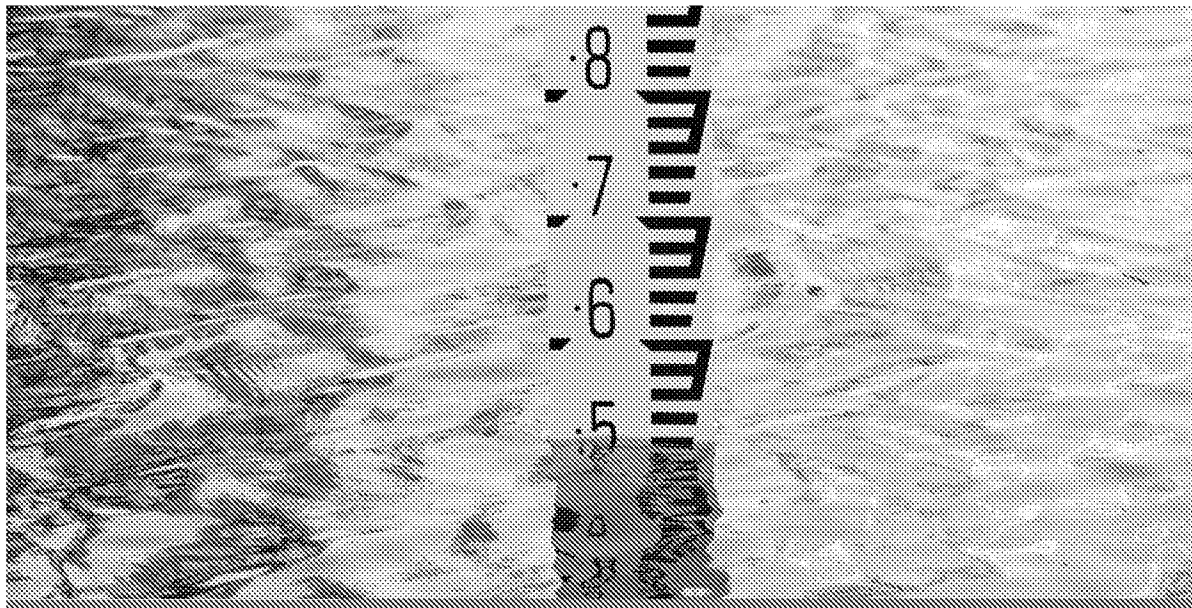




Flood Risk Assessment

72 Ancton Way, Bognor Regis, PO22 6JP

Client

Mr & Mrs Hudlass- Galley

Touchwood

Pagham Road

Lagness

Chichester PO20 1LL

Ref: 6995

Date: September 2017

Consulting Engineers

GTA Civils Ltd

Gloucester House

66a Church Walk

Burgess Hill

West Sussex RH15 9AS

Index

1	Introduction	2
2	Existing Site & Flood Risk Profile	3
3	Proposed Development & Mitigation	5

Schedule of Appendices

A	Site Location Map & Aerial Photos
B	Environment Agency & SFRA Flood Maps
C	Architect's Scheme Drawings

Issue	Issue date	Compiled	Checked
Preliminary Issue	01 September 2017	JP	MR
First Issue	04 September 2017	JP	MR

Report by: John Pakenham BSc (Hons)

Checked by: Grant Kahil BEng (Hons)

Overseen by: Martin Roberts I Eng, ACIWEM, MCIHT

1 Introduction

- 1.1 GTA Civils Ltd. was appointed by its client, Mr & Mrs Hudlass- Galley, to provide a Flood Risk Assessment (FRA) report as required by Arun District Council, in order to achieve Planning Permission for the re-development of 72 Ancton Way, Bognor Regis, PO22 6JP. This FRA has been written to conform with the policies of the 2014 National Planning Policy Framework, its Technical Guidance (TG) and 2015 Planning Practice Guidance.
- 1.2 This report has been prepared for the Client in relation to the proposed development at the above address and no responsibility is accepted to any third party for all or part of this study in connection with this or any other development.

2 Existing Site & Flood Risk Profile

- 2.1 The application site lies to the north of the village of Elmer (at the east end of Bognor Regis), which administered by Arun District Council (ADC). It comprises a private residential dwelling (bungalow) and is accessed from Ancton Way. A site location map and aerial view of the site are shown in Appendix A.
- 2.2 The English Channel lies some 380m to the south. There are 2 unnamed watercourses (drains) to the east and west of the site – the nearer is to the east at approximately 200m away.
- 2.3 Topography: The external levels range between 3.4m AOD and 3.12m AOD. The unit's main FFL is 3.47m AOD but the lowest floor level is 3.22m AOD. The unit's roofed area is 76.5m².
- 2.4 The Environment Agency's (EA) Rivers and Seas Flood Map (the first map in Appendix B) shows that the majority of the site, ie the barn itself, lies in Flood Zone 1 (FZ1), with a small area in Flood Zone 3 (FZ3) at the NE corner. Coastal sites in FZ3 are susceptible to greater than a 0.5% chance of tidal flooding each year (more than once in 200 years on average).
- 2.5 The site benefits from coastal defences at Elmer. These are in generally 'fair' condition and protect nominally up to the 1 in 100 years storm. The '2015 TUFLOW Modelled Flood Extents' flood map in Appendix B shows that although the defences will overtop in the '2115 defended tidal 0.5% AEP' event, the resultant flood pattern stops short of the site.
- 2.6 Residual risk: in the unlikely event that the defences were to be breached (ie catastrophic failure) over a very large area, the site may be liable to flood. The EA's modelled flood levels table (in Appendix B) shows that the site is liable to flood - in the *undefended scenario* only. As this scenario takes no account of sea defences it is unrealistic, compared to breach modelling, which assumes some failure not complete disintegration of the defence structure.
- 2.7 The Strategic Flood Risk Assessment commissioned by ADC includes 2 breach model flood maps – see Maps A1T and B in Appendix B. The site is clear of the breach (residual) risk on both of these maps but falls within the 'Coastal Risk Area' shown on A1-T. The SFRA explains that ADC engineers can provide advice on how to mitigate the risk in this zone. No Drainage Engineer at ADC was available to discuss this site at this time, however. 'Appropriate mitigation' will be outlined in the next section.

- 2.8 Surface water flooding occurs when excess rainwater does not infiltrate into the ground, or is not intercepted. The EA's Online 'Surface Water Depth - Medium Risk Scenario' (1 in 100 years) Flood Map (see Appendix B) shows the site being unaffected in this scenario.
- 2.9 In the EA's 'Surface Water Depth - Low Risk Scenario' (1 in 1000 years) and 'Surface Water Velocity - Low Risk Scenario' (1 in 1000 years) Flood Maps (in Appendix B) there is a shallow and slow band of flooding affecting the south edge outside the unit. The area to the north of the unit originates within the site and so will be dealt with by introducing SuDS measures.

Other sources of flooding

- 2.10 Sewer flooding occurs due to limited capacity or blockage in the sewer system causing backing up of storm water and effluent. There is no indication in SBC's Strategic Flood Risk Assessment (SFRA) – or from the EA – that this site is prone to flooding from sewer failure.
- 2.11 Groundwater flooding occurs when water levels in the ground rise above surface elevations. Groundwater flooding is the least understood of all the sources of flooding and more research is needed. Low lying areas of permeable strata overlying an impermeable stratum are typical places where this can occur. As the development proposals do not extend below ground level it is contended that this risk is low.
- 2.12 Artificial sources: flooding from reservoirs, canals and docks. The EA reservoir flooding map in Appendix B shows the site is removed from this source of flooding. There are no docks or canals in this vicinity.
- 2.13 The SFRA's historical flood events map (Map H in Appendix B) shows that the wider area has suffered numerous incidents of Sewer Failure flooding, but there is no indication that this site or the neighbouring streets adjacent to Ancton Way have suffered similarly. It is more likely than not that sewerage networks that are identified as being problematic will be improved over the medium to long term.
- 2.14 In summary, the flood risk profile of this site is Low, with the exception that it falls within ADC's 'coastal risk area'.

3 Proposed Development & Mitigation

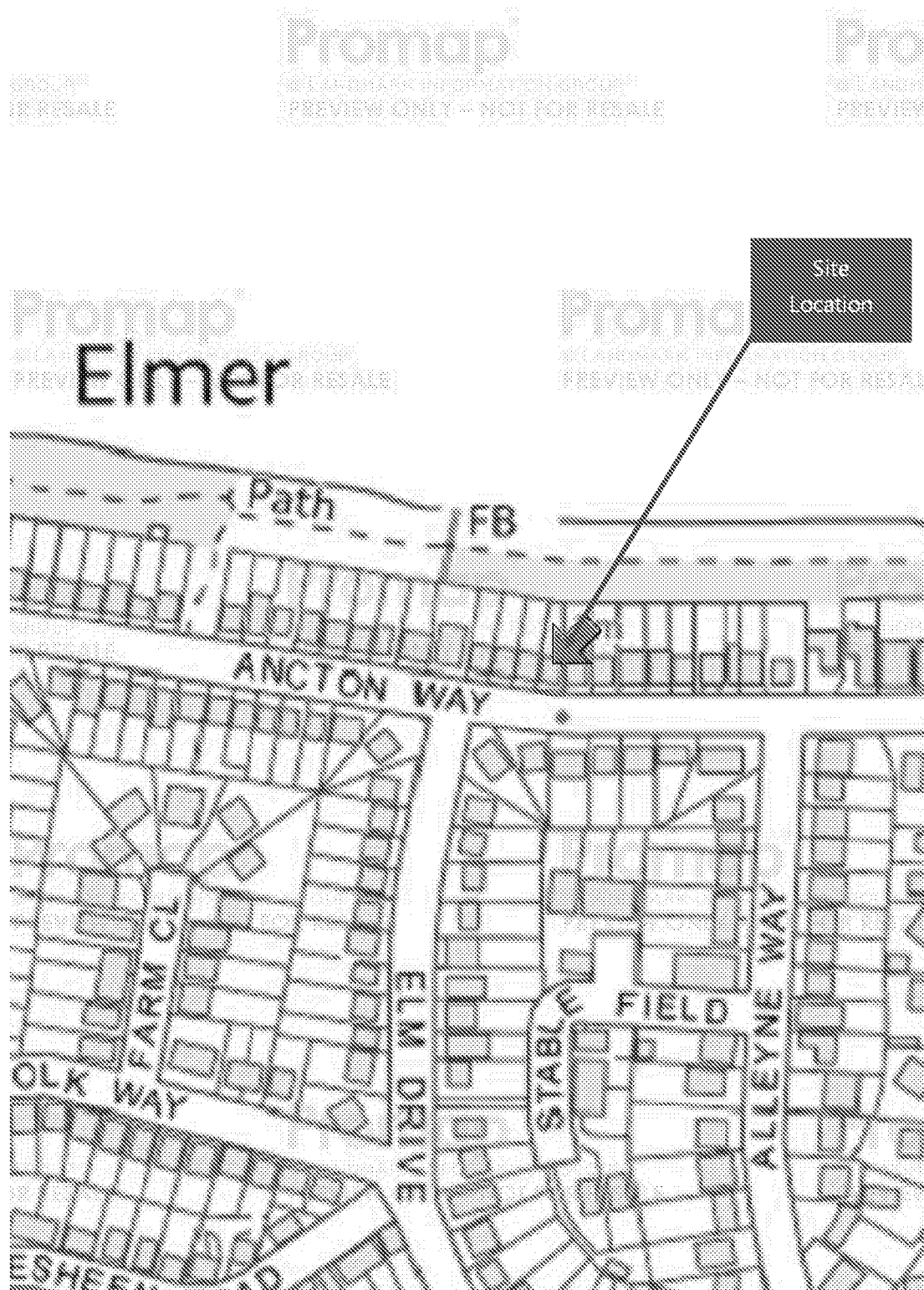
- 3.1 The proposed development is for demolition of the existing dwelling unit and building a replacement 2 storey dwelling unit.
- 3.2 The replacement building's footprint (roofed) area will be 102.7m².
- 3.3 The lowest (ground floor) floor level (FFL) will be set +0.6m above the ambient level of 3.19m ie at **3.79m AOD**.
- 3.4 Mitigation: because of the site lying within ADC's 'coastal risk area' it is proposed to install 0.7m high demountable flood barriers in front of each doorway. This will provide protection to 4.49m AOD, which is higher than the *undefended* 2070 flood level of 4.38m AOD. All airbricks shall be similarly flood-proofed.
- 3.5 Non-return valves will be installed in both the surface and foul drainage networks. Any flood water in the sewerage networks will not be able to flow up into the site once these are installed.
- 3.6 Sequential / Exception Tests: any replacement dwelling will not have to pass the Sequential Test. The site is outside the breach flood pattern in any case.
- 3.7 Safe access to dry land: the occupants of the new unit will be able to reside safely at first floor during a flood incident. The site is defended and, as the threat is tidal, any period of having to reside at high level will be limited to only a few hours at the very most, ie the peak of any such breach flood incident.
- 3.8 It is recommended that all occupants register with the free flood warning service provided by the Environment Agency (called 'Floodline'), in order to raise and then maintain the awareness of the flood risk issues on this site. This area is covered by the EA's free service.
- 3.9 Surface water drainage: the development's surface water will be routed into the sea, as per the existing site's surface water. This is 100% sustainable.
- 3.10 Foul drainage: there is no increase in flow rate into the sewer as this is a replacement dwelling. The existing lateral connection will be used.

- 3.11 Conclusion: this proposal will not affect the flood risk of neighbouring properties; with the mitigation measures outlined in this report the flood risk within the site will have been mitigated fully with the result that this will be safe: this development complies with the NPPF/PPG.

- End of Report -

Appendix A

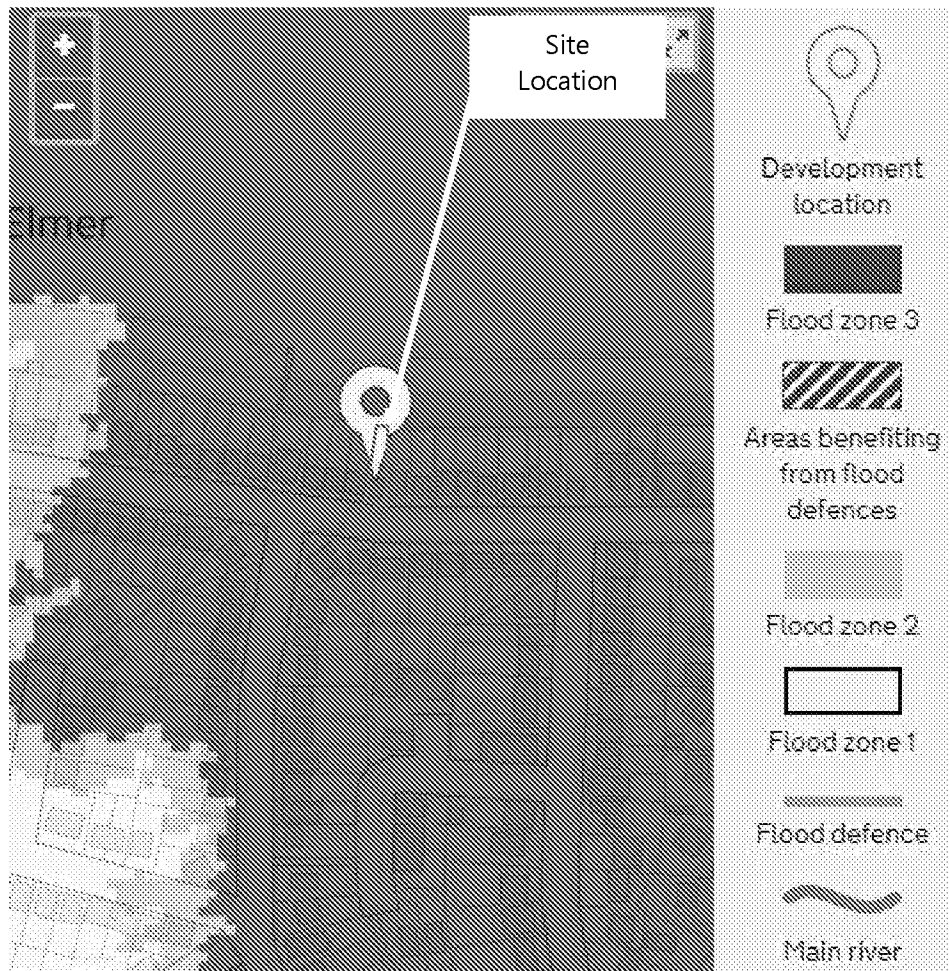
Site Location Map & Aerial Photo





Appendix B

Environment Agency & SFRA Flood Maps



EA's Online Flood Map for Planning (Rivers and Seas)

The site is in 'undefended', fluvial Flood Zone 3 (FZ3)



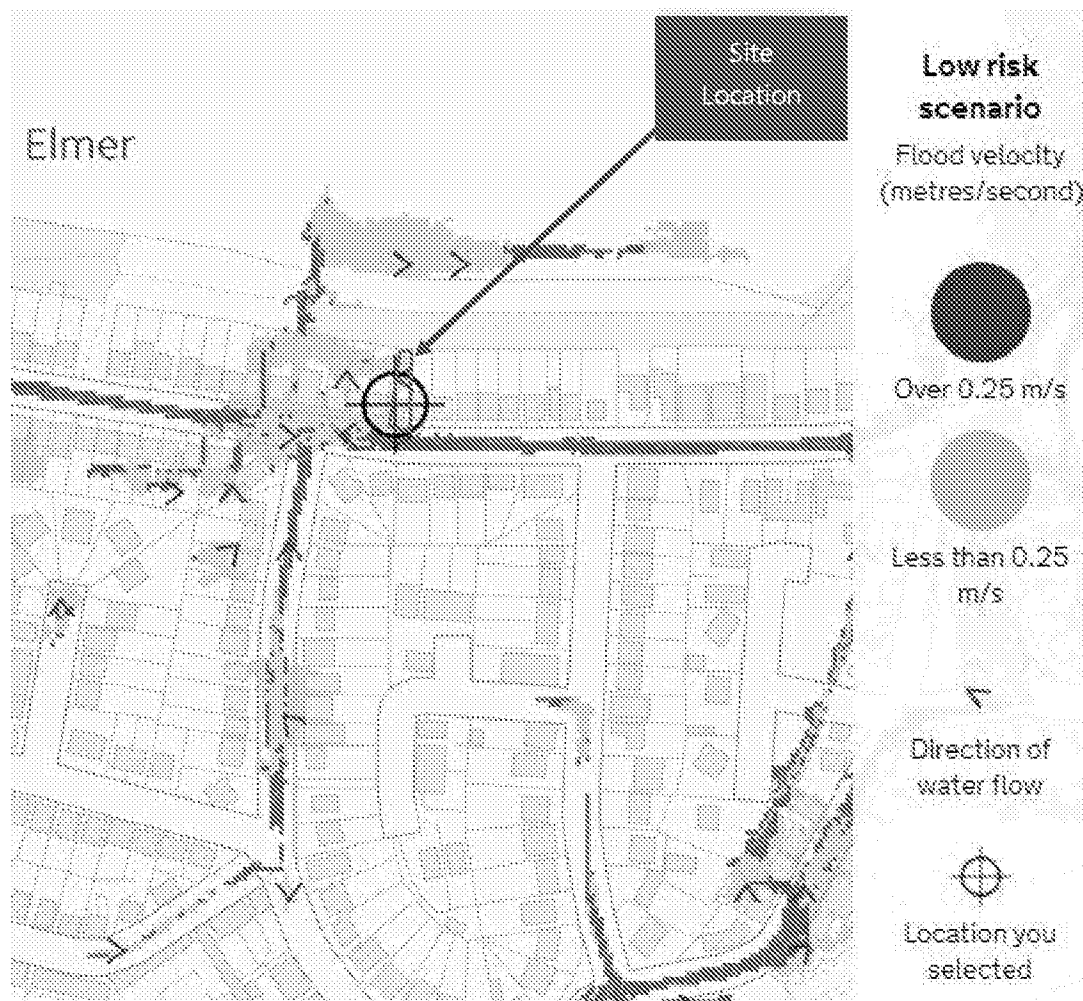
EA's Online Surface Water Flood Depth Map in the 'Medium Risk Scenario'
(1 in 100 years storm event)

The site is removed from flooding in this scenario



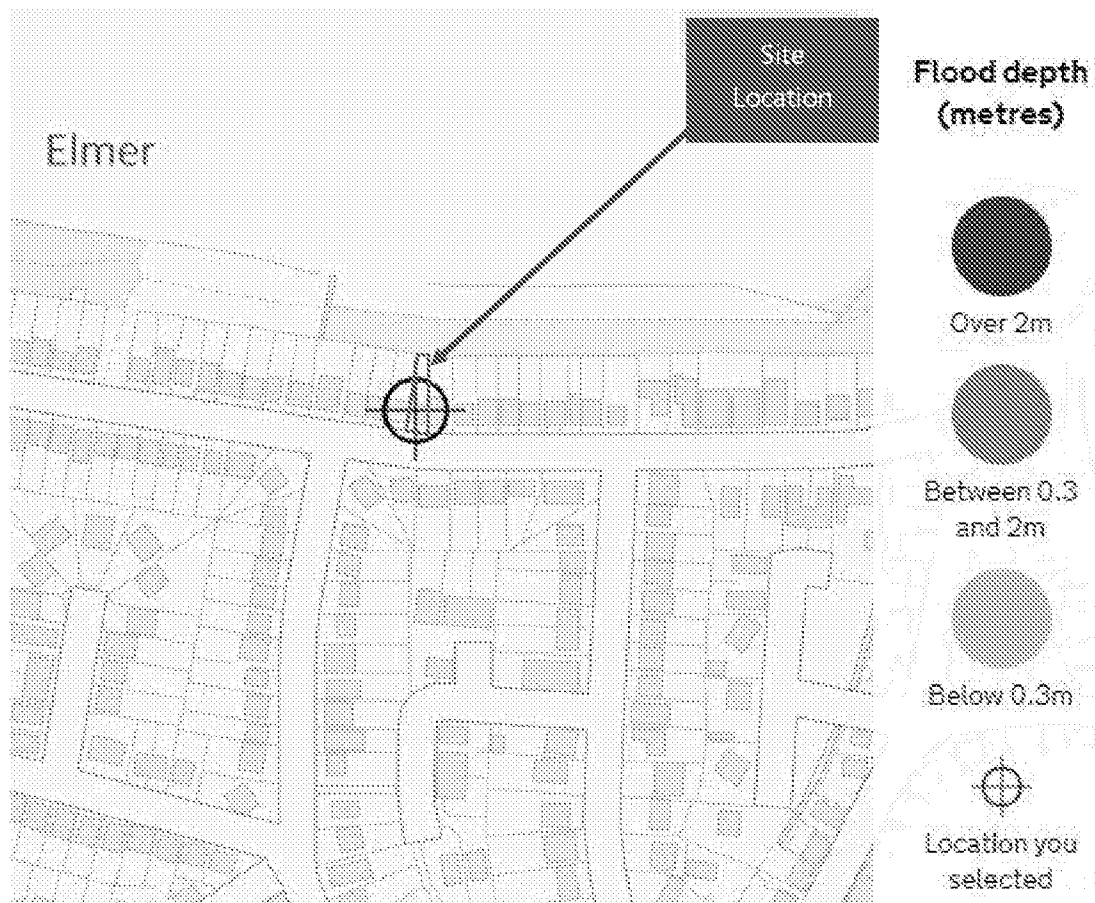
EA's Online Surface Water Flood Depth Map in the 'Low Risk Scenario'
(1 in 1000 years storm event)

The site is liable to flood in this extreme scenario: the overland flow route along the north of the site originates within the site and the flow along the south boundary is shallow and limited to external areas only



EA's Online Surface Water Flood Velocity Map in the 'Low Risk Scenario'
(1 in 1000 years storm event)

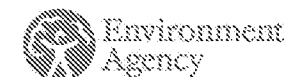
The velocity of the flow along the south boundary is low; this confirms that the water in the north of the site originates within this site (and so will be dealt with in the SuDS design)



EA's Online Flood Risk from Reservoirs – Flood Depth - Map

The site is removed from this source of flooding

Flood Map for Planning (Rivers and Sea). Centred PO22 6JP. Created 28/07/2017.



Scale 1: 10,000



Flood Map for Planning (Rivers & Sea)

- Sealed Main Rivers
- Defences
- Flood Storage Areas
- Areas benefiting from flood defences
- Flood Zone 3
- Flood Zone 2

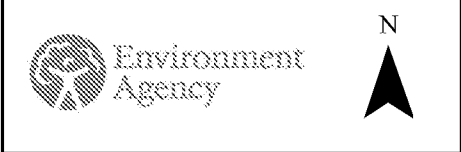
Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

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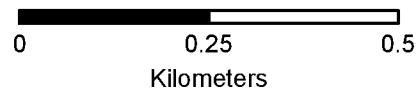


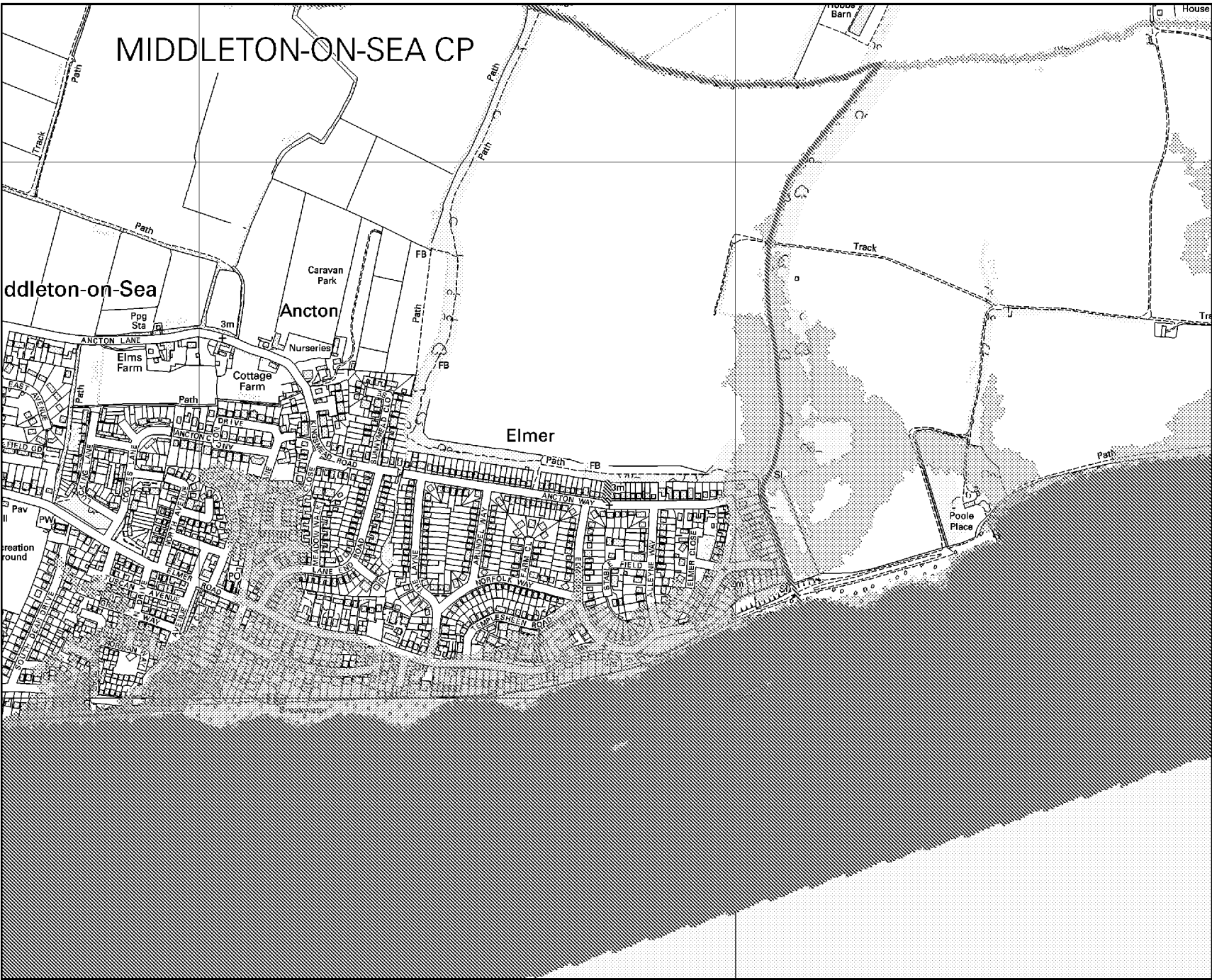
Legend

- Site Boundary
- Main River
- 5% AEP (Un defended Tidal)
- 0.5% AEP (Un defended Tidal)
- 0.5% AEP (2070) NPPF (Un defended Tidal)
- 0.5% AEP (2115) NPPF (Un defended Tidal)
- 0.1% AEP (Un defended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



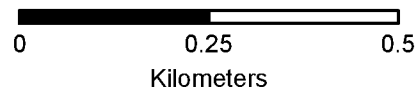


Legend

- Site Boundary
- Main River
- 5% AEP (Defended Tidal)
- 0.5% AEP (Defended Tidal)
- 0.5% AEP (2070) NPPF (Defended Tidal)
- 0.5% AEP (2115) NPPF (Defended Tidal)
- 0.1% AEP (Defended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



Product 4 Flood Risk Data Requested by: John Pakenham

Site: 72 Ancton Way, Bognor Regis, PO22 6JP.

Table 1: Water Levels: Tidal Undefended

Node Reference	NGR		Modelled Flood Levels in Metres				
	Easting	Northings	Undefended Annual Exceedance Probability				
			5%	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	498761	100401	3.55	3.86	4.38	4.97	4.07
2	498760	100384	3.55	3.86	4.38	4.97	4.07
3	498759	100368	3.55	3.86	4.38	4.97	4.08

Table 2: Water Depth: Tidal Undefended

Node Reference	NGR		Modelled Flood Depth in Metres				
	Easting	Northings	Undefended Annual Exceedance Probability				
			5%	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	498761	100401	0.28	0.58	1.10	1.69	0.80
2	498760	100384	0.28	0.59	1.11	1.70	0.80
3	498759	100368	0.35	0.66	1.18	1.77	0.87

All levels taken from: River Arun to East Head 2016 model, completed by JBA Consulting.

There is no additional information or health warnings for these levels/depths or the model from which they have been produced.

Produced on 28/07/2017



Environment
Agency

N



Legend

- Site Nodes
- Site Boundary
- Main River

Scale: 1:1,000

00.0250.05

Kilometers



Flood Defence Locations. Centred PO22 6JP. Created 28/07/2017.

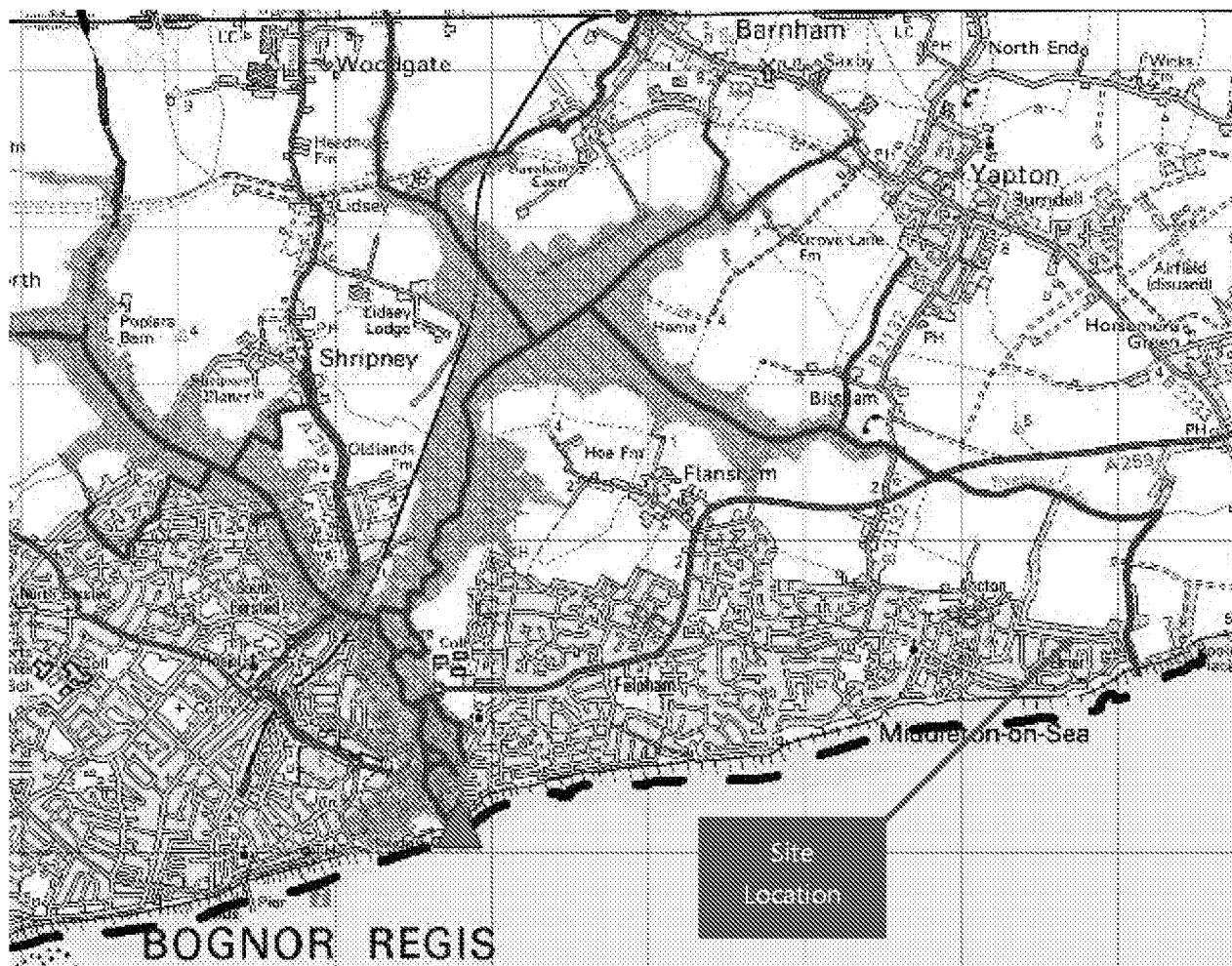
Legend

-  Statutory Main Rivers
- Defences**
-  Embankment
-  Wall
-  Flood Gate
-  Demountable Defence
-  Bridge Abutment
-  High Ground
-  Beach
-  Barrier Beach
-  Promenade
-  Quay
-  Cliff
-  Dunes
-  Culvert



0 100 200 300
Metres





Modelled Fluvial Breach Extents - Residual Risk



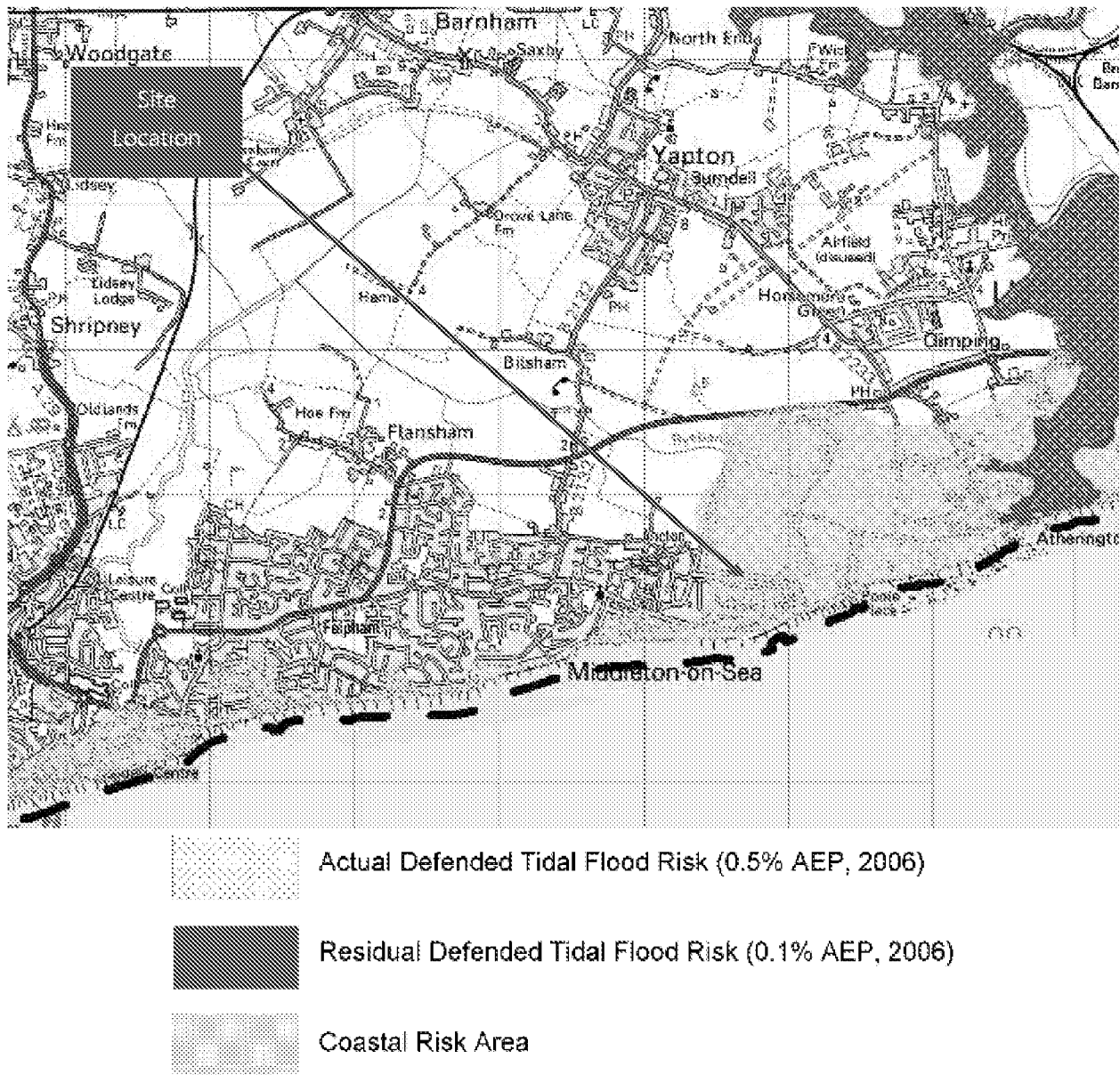
Modelled Tidal Breach Extents - Residual Risk



Proposed Breach Locations

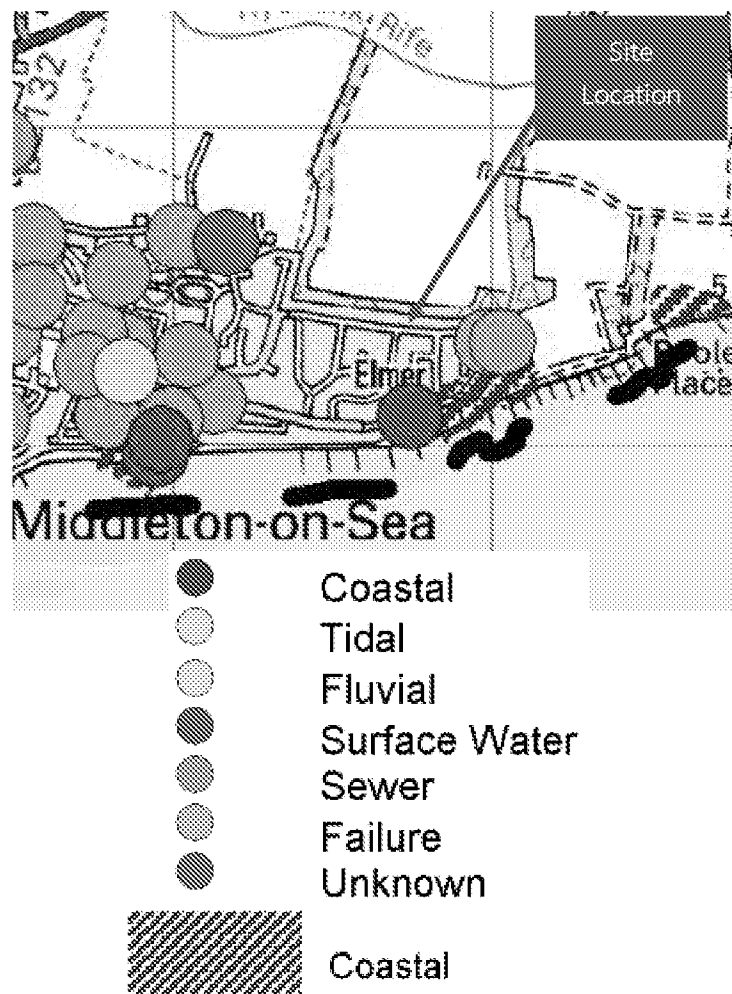
Excerpt from SFRA's Map B – Residual Risk from Beach

The site is removed from the flood pattern in this scenario



Excerpt from SFRA's Map A1-T: Actual and Residual Flooding from the Sea

The site is in the 'Coastal Risk Area' but removed from both the Actual and Residual Tidal Flood Risk zones

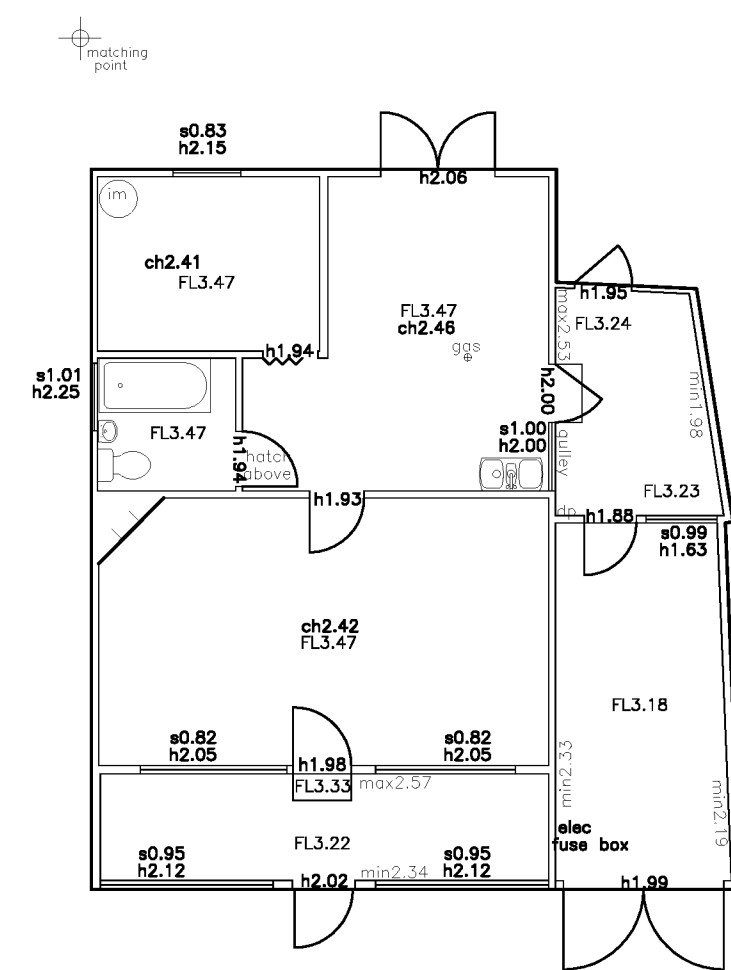
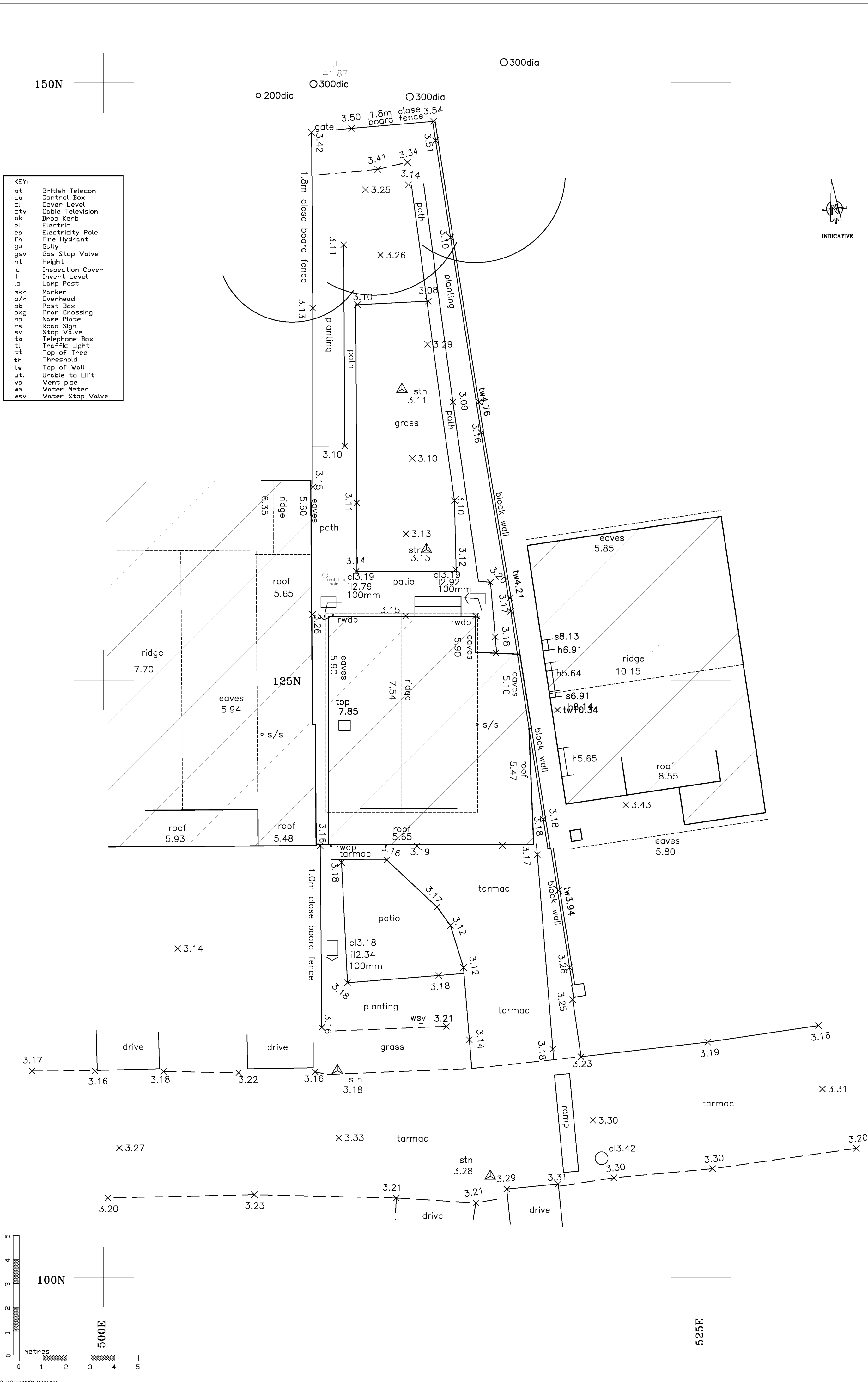


Excerpt from SFRA's Map A1-T: Actual and Residual Flooding from the Sea

The site is removed from the nearest recorded incident, as is much of Ancton Way and surrounding streets

Appendix C

Architect's Scheme Drawings



key:-

- ch ceiling height
- fl floor level relative to external survey
- h head height from floor
- in immersion heater
- min minimum height from floor
- max maximum height from floor
- s sill height from floor
- w/s height to underside

P STUBBINGTON
LAND SURVEYS LTD

THE MEAD
DURLEY BROOK ROAD
DURLEY
SOUTHAMPTON
HAMPSHIRE
SO32 2AR
TEL : 023 8060 1876
MOBILE:-
07973 348165
EMAIL:-
PAUL@PSLANDSURVEYS.COM

CLIENT:- MR & MRS HUDLASS-GALLERY

CONTRACT:- 72 ANCTON WAY
ELMER
BOGNOR REGIS

TITLE:- EXISTING SURVEY

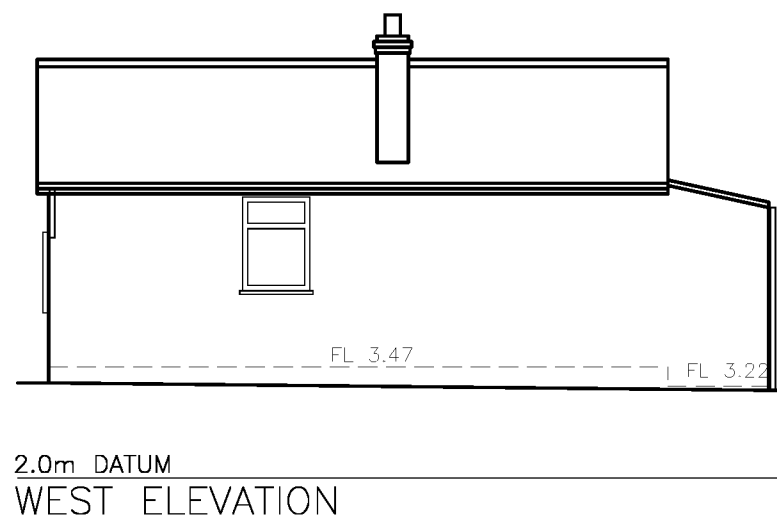
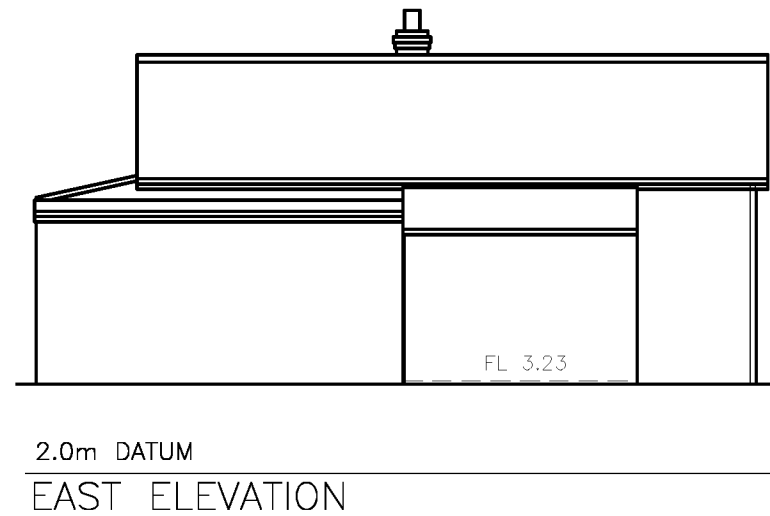
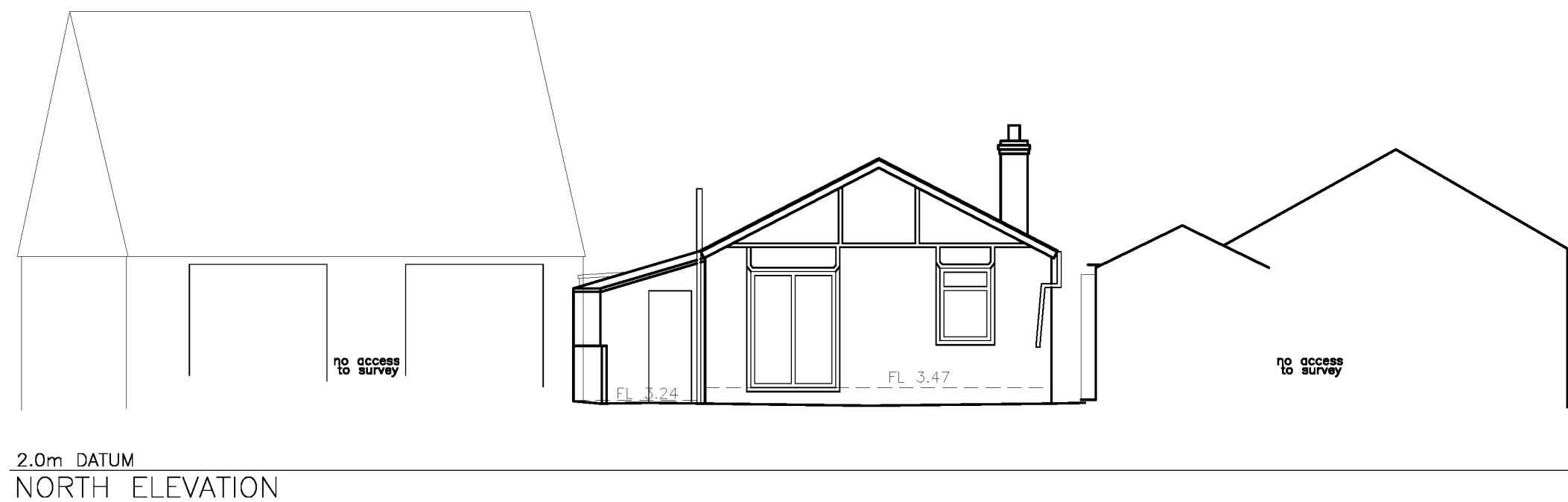
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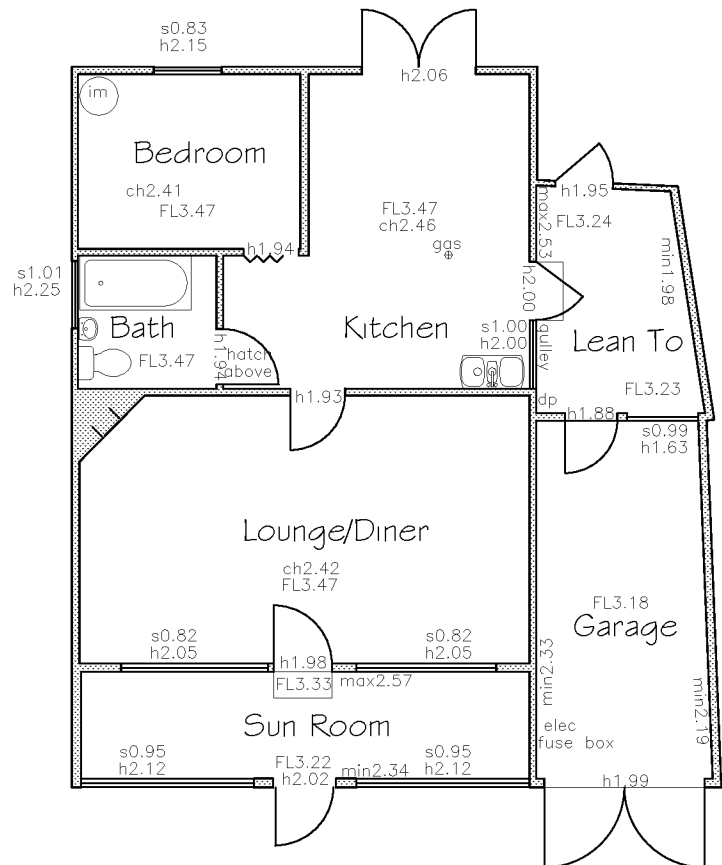
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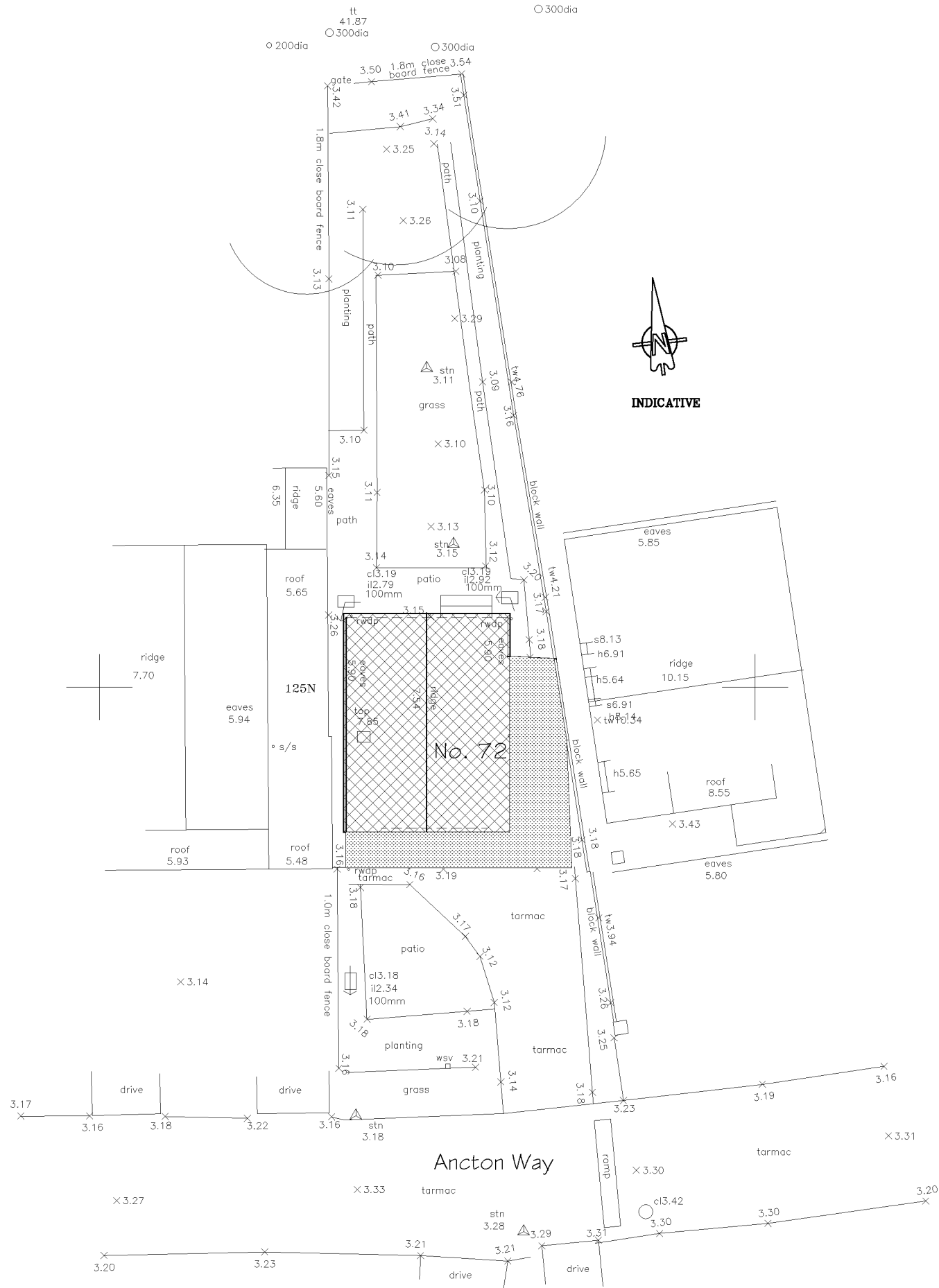
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LEVELS RELATE TO O.S. DATUM
TREE SPECIES SHOULD BE VERIFIED WHERE OF
CRITICAL IMPORTANCE
THE ARCHITECT SHOULD SATISFY HIMSELF THAT ALL TREES
LIKELY TO AFFECT HIS DESIGN HAVE BEEN SHOWN
INTER CONNECTION OF MANHOLES SHOULD BE VERIFIED
WHERE OF CRITICAL IMPORTANCE USING CCTV
PIPE SIZES & INVERTS DETERMINED WITHOUT
ENTRY INTO MANHOLE



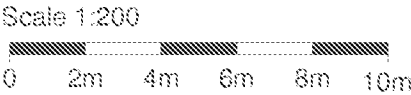
LOCATION PLAN @ 1:1250
licence No. 100047474
Application site shown in red



EXISTING FLOOR PLAN @ 1:100



EXISTING SITE PLAN @ 1:200



NOTES:
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Revisions		

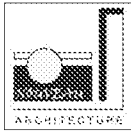
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Mr & Mrs Hudlass-Galley
Touchwood
Pagham Road
Lagness
Chichester PO20 1LL

PROJECT:
New House
72 Ancton Way
Bognor Regis
PO22 6JP

DRAWING TITLE:
Existing Site Plan, Floor Plan & Location Plan
PLANNING APPLICATION

NOUVEAU ARCHITECTURE

9 Bere Lane
Knowle Village
Hampshire
PO17 5GL
Tel: 01329 833396
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Web: www.nouveau-architecture.co.uk



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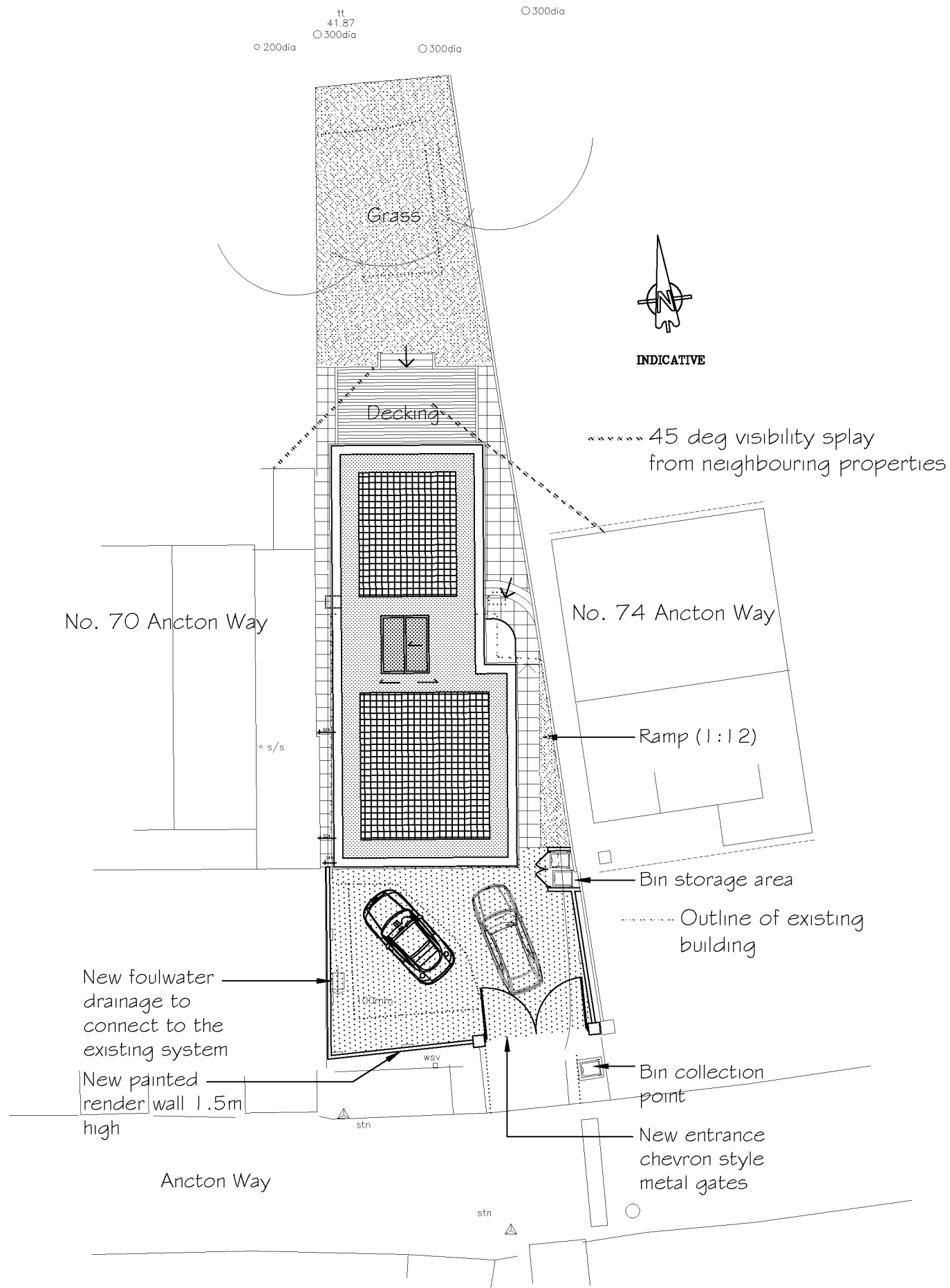
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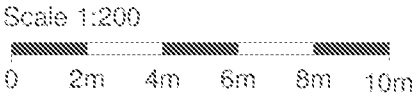
Demolition

Permeable Surface

Landscape Planting



PROPOSED SITE PLAN @ 1:200



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Mr & Mrs Hudlass-Galley
Touchwood
Pagham Road
Lagness
Chichester PO20 1LL

PROJECT:

New House
72 Ancton Way
Bognor Regis
PO22 6JP

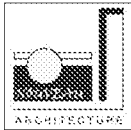
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Proposed Site Plan

PLANNING APPLICATION

NOUVEAU ARCHITECTURE

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Hampshire
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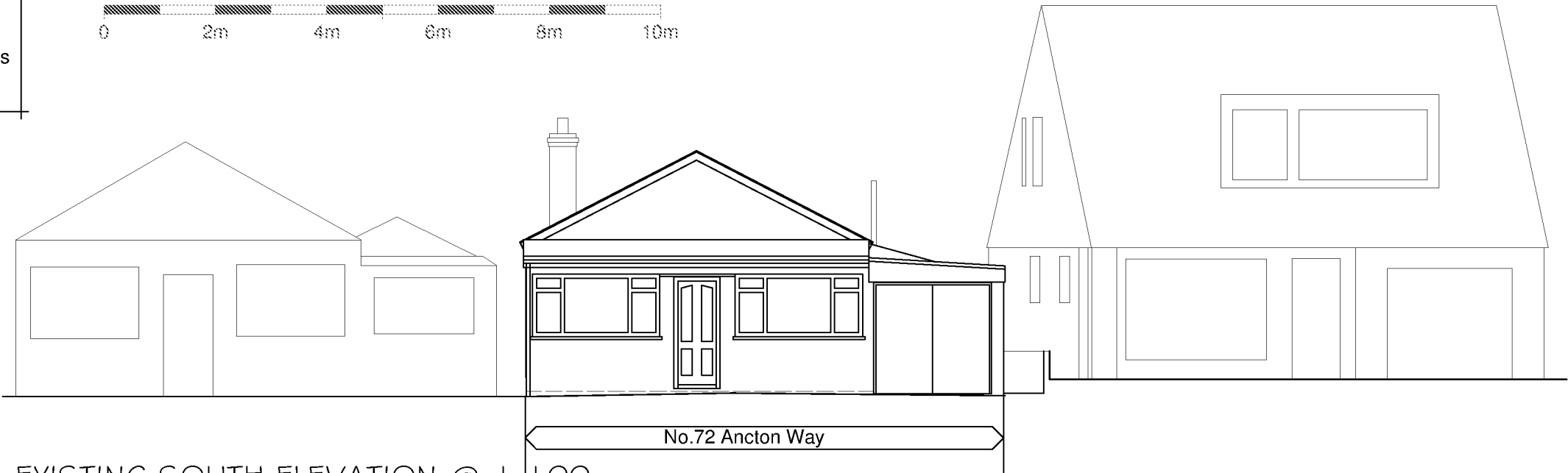
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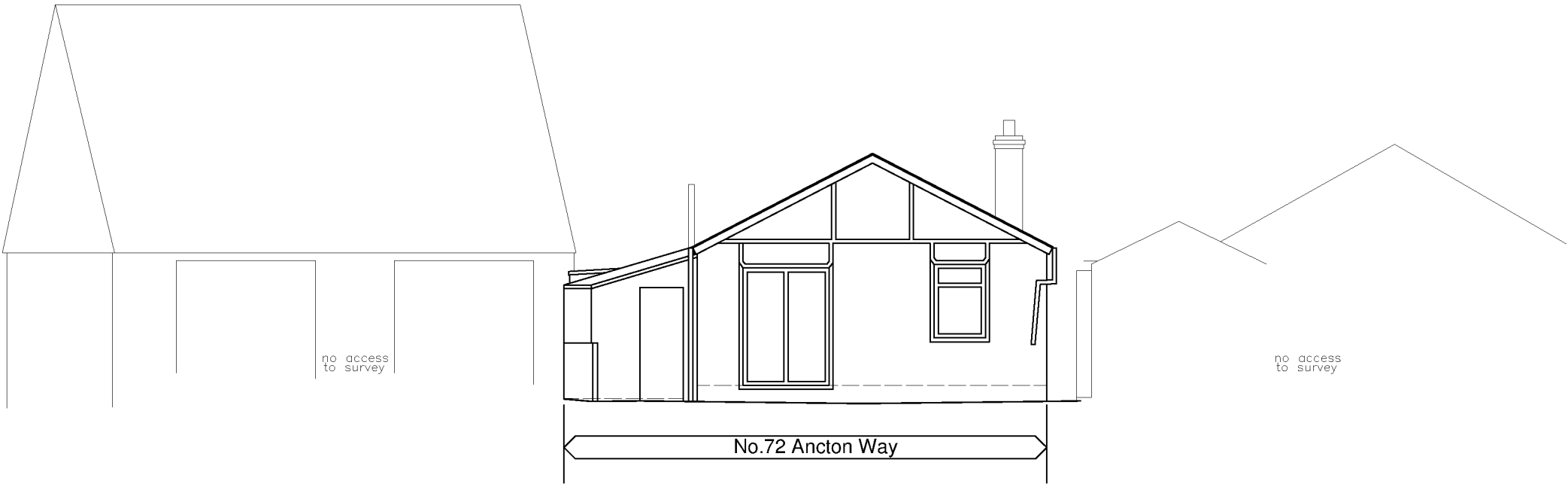
Existing walls

Proposed walls

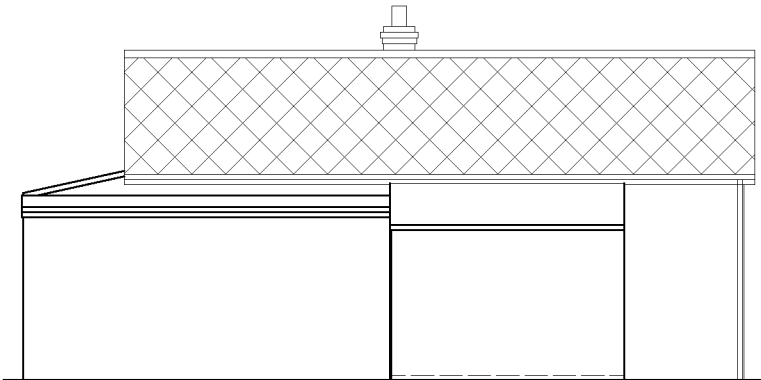
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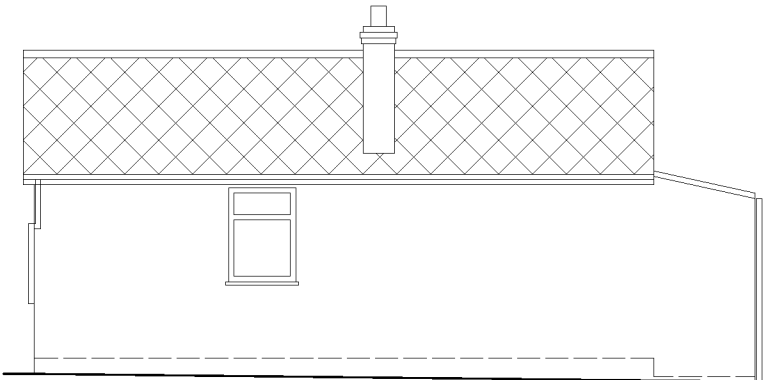
EXISTING SOUTH ELEVATION @ 1:100



EXISTING NORTH ELEVATION @ 1:100



EXISTING EAST ELEVATION @ 1:100



EXISTING WEST ELEVATION @ 1:100

NOTES:

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Rev	Date	Description
Revisions		

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Mr & Mrs Hudlass-Galley
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Pagham Road
Lagness
Chichester PO20 1LL

PROJECT:

New House
72 Ancton Way
Bognor Regis
PO22 6JP

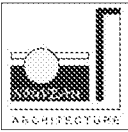
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Existing Elevations

PLANNING APPLICATION

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PO17 5GL
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Web: www.nouveau-architecture.co.uk

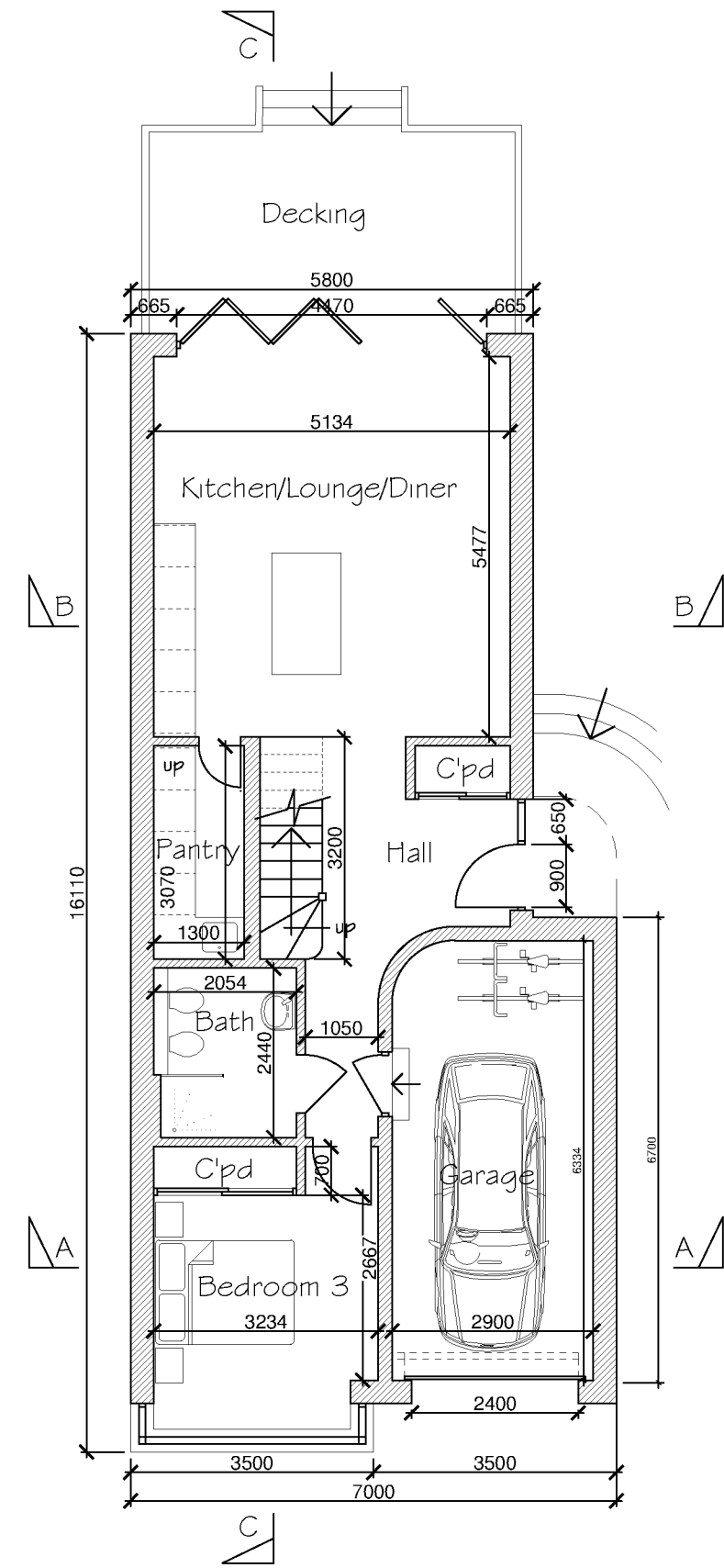


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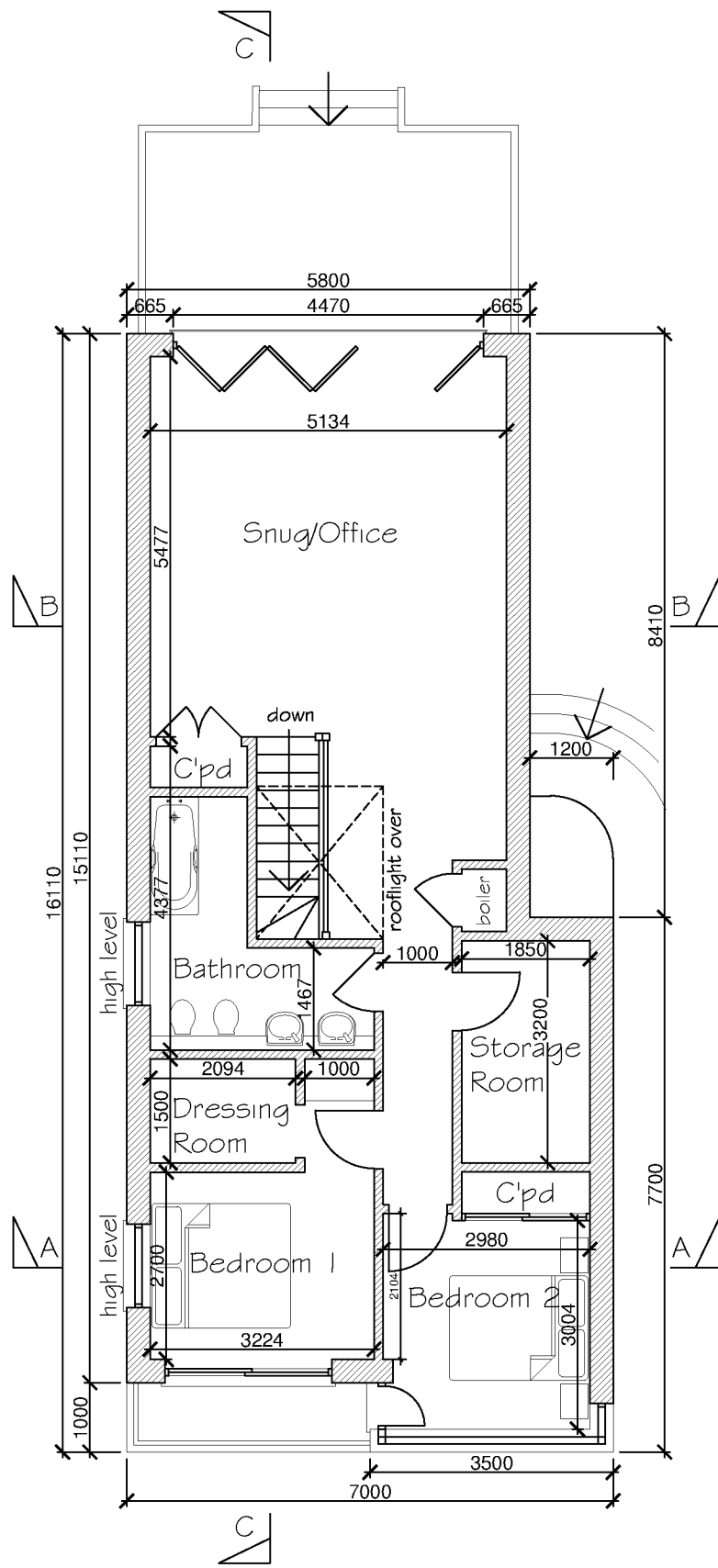
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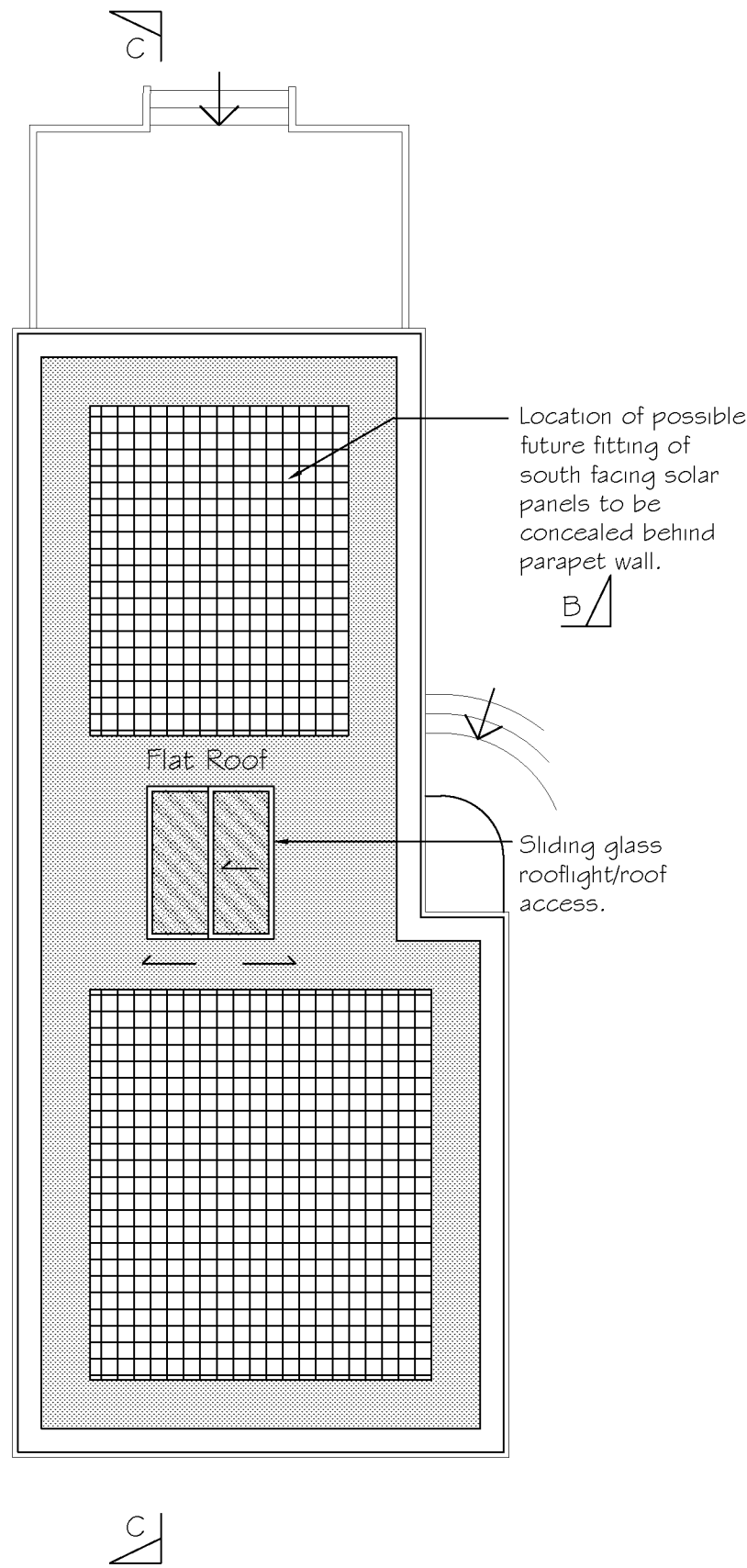
- Existing walls
- Proposed walls
- Demolition



PROPOSED GROUND
FLOOR PLAN @ 1:100



PROPOSED FIRST
FLOOR PLAN @ 1:100



PROPOSED ROOF
PLAN @ 1:100

NOTES:

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ISSUED FOR PLANNING PURPOSES ONLY

Rev	Date	Description
Revisions		

CLIENT:

Mr & Mrs Hudlass-Galley
Touchwood
Pagham Road
Lagness
Chichester PO20 1LL

PROJECT:

New House
72 Ancton Way
Bognor Regis
PO22 6JP

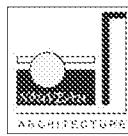
DRAWING TITLE:

Proposed Floor Plans

PLANNING APPLICATION

NOUVEAU ARCHITECTURE

9 Bere Lane
Knowle Village
Hampshire
PO17 5GL
Tel: 01329 833396
Email: info@nouveau-architecture.co.uk
Web: www.nouveau-architecture.co.uk



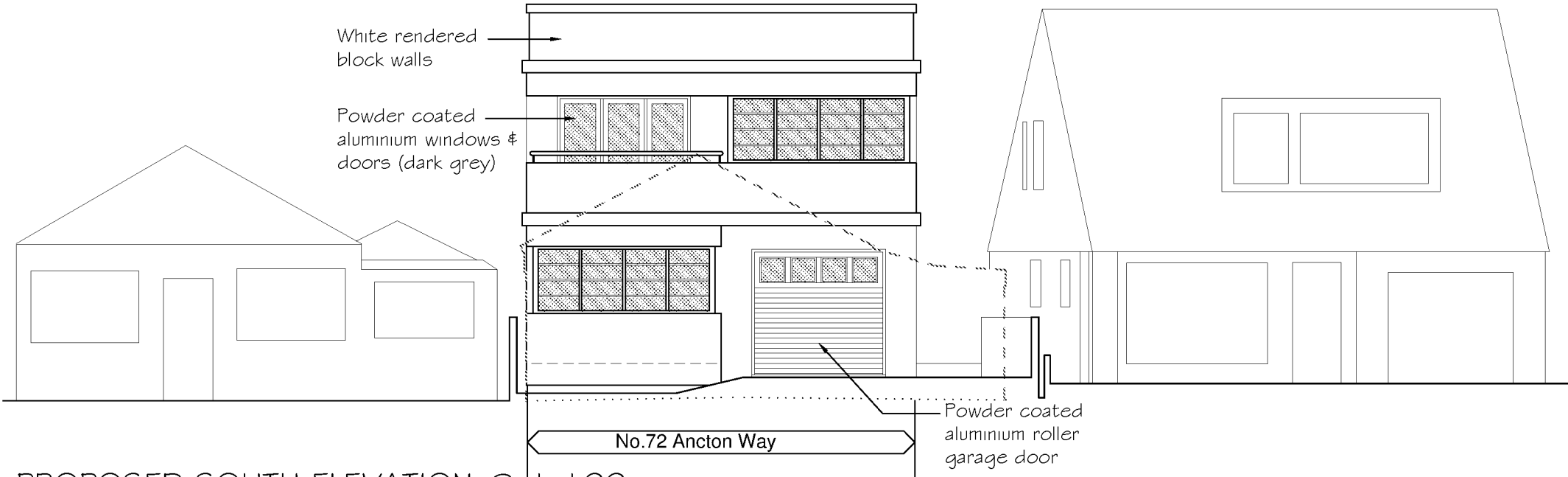
SCALE:	As shown @ A3		
DATE:	July 2017		
DRAWN:	ASW		
CHECKED BY:	CW		
DRAWING NO:			
N265	PL04	*	

Key

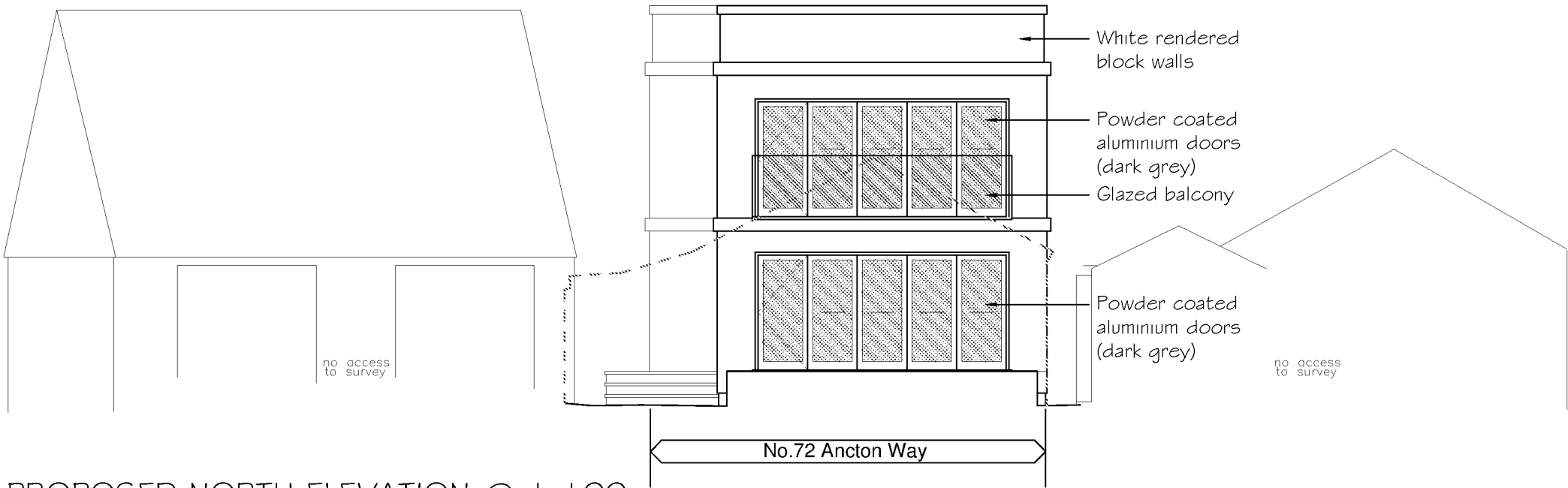
Existing walls

Proposed walls

Demolition



PROPOSED SOUTH ELEVATION @ 1:100



PROPOSED NORTH ELEVATION @ 1:100

NOTES:

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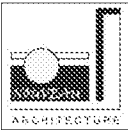
DRAWING TITLE:

Proposed Elevations
(1 of 2)

PLANNING APPLICATION

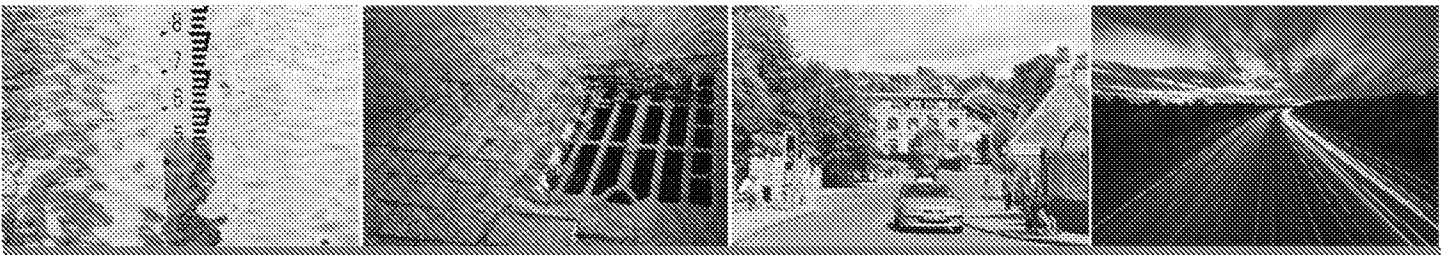
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N265	PL05	*	

NO/400-097



Drainage - Flood Risk - Highways - Transport

GTA Civils, Gloucester House, 66a Church Walk, Burgess Hill, West Sussex, RH15 9AS

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