impermeable area or drainage arrangements.

3 FLOOD RISK

3.1 National Planning Policy Framework (NPPF)

3.1.1 In accordance with the NPPF, this FRA considers the following sources of flooding:

1. Tidal Flooding – from the sea;
2. Fluvial Flooding – from rivers and streams;
3. Surface Water Flooding – from intense rainfall events;
4. Groundwater flooding – from elevated groundwater levels or springs;
5. Flooding from sewers – from existing sewer systems; and
6. Artificial sources – from reservoirs, canals etc.

3.2 Flood Zones

3.2.1 The Flood Zones are based on the assessed probability of the site flooding from rivers and the sea, ignoring the presence of flood defences. The flood zone classifications from the Flood Risk and Coastal Change Planning Practice Guidance (PPG) are presented in Table 4-1 below.

Table 4-1 Flood Zone Classification

Flood Zone	Risk	Fluvial Flooding Chance	Tidal Flooding Chance
1	Low	> 1 in 1,000 year	
2	Medium	Between 1 in 100 and 1 in 1,000 year	Between 1 in 200 and 1 in 1,000 year
3	High	Up to 1 in 100 year	Up to 1 in 200 year
3b	Functional Floodplain	Land where water has to flow or be stored in times of flood. This is defined in the relevant SFRA.	

3.2.2 The 2025 iteration of the Flood Map for Planning defines the site as falling within Flood Zone 1 and is therefore at Low risk of flooding from rivers. It is well beyond tidal limits.

3.3 Surface Water Flooding

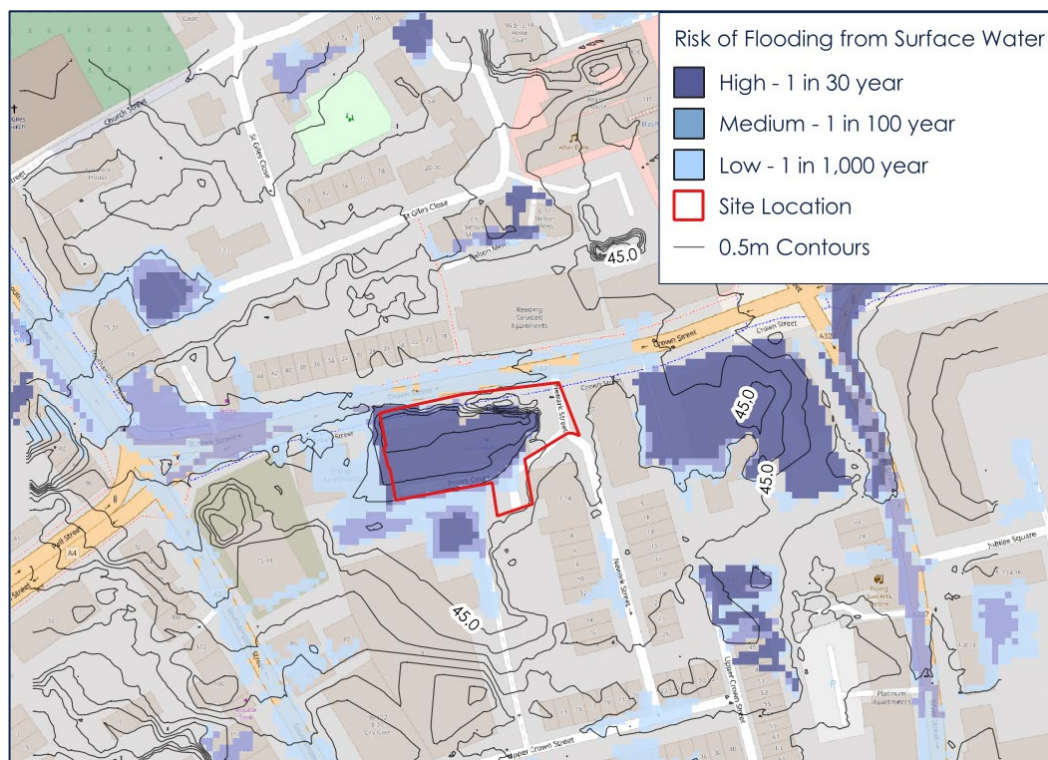
3.3.1 The January 2025 iteration of the Risk of Flooding from Surface Water (RoFSW) dataset indicates areas where surface water is likely to flow and accumulate. The mapping is derived by simulation of rainfall events over a digital terrain model (DTM) and includes an uplift of 20% to account for climate change.

3.3.2 According to the Environment Agency's National Flood Risk Assessment (NaFRA) 2 New National Modelling Methodology Statement, the RoFSW model build does not represent the underground drainage network. However, it accounts for drainage

systems by applying a loss rate (normally 18mm/hr) to the input hyetograph. The model simulation runtime is normally 6 hours more than the storm duration (which is 1, 6 or 18 hours).

- 3.3.3 Urban areas are modelled as being 100% impervious and the ground model uses the Digital Terrain Model from LiDAR data (i.e. Figure 2-2), i.e. essentially ignoring the presence of buildings.
- 3.3.4 The above means that in an urban setting, there are no losses to the ground or drainage systems from the model. Therefore, in areas where there are depressions in the ground, rainfall will accumulate across the model runtime, with no means of escape.
- 3.3.5 Although the rainfall rate is reduced in the three modelled events, the water cannot escape, which is very conservative or representative of a complete blockage of the drainage system.
- 3.3.6 The RoFSW dataset, shown in Figure 3-1, demonstrates that the site is predicted to be at risk during the High, Medium and Low risk events.

Figure 3-1 RoFSW + 20% Climate Change Extents



- 3.3.7 Crown Street is predicted to not be flooded in the design 1 in 100 year plus climate change event. It is predicted to be inundated in the future 1 in 1,000 year event but detailed inspection of the data demonstrates the depth along Crown Street would be shallow, much less than 0.2m. Therefore safe access and egress along Crown Street to the building would be possible even during future extreme flood conditions.

- 3.3.8 The RoFSW data shows that the depth of flooding in the undercroft would be no more than 600mm.
- 3.3.9 Comparison of the RoFSW data with the information in Section 2.2 shows that the predicted flooding is due to the undercroft filling with rainfall in the model, which can't escape due to the impervious ground and lack of drainage, across the model duration.
- 3.3.10 Analysis of the patch of High flood risk to the south of the site is another localised depression where flood depths would be shallow, less than 200mm.
- 3.3.11 The building is elevated above the surrounding areas. In addition, there is a gap between it and Crown Street (as shown in Figure 2-3). This means that the building would remain comfortably above the likely flood depths even in a future extreme event with no chance for water to enter from overland flows. Consequently, occupants would remain safe during flood events.
- 3.3.12 Furthermore, the topographic survey shows that the northern edge of the building is elevated above the northern edge of the adjoining footway and the Crown Street carriageway. This means that flows along Crown Street would be unlikely to flow into the undercroft.
- 3.3.13 Given the drainage in the undercroft, confirmed by the presence of gullies in the topographic survey, the depth of flooding predicted by the RoFSW model is assessed as being overestimated. In addition, the area of flooding predicted in the model is not particularly extensive. This means the volume of water to be drained across the modelled event is also not significant and it would be reasonable to presume the drainage would remove a considerable proportion of this flooding. The RoFSW would therefore represent flooding that would coincide with a complete blockage of the drainage system with a heavy rainfall event, which is very unlikely.
- 3.3.14 The site is therefore at **Very Low** risk from surface water flooding with no specific mitigation required. Site access issues are addressed below.

3.4 Groundwater Flooding

- 3.4.1 The Reading SFRA has limited information regarding groundwater flooding. It does note that areas of the borough that are underlain by chalk can be susceptible to elevate groundwater during prolonged wet weather. This is not the case at the site as the underlying bedrock has limited productivity.
- 3.4.2 The hardstanding nature of the site and surrounds would limit the chance for groundwater emergence. The site is therefore assessed as being at **Very Low** risk of groundwater flooding with no mitigation required.

3.5 Flooding from Sewers

- 3.5.1 The site and surrounding areas are likely to be served by a strategic sewer system, maintained by Thames Water. Applying a precautionary assessment, in the unlikely event of blockage in the network, water would likely behave as predicted by the RoFSW and therefore the building would remain dry and is therefore at **Very Low** risk of sewer flooding with no mitigation required.

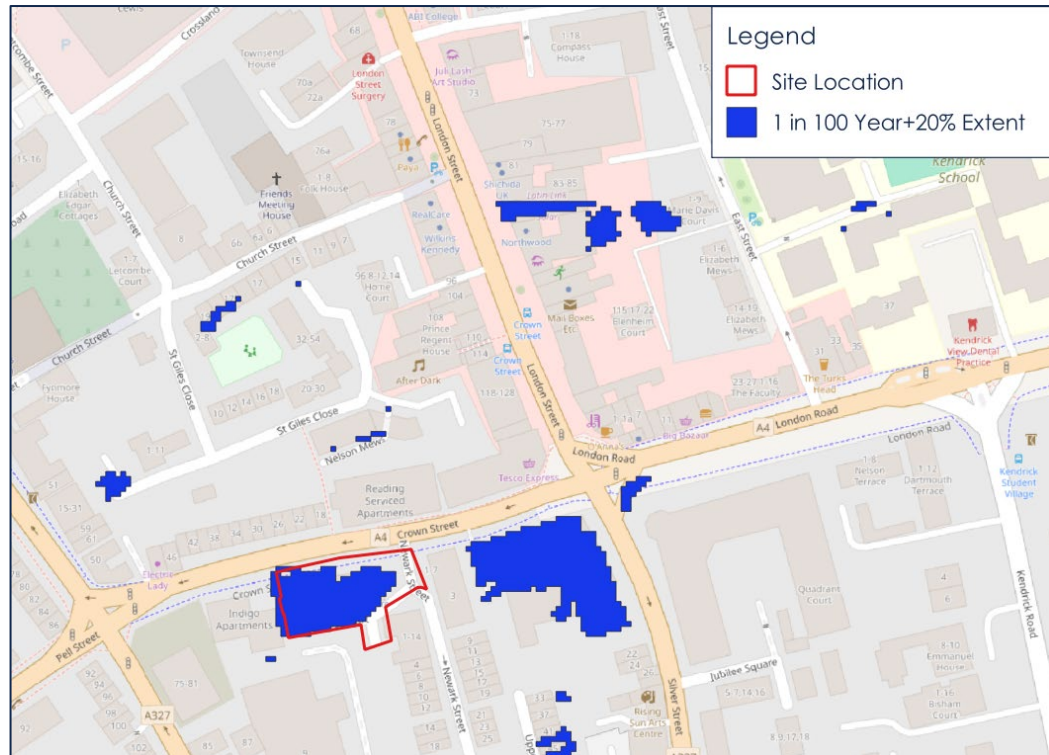
3.6 Flooding from Artificial Sources

- 3.6.1 The Environment Agency 'Reservoir Flood Extents' national dataset shows the site falls outside of areas predicted to flood in the event that of reservoir breach. There are no other artificial water bodies within the vicinity of the site, which is therefore assessed as being at **Negligible** risk of reservoir flooding with no mitigation required.

3.7 Access and Egress

- 3.7.1 There is no flooding predicted on Crown Street in the design 1 in 100 year plus climate change event. This means that safe access and egress would be possible and occupants would have voluntary and free movement during a design (future 1 in 100 year). This is a key consideration of the PPG (paragraph 47).
- 3.7.2 Looking beyond Crown Street, although patches of Medium risk (design flood of 1 in 100 year plus climate change), the roads are not completely inundated. This means access would be possible along these routes, particularly when filtering out the shallower, non-hazardous flooding below 0.2m, as demonstrated in Figure 3-2.

Figure 3-2 RoFSW + 20% Climate Change Extents, 0.2m Depth



3.7.3 It is unlikely that the drainage network serving the undercroft would be sufficient to drain all water during future High, Medium or Low rainfall events. However, flooding of the undercroft would likely be significantly less than the depths predicted by the RoFSW.

3.7.4 It is acknowledged that the undercroft would be used for car parking. Given the above analysis, the depth of flooding in the undercroft would likely be significantly shallower than the RoFSW model predicts. Furthermore, given the gently sloping ground, velocities would be low. As a result, the risk of damage to vehicles would likely be low. To fully quantify this would require detailed survey and/or modelling studies to be conducted, which is disproportionate.

3.8 Development Vulnerability

3.8.1 Table 2 of the Flood Risk and Coastal Change Planning Practice Guidance (PPG) defines which types of development are acceptable in each flood zone and is reproduced in Table 4-2. In accordance with Annex 3 of the NPPF, the proposals are considered to be More Vulnerable. The site is assessed as falling in Flood Zone 1. All forms, including More Vulnerable, of development are appropriate in Flood Zone 1.

Table 4-2 Flood Risk Vulnerability

Flood Zone	Flood Risk Vulnerability				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
1	✓	✓	✓	✓	✓
2	✓	Exception Test Required	✓	✓	✓
3a	Exception Test Required	✗	Exception Test Required	✓	✓
3b	Exception Test Required	✗	✗	✗	✓

- 3.8.2 Furthermore, this assessment demonstrates the risk of flooding posed to the building and its users would be low and consequently the proposals are acceptable, despite the change in vulnerability from offices (Less Vulnerable) to dwellings (More Vulnerable).

4 IMPACT ON LOCAL DRAINAGE

- 4.1.1 The existing site is understood to drain to an existing sewer network, as evidenced in the topographic survey.
- 4.1.2 The proposals would result in no alteration to the impermeable footprint of the site.

It is therefore proposed to retain the same general drainage arrangements for the site with no additional mitigation required.

- 4.1.3 This would result in negligible change to local drainage.

5 SUMMARY

- 5.1.1 It is proposed to convert an existing office building to provide 29no. residential dwellings. There would be negligible change to the impermeable footprint of the site
- 5.1.2 The site is located in Flood Zone 1 and assessed to be at low risk from groundwater, sewers and artificial sources.
- 5.1.3 The site is shown by the RoFSW modelling to be at risk from surface water flooding.
- 5.1.4 However, investigation of the modelled flooding shows it to be occurring due to the RoFSW model not fully representing the underground drainage network. Therefore, water is becoming stuck in the undercroft with no means of draining away.
- 5.1.5 The modelling is therefore not representing the behaviour of rainfall on the site and surroundings, which would drain away and therefore not pond to the depth predicted by the modelling. However, without detailed survey and site-specific modelling (which is disproportionate), it cannot be fully concluded that the drainage system is sufficient to accommodate all of the design rainfall. Therefore, taking a precautionary approach, some flooding of the undercroft is possible, albeit to limited depths and velocities.
- 5.1.6 Such flooding would be shallower than the RoFSW model predicts and likely to be of low velocity, meaning the risk of car damage is low.
- 5.1.7 The building itself is elevated above surrounding ground levels. It is also set back from Crown Street with a void between the two. This means that the chance for water entry into the building interior is negligible.
- 5.1.8 Crown Street, and the highway network beyond, is predicted to be flood-free during the design 1 in 100 year plus climate change event. Consequently, occupiers would have free and voluntary movement during design flood conditions, a key requirement of the PPG.
- 5.1.9 The proposals would result in a no alteration to the impermeable footprint of the site. It is therefore proposed to retain the same general drainage arrangements for the site with negligible impact on local drainage.
- 5.1.10 This FRA shows that the development will be safe for its lifetime, with negligible impact on flooding elsewhere, and it therefore meets the requirements of the NPPF.

APPENDICES

APPENDIX A

Topographic Survey

172855mN

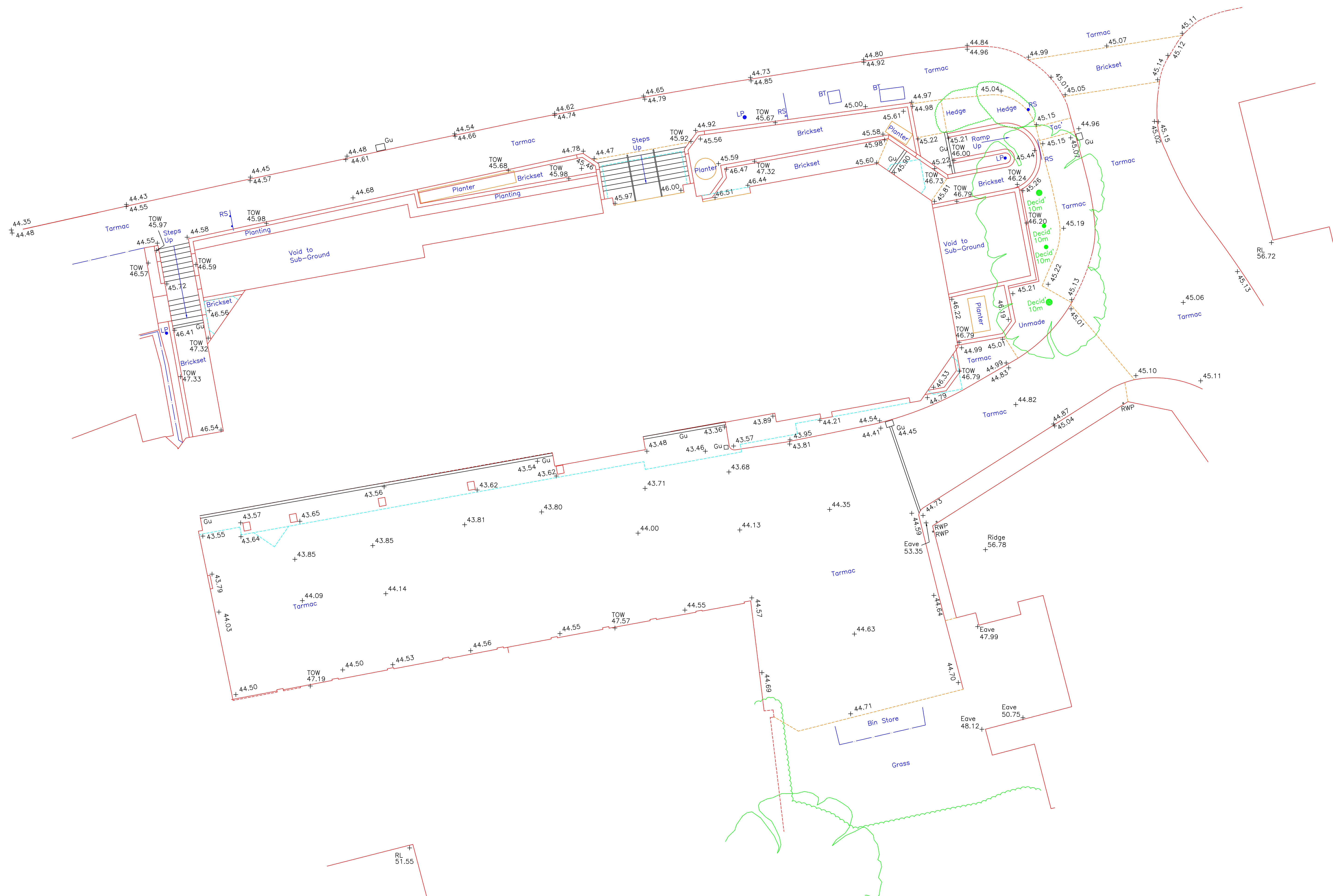
172845mN

172835mN

172825mN

172815mN

172805mN



471735mE

471745mE

471755mE

471765mE

471775mE

471785mE

471795mE

421805mE

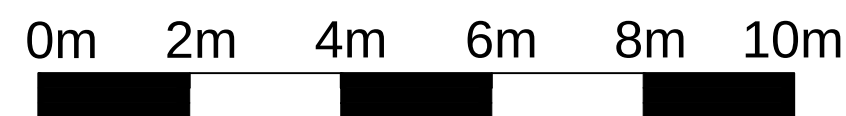
421815mE

471825mE

The Quarry
Lee Farm
Lee Farm

The Granary
Lee Farm

Tel No / Fax: +91 93 1835 62
e-mail: multimedia@satyam.net

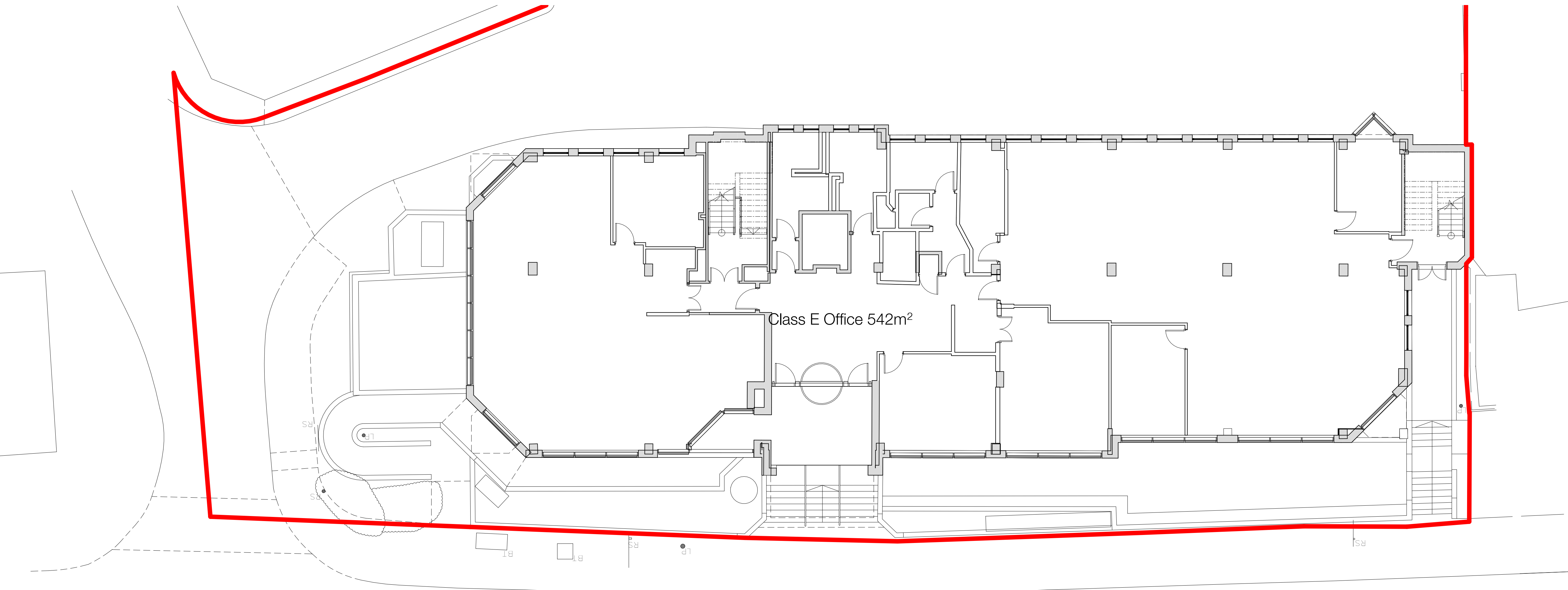


The Company
 Lee Farm
 Lee Lane
 Pinkneys Green
 Maidenhead
 SL6 6PE

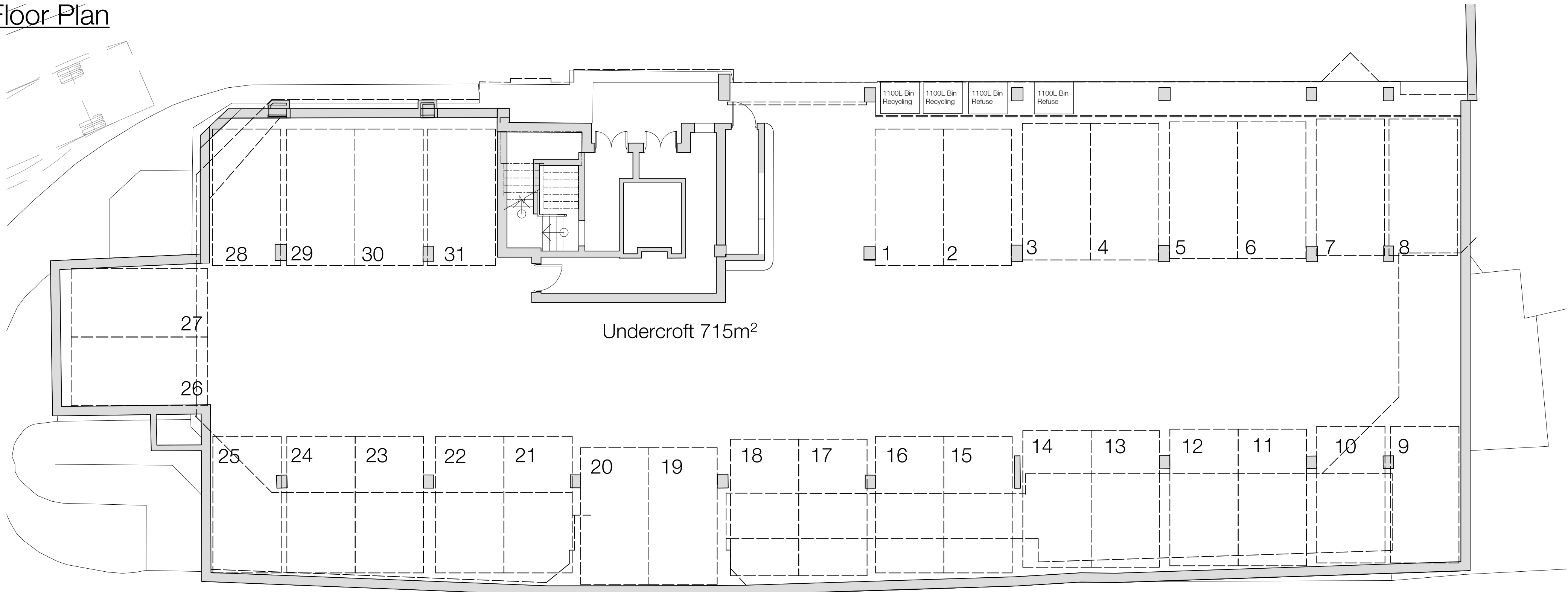
Registered Company No. 5306475
 Tel No (Fax) 44
 e-mail: mail@w

APPENDIX B

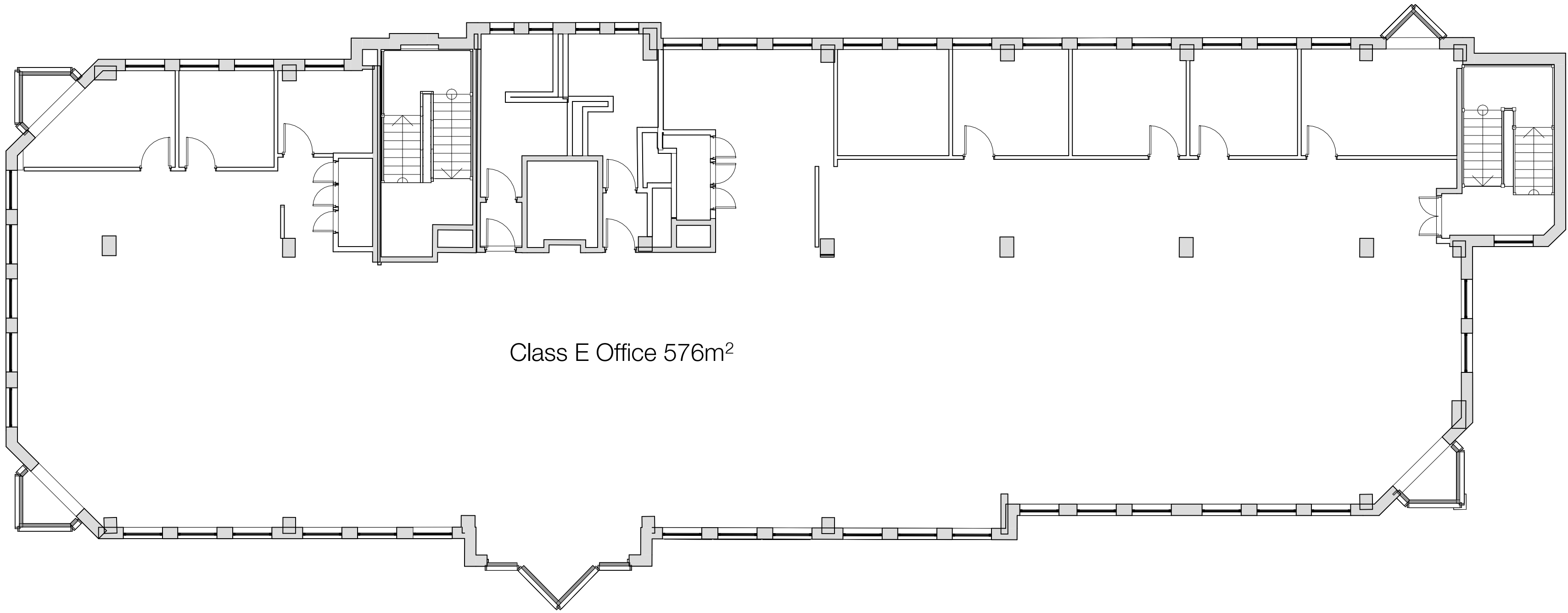
Existing Site Layout and Proposals



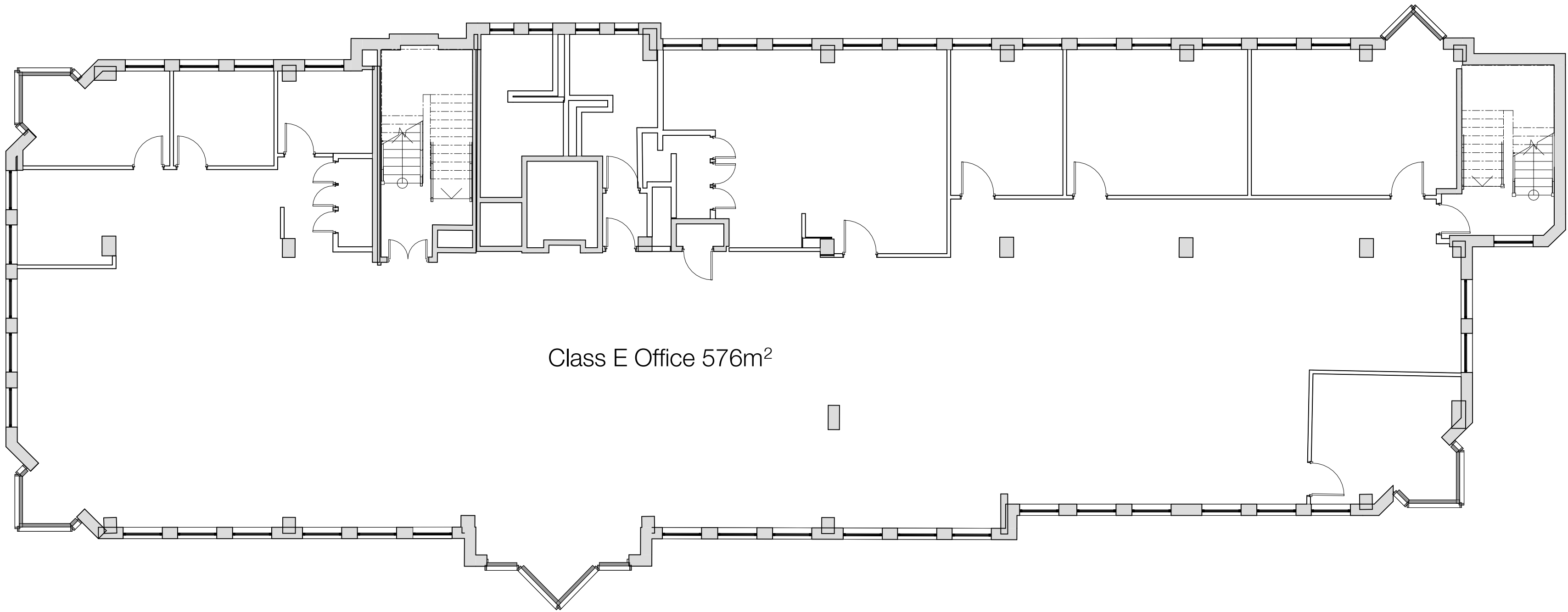
00 Existing Ground Floor Plan
SCALE 1 : 100



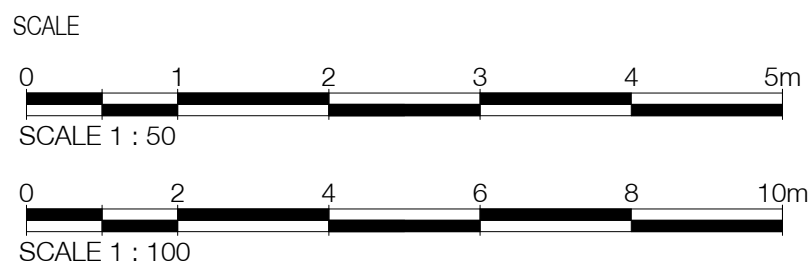
-01 Existing Lower Ground Floor Plan
SCALE 1 : 100



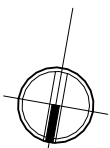
02 Existing Second Floor Plan
SCALE 1 : 100



01 Existing First Floor Plan
SCALE 1 : 100



KEY PLAN



REVISIONS

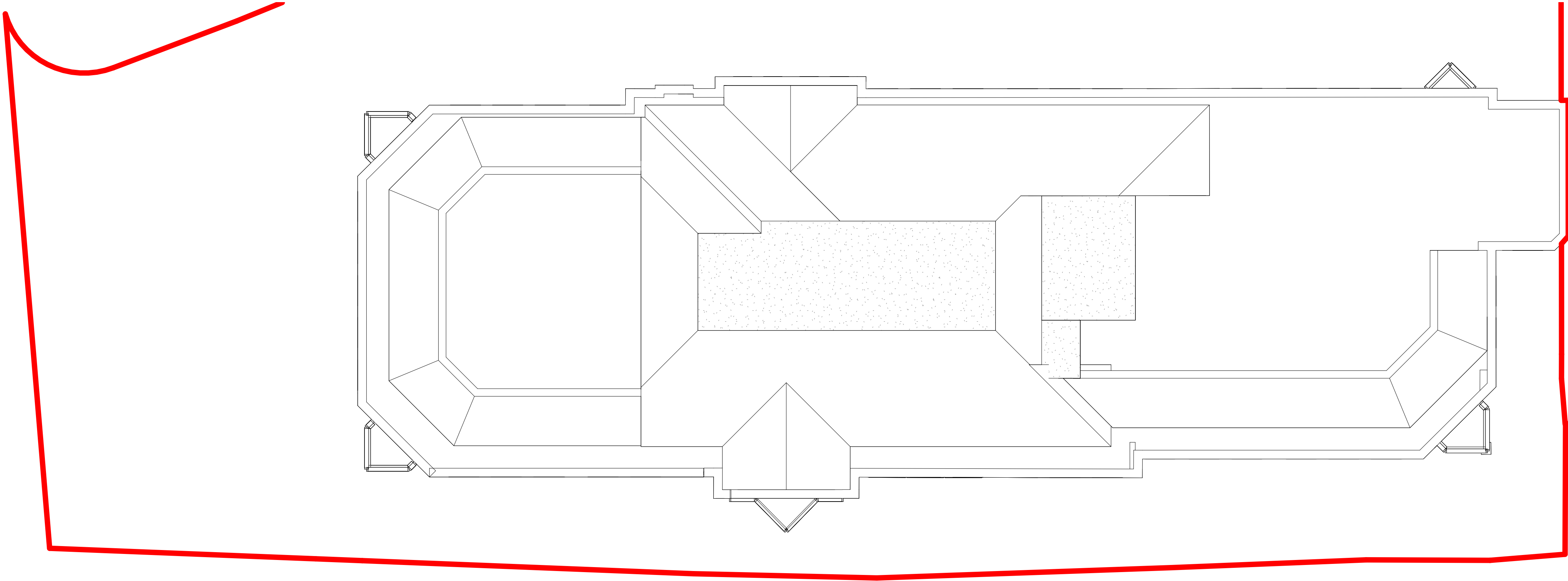
Rev.	Date	Description	By

PROJECT	REGENTS GATE, READING		
TITLE	EXISTING PLANS		
NUMBER	25/31/-03-	DATE	
SCALE	1 : 100	PAPER	A1

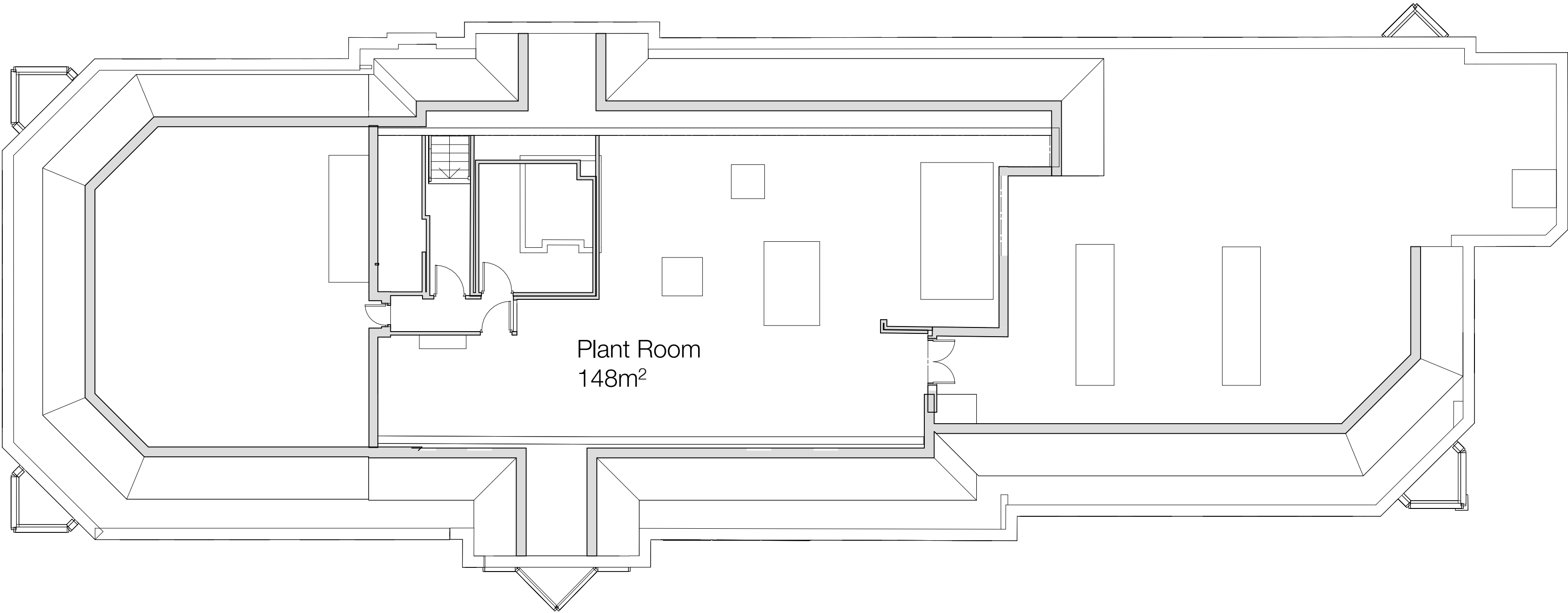
Planning

DANKSBADNELL
Chartered Architects

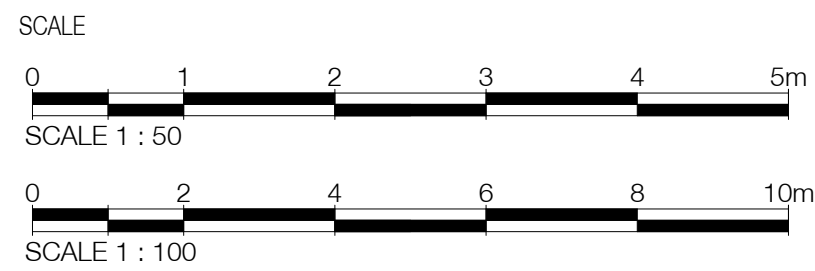
KINGS STABLES, 3-4 OSBORNE MEWS, WINDSOR, BERKSHIRE, S
L4 3DE
01753 859880 - enquiry@danksbadnell.co.uk



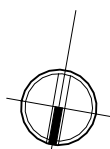
04 Existing Roof Plan
SCALE 1 : 100



03 Existing Plant Room
SCALE 1 : 100



KEY PLAN



REVISIONS

Rev.	Date	Description	By

PROJECT	REGENTS GATE, READING		
TITLE	EXISTING PLANS		
NUMBER	25/31/-04-	DATE	
SCALE	1 : 100	PAPER	A1

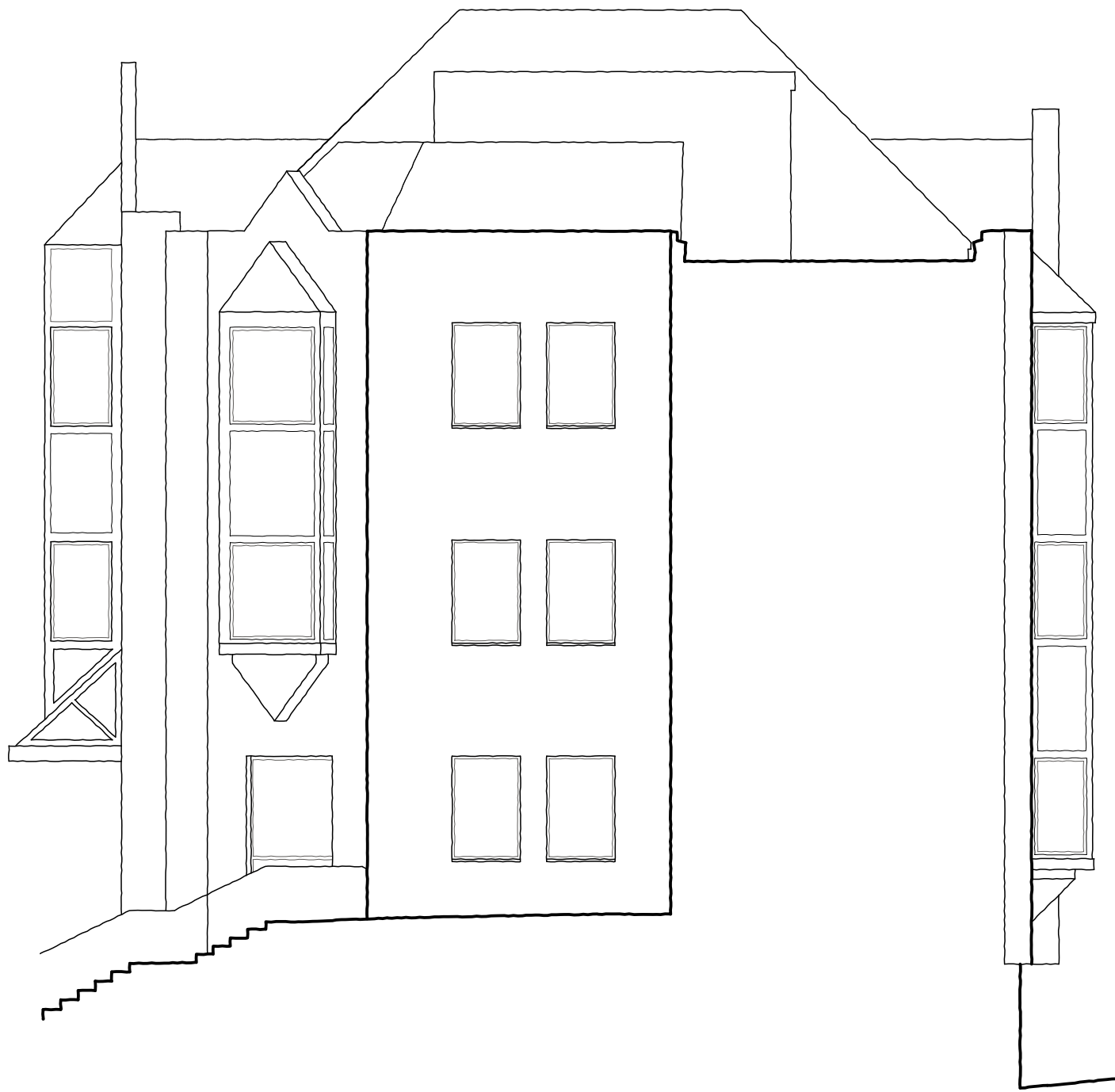
Planning

DANKSBADNELL
Chartered Architects

KINGS STABLES, 3-4 OSBORNE MEWS, WINDSOR, BERKSHIRE, S
L4 3DE
01753 859880 - enquiry@danksbadnell.co.uk



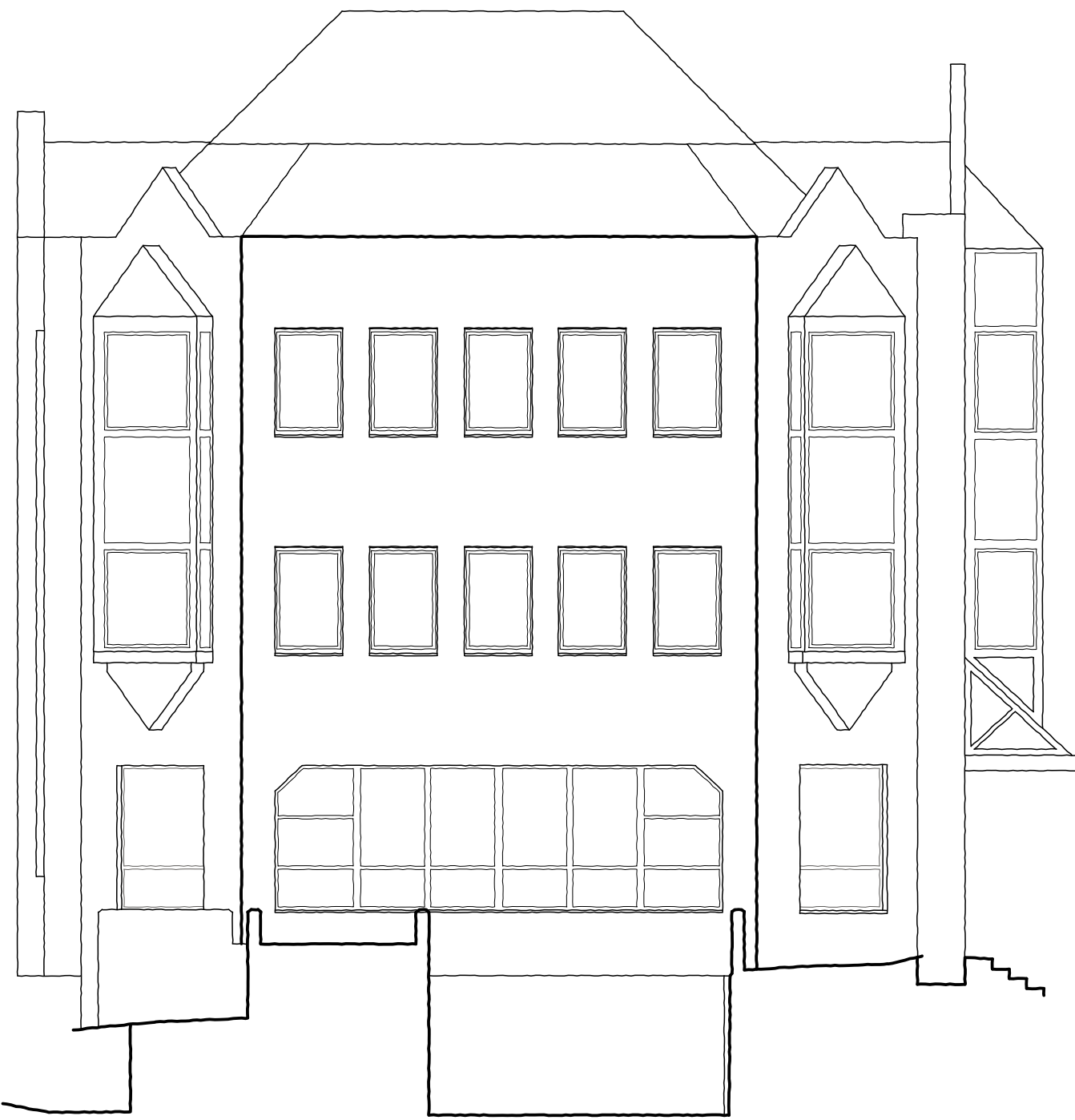
EXISTING FRONT ELEVATION



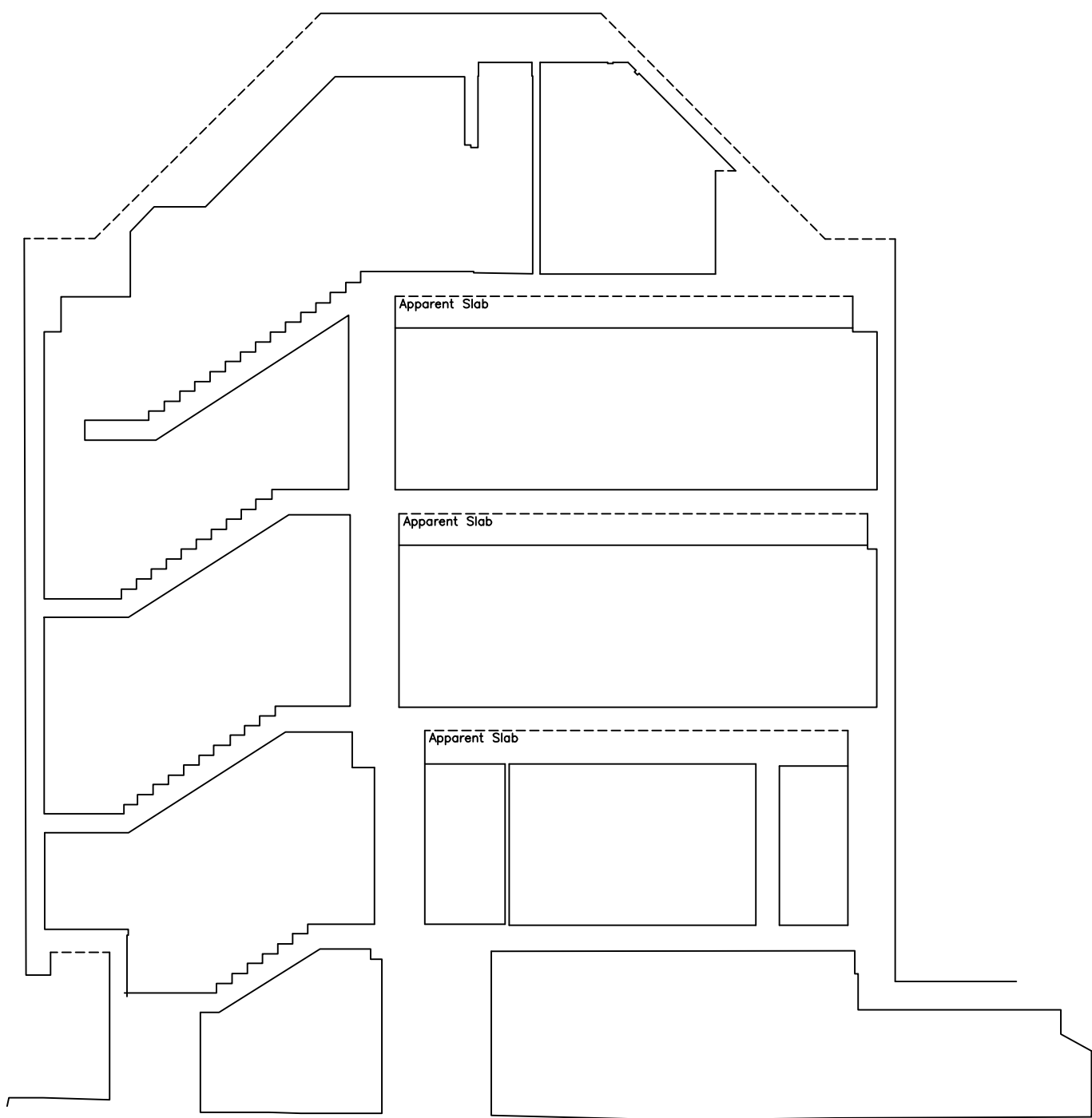
EXISTING SIDE ELEVATION (WEST)



EXISTING REAR ELEVATION

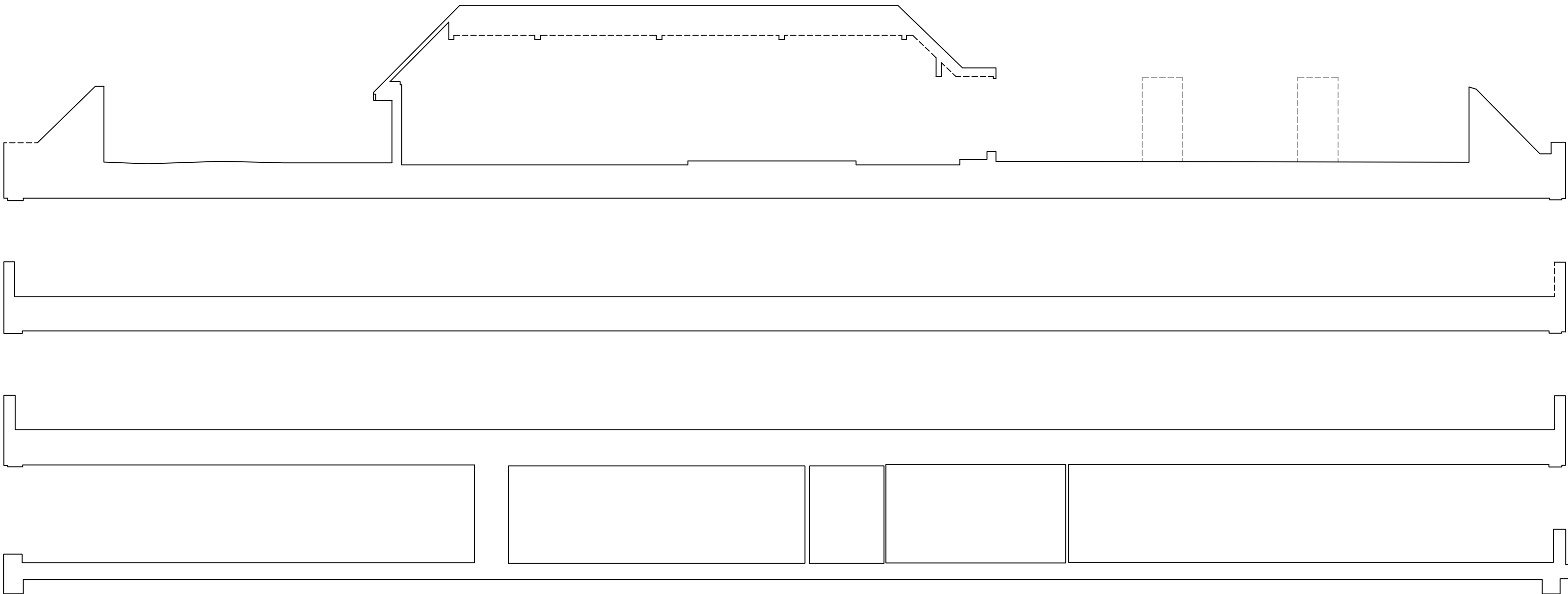


EXISTING SIDE ELEVATION (EAST)



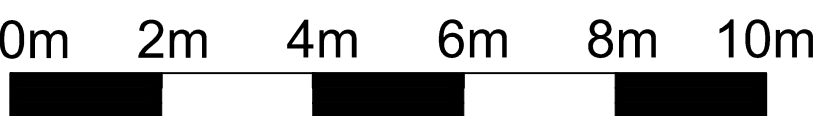
Datum 40.00mts

Section A



Datum 40.00mts

Section B



NOTES:
While every effort has been made to correctly identify locations of items on this site, we cannot be held responsible for any errors or omissions.
Our coordinates are based on Distance Survey using GPS equipment.
This is a preliminary drawing. Details of materials and construction are not shown.

ABBREVIATION KEY - TOPOGRAPHIC SURVEY	
AV	Air Valve
BP	Back Plot
BT	British Telecom
CP	Concrete Paving Slabs
CL	Cover Level
CTV	Cable Television Cover
DL	Double Yellow Line
DW	Dashed White Line
ED	Electric Cable
EP	Electric Pole
EP	Electricity Pole
FA	Fresh Air Inlet
FH	Fire Hydrant
F/B	Down Bed
GV	Gas Valve
LV	Level
LC	Lamp Column
LP	Lamp Post
MB	Multi-Bolt
MS	Service Marker
RM	Running Meter
RS	Road Sign
RWP	Rain Water Pipe
SC	Stop Cock
SV	Single Yellow Line
SV	Stop Valve
TV	Telephone
TVB	Telephone Cable Cabinet
UTL	Unable To Lift
WM	Water Meter
WO	Wash Out

ABBREVIATION KEY - BUILDING SURVEY	
CB	Floor To Ceiling
AB	Floor To Floor Ceiling
DB	Door Head Level
HT	Head Level
FA	Floor Alarm
FL	Floor Level
FS	Floor To Sill
GL	Ground Level
HL	Height
LS	Light Switch
RWP	Rain Water Pipe
SA	Smoke Alarm
SD	Smoke Detector
SH	Sill To Head
SH	Single Socket
SH	Shut
SH	Shut
TV	Telephone/Dial
UA	Under Arch (Centre)
UB	Under Beam
UD	Under Duct
UL	Under Light
WL	Window Head Level
WS	Window Sill Level

Co-ordinate Table		
ID	Easting	Northing

REV.	DATE	BY	REVISION

SURVEY & ENGINEERING SERVICES

CLIENT

Danks Badnell Architects

LOCATION

Regents Gate,
25-41 Crown St,
Reading
RG1 2SN

DRAWING TITLE

Sections

DRAWING NO.

020128

DRAWING DATE

26th Jan '26

DRAWING SCALE

1:100

DRAWING BY

020128/Sec

DRAWING CHECKED

020128/Sec

DRAWING DATE

26th Jan '26

DRAWING SCALE

1:100

DRAWING BY

020128/Sec

DRAWING CHECKED

020128/Sec

DRAWING DATE

26th Jan '26

DRAWING SCALE

1:100

The Company

Land Survey

Reading, UK

0118 925 1234

Registered Engineers and Surveyors

0118 925 1234

0118 925 1234

0118 925 1234



📍 Spectrum, Bond St., | Bristol | BS1 3LG

☎ 0117 2441 970

✉ hello@calibro-consultants.com

🌐 www.calibro-consultants.com

Registered office as above

Registered in England & Wales: 9988524



Transport Planning | Flood Risk & Hydrology | Infrastructure & Drainage

IEMA Transforming the world
to sustainability