FLOOD RISK ASSESSMENT

Compliant with LLFA SUDS Guidance

NPPF Compliant

Remodel existing bungalow dwelling; extensions to establish upper level bedrooms / living

Flood future-proofing & flood safety betterment

Better protected and flood future-proofed than existing

Maximise porous / permeable areas

at:

1 South Beach, Beach Road, Shoreham-By-Sea,

BN43 5LY

March 2020

ARK Environmental Consultancy Ltd

Table of Contents

If this report has been released electronically, the appendices referred to herein can be found in the annexed zip folder/s as .pdf or .dwg files. If this report has been released in hard copy the appendices will be bound into the back of this report. Plans may be annexed separately as A1 or A0 copies where a bound-in A3 copy is not appropriate.

1.0 Scope 4

2.0 Executive Summary 4

3.0 Introduction 5

4.0 Purpose of the Report 5

5.0 Report Information Sources 5

6.0 Consultation 5

7.0 Overview of British Legislation 5

7.1 National Planning Policy 5

8.0 Site Status and Environmental Setting 6

8.1 Site Location and Status 6

8.2 Existing Flood Risk 6

8.3 Geology 8

8.4 Surface Water Risk and Hazard Summary 8

8.5 SFRA / LFRMS Surface Water Mapping & Hazard 9

8.6 Design Response: address SUDS hierarchy and climate change 11

9.0 Assessment of Proposed Development 12

9.1 Proposed Development 12

9.2 Topo vs Scheme Raised Floor Levels 12

9.3 Drainage Connections 12

9.4 Pipe sizes /Manholes / Pipe runs 13

9.5 SUDS Hierarchy Check 14

9.6 Flood Resilience 14

9.7 Refuge and Evacuation 15

9.8 Annual Monitoring 16

9.9 Surface Water Runoff – Flood Risk from the Development 16

9.10 Climate Change including New Allowances 16

10.0 Flood Storage 17

11.0 Conclusion 17

12.0 Appendices.....17

1.0 Scope

This report contains the details of a Flood Risk Assessment carried out by Ark Environmental Consultancy Limited ("ARK Ltd") for 1 South Beach, Beach Road, Shoreham-By-Sea, BN43 5LY, henceforth referred to as "the site" in this report.

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The Executive Summary contains an overview of key findings and conclusions. However, no reliance should be placed on the Executive Summary until the whole of the report has been read. Other sections of the report may contain information which puts into context the findings noted within the Executive Summary.

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2.0 Executive Summary

This FRA&SUDS Strategy for Planning has been carried out in accordance with the National Planning Policy Framework (NPPF) 2019 and NPPG 2018 to assist the council and EA in their assessment of the planning application.

The proposed development is for remodeling and extensions to an existing bungalow: establishes upper level which is flood future proofing and new porous & permeable areas maximized.

- Site is in EA FZ3 Tidal defended: EA official LOW risk
- Within NO - VERY LOW surface water hazard based on site specific mapping
- REDUCES FLOOD RISK OVERALL
    - Maximise porous and permeable areas
    - No formal SUDS required given no increase in impermeable areas / nature of scheme and site setting
- Resilient and resistant measures
- **Results in better protected and flood future proofed dwelling than existing**

This is categorized as a "More Vulnerable" in FZ3: in accordance with the NPPF classifications the NPPF/PPG Exception Test does need to be passed.

Given the residual risk flood setting, the level, extent and depth of flooding on the site can be managed in terms of resistant and resilient measures and precautionary mitigation measures.

Based on the likely flooding risk and small scale of the proposed development, it is considered that the proposed development can be constructed and continue to be operated safely in flood risk terms, without increasing flood risk elsewhere; it is therefore considered appropriate development in accordance with the NPPF / PPG.

3.0 Introduction

The FRA combined a desktop study, review of available information, consultations and an assessment of all sources of flooding posed to and from the site and proposed development, in accordance with NPPF & NPPG. Appropriate flood mitigation measures were then considered, either as already incorporated within the scheme or recommended for inclusion at detailed design stage. The suitability of the proposed development was also reviewed in the context of the NPPF/NPPG and any relevant technical guidance accompanying the NPPF.

4.0 Purpose of the Report

This FRA has been carried out in accordance with National Planning Policy Framework (NPPF) & PPG.

The report provides the following information in accordance with the NPPF:

- An assessment of the flood risk posed to the site based on flood information and mapping provided by the EA and Strategic Flood Risk Assessment (SFRA);
- An assessment of the proposed development in terms of surface water run-off; and
- Proposals for measures to mitigate the flood risks posed to and from the development where appropriate.

5.0 Report Information Sources

The information source used to undertake this FRA has been collected from the following sources:

- British Geological Survey Website & iGeology App
- EA Website & Data
- Adur (& Worthing) District Council (ADC) Strategic Flood Risk Assessment (2018 and as updated)
- ADC (Joint) Preliminary Flood Risk Assessment (2011 and as updated);
- West Sussex County Council as the Lead Local Flood Authority (LLFA) SUDS Policies and Guidance
- Internet mapping and searches.

6.0 Consultation

Where appropriate, the EA and local council will have been contacted to request any available and relevant flooding data.

7.0 Overview of British Legislation

7.1 National Planning Policy

The National Planning Policy Framework (NPPF) and NPPG supercede all Planning Policy Statements (PPS's) and Planning Policy Guidance (PPG's). Flood risk is retained as a key development consideration.

The Sequential and Exception Tests are retained. The accompanying NPPF Technical Guidance / NPPG also include Tables 2 and 3 to assist with flood risk vulnerability classifications and development suitability.

NPPG 2019, New Climate Change Allowances and Government & LLFA SUDS guidance compliant.

7.2 Local Policy

The Strategic Flood Risk Assessment (SFRA) is a key source of flood risk specific information for the area. The SFRA provides a more detailed review of flood risks and recommendations for ensuring developments can be constructed and operated safely in accordance with the NPPF. Greater detail of the SFRA is provided in the report where appropriate.

8.0 Site Status and Environmental Setting

8.1 Site Location and Status

The site is located to the south of Beach Road and is the last coast side property on Beach Road. The site is currently occupied by an existing dwelling and outbuildings, soft and hard landscaping. Location plan included in Appendix A.

8.2 Existing Flood Risk

Flood Sources	**Site Status**	**Comment on flood risk posed to / from the development**
Fluvial / Tidal	Site is in Flood Zone FZ3 Tidal EA's LOW risk Not in fluvial flood extents. Within tidal extreme flood event extents. Low Risk	Re-modelling and extension to establish upper floors to existing dwelling is appropriate in FZ3 tidal and the scheme can incorporate suitable mitigation measures to address residual surface water risk **Results in better protected and flood future proofed dwelling than existing.**
Groundwater	SWMP indicates site not in potential elevated future groundwater risk	The proposed development will not increase the risk of groundwater flooding; New slabs can be engineered / waterproofed appropriately to industry standard Non return valves and sump Low Risk
Artificial Sources	No artificial sources within 250m	Low Risk
Surface Water / Sewer Flooding	Site is in NO – VERY LOW hazard area Evacuation route which is to the north always in NO – VERY LOW hazard Condition, depth and location of surrounding infrastructure uncertain	Scheme can REDUCE FLOOD RISK OVERALL: see main sections below Scheme incorporate new SUDS: new soakaway (designs by others) Development will utilise existing connection to sewers, gravity drainage and non-return valves Development will not increase the peak flow or volume of discharge from the site: Low Risk No further drainage assessment required
Climate Change including new allowances	Included in the flood modelling extents Site not within climate change flood extent area	Development will not increase the peak flow and volume of discharge from the site Low risk posed to and from the development



Site is in official EA LOW risk



Extent of flooding from rivers or the sea

High Medium Low Very low Location you selected

8.3 Geology

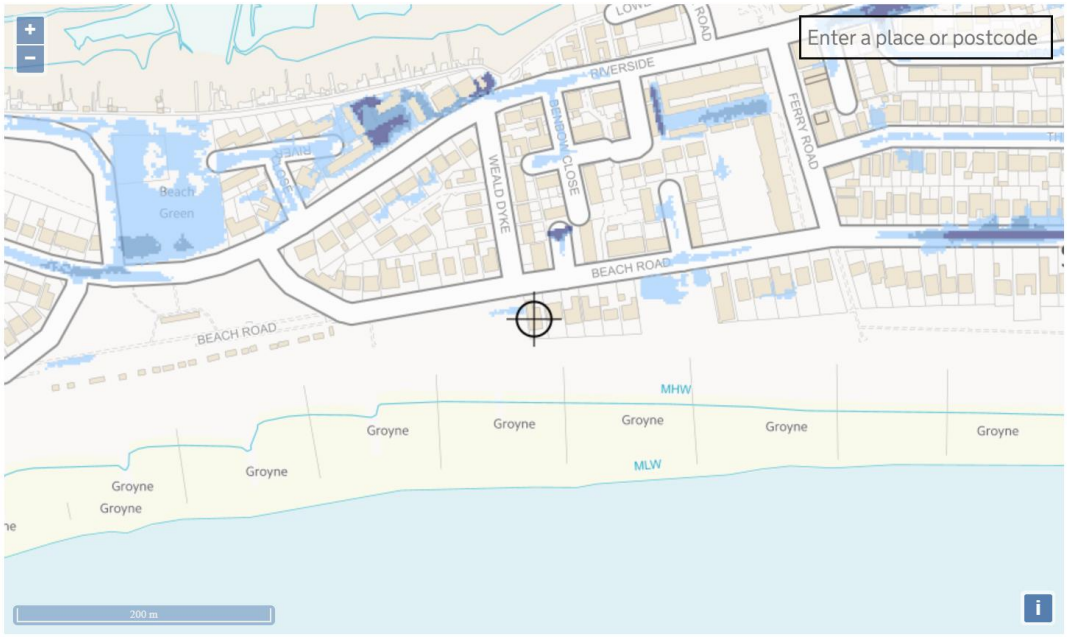
Based on BGS mapping and surrounding adjacent boreholes:

- Bedrock: Lambeth Group - Clay, Silt And Sand
- Superficial: Storm Beach deposits

No lost / underground rivers documented at the site or near the site nor identifiable by the local geology mapping.

8.4 Surface Water Risk and Hazard Summary

- Property itself is not inundated:
  - In No hazard in all EA risk scenarios
  - Small patchy area of ponding on Alleyne Way
- Access & Egress is always in NO hazard
- NO need for evacuation given surface water risk but still feasible
- Scheme will reduce this flood risk by reducing surface water discharge



Extent of flooding from surface water

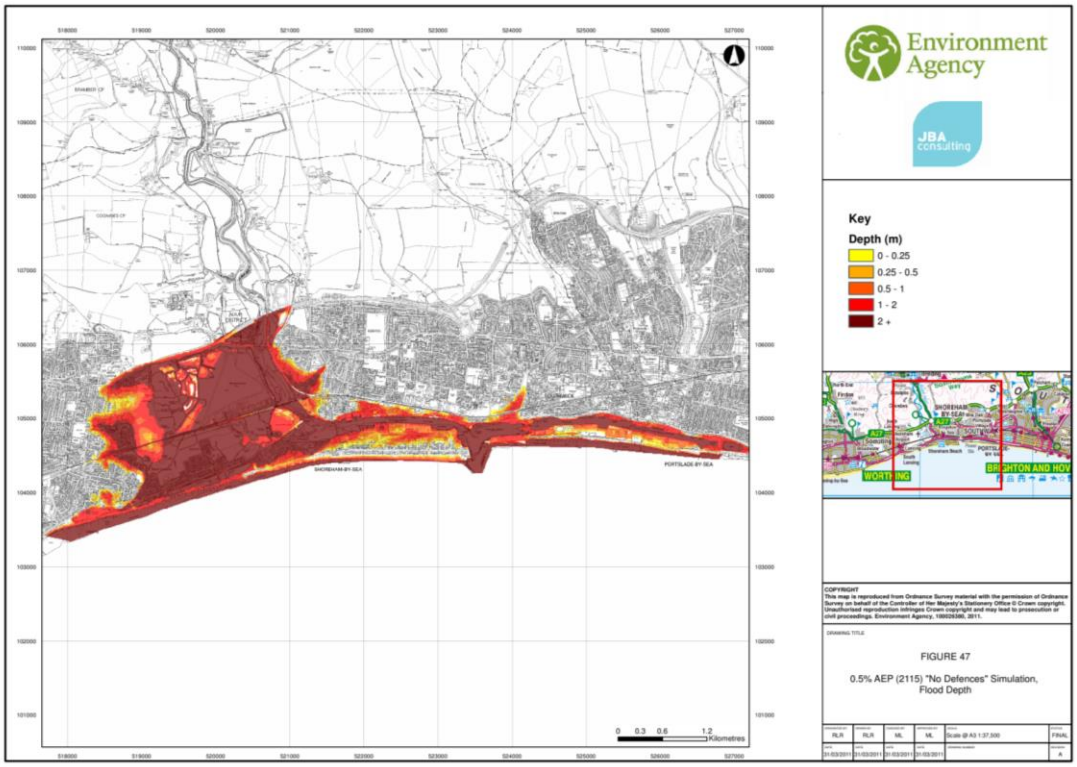
High Medium Low Very low Location you selected

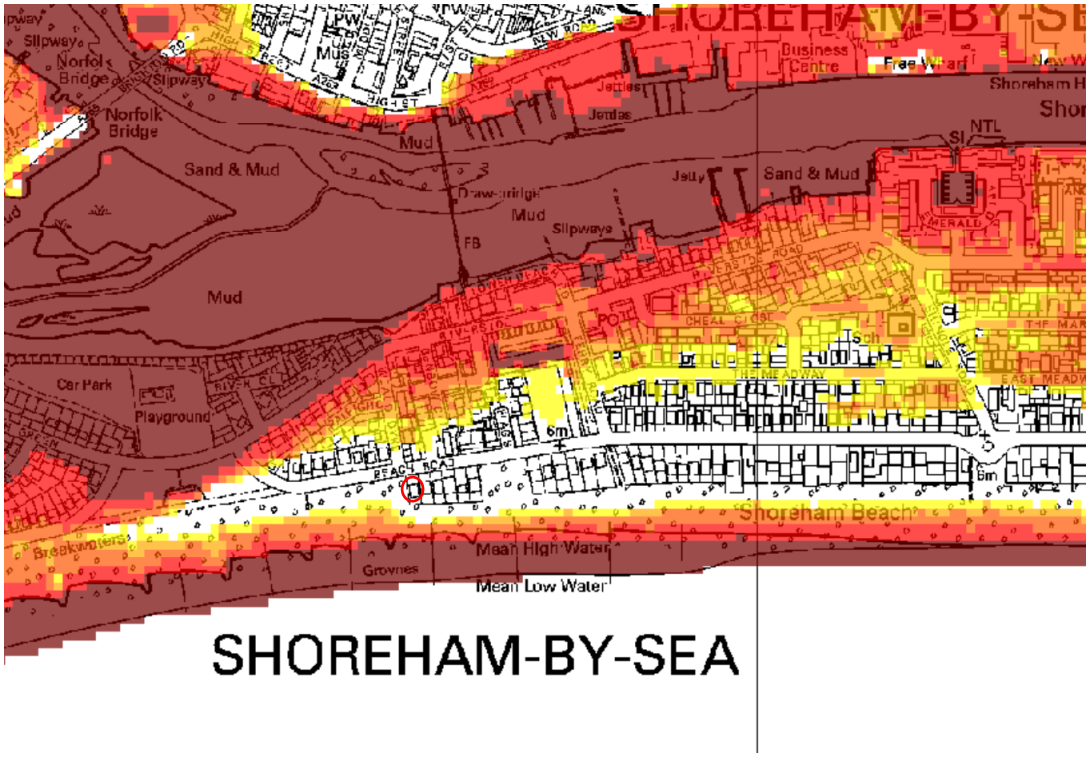
8.5 SFRA / LFRMS Surface Water Mapping & Hazard

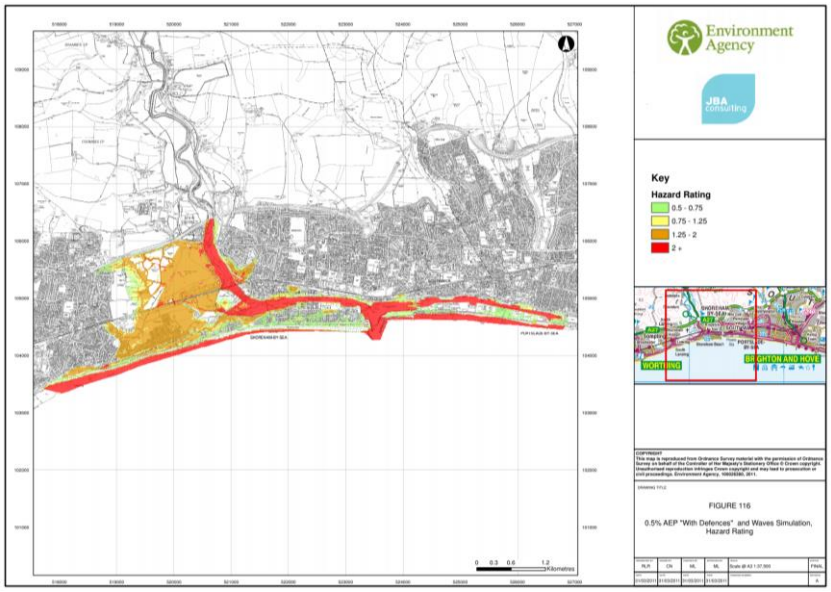
NOTE: the resolution of the SFRA and SWMP mapping is not appropriate to be site specific but the following information is relevant.

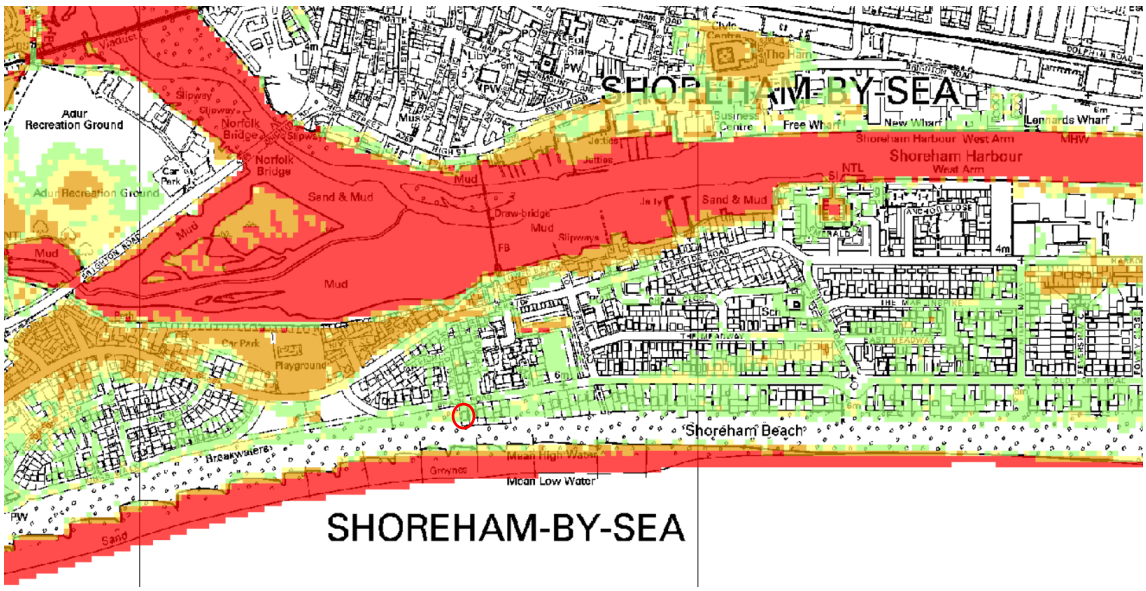
The mapping corroborates the data in the more up to date EA mapping above.

- Site is not within undefended fluvial or tidal floodplain delineation for the SFRA
- Site is not within the functional floodplain
- Site is not within 1in100year climate change fluvial Year 2106 defended
- Site is not within 1in200year climate change tidal Year 2115 defended
- Site is within 5% and 0.5% residual waver overtopping tidal present day defended
- Critical: site is not inundated in the present 1in1000year (0.1%) for the future “no defences” simulation
- Site is not inundated, even in the 1in200year no defences simulation for Year 2115
- Onset of flooding: 0.5% AEP "With Defences" and Waves Simulation: 2-4 hours at least
- Critical: appropriate hazard setting of 0.5-0.75 in the 0.5% wave overtopping defended scenario
- Scheme can address this residual risk and REDUCE FLOOD RISK OVERALL


Environment Agency
JBA consulting
Key
Depth (m)
0 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 +
FIGURE 47
0.5% AEP (2115) "No Defences" Simulation, Flood Depth


Slipway
Norfolk Bridge
Sand & Mud
Mud
Jetties
Jetty
Slipways
FB
Car Park
Playground
Shoreham Beach
Breakwaters
Groynes
Mean High Water
Mean Low Water
SHOREHAM-BY-SEA





8.6 Design Response: address SUDS hierarchy and climate change

- Existing dwelling and all proposed works are located in EA LOW hazard
  - Scheme establishes upper level to meet EA guidance / NPPF compliance
  - This report demonstrates that the scheme can pass the Exception Test

REDUCE FLOOD RISK OVERALL

- Maximise porous and permeable areas – significant betterment
- Highest forms of SUDS to be used for a previously un-attenuated site
  - Permeable and Porous areas
- Betterment as will attenuate for areas currently unattenuated
- Mandatory and standard resilient measures
- **Results in better protected and flood future proofed dwelling than existing**

9.0 Assessment of Proposed Development

9.1 Proposed Development

The proposed development can be seen in Appendix A&B.

The proposed development comprises:

- Remodeling and extensions to an existing bungalow: establishes upper level which is flood future proofing and new porous & permeable areas maximized.
- **Reduces flood risk overall**
    - New modern flood resilience – see below
    - New porous / permeable
- Given the site constraints and LOW hazard setting: further raised floor levels are not considered necessary

As an appropriate response, the site will operate as existing with an improvement based on the design:

1) robust resilient construction techniques in order to minimise the damage caused by water entry and also to reduce the time taken to return the property to use after a flood (see later sections)
2) Reduce flood risk overall with new lower water demand white goods: betterment of surface water management on the site as a result of the scheme where feasible

Drainage

The existing connections will be retained / additional secured with the water company; non-return valves can be utilized as standard.

9.2 Topo vs Scheme Raised Floor Levels

- No site levels are required given it is an existing dwelling and the scheme is a remodeling / extension.
- The flood depths are not relevant to the design since all new ground floor structures are to be full height resilient and the establishment of an upper level provides the required betterment in terms of flood response management
- There is not a need to compare floor levels with the data given the nature of the flood setting: it will not alter the recommendations or the comments of the EA so there should not be an objection on these grounds if the report has been read and the flood setting understood.

9.3 Drainage Connections

Foul

The existing connections will be retained / new connections installed subject to agreement with the water company.

Surface Water

The existing connections will be retained / new connections installed subject to agreement with the water company.

SUDS Commensurate with the scheme

The new raised planter bed and areas of new permeable paving can be used a surface storage using splayed ends to the raindownpipes: standard approach for minimal disruption scheme.

9.4 Pipe sizes /Manholes / Pipe runs

These will be confirmed as part of detailed designs; specifications of landscaping and drainage products need to be confirmed through Buildings Regs.

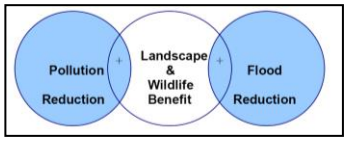
Not required at this stage to demonstrate scheme can accommodate the surface water flows or meet LLFA requirements.

9.5 SUDS Hierarchy Check

The scheme offers tangible benefit in that it maximises permeable / porous areas:

Concept SUDS Strategy

The following diagram indicates the philosophy behind the proposed SUDS strategy, and is taken from the EA's SUDS guidance:



(Source: Environment Agency, 2009)

Table 2 indicates the SUDS Hierarchy Appraisal for the site and proposed development:

Table 2: Site Specific SUDS Appraisal

SUDS Hierarchy	SUDS Technique	Potential Benefits			Site Specific	
		Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit	?	Scheme Specific SUDS Suitability Appraisal and Comment
Most Sustainable	Living Roofs	•	•	•	*	To reduce the amount of underground storage SUDS but not likely feasible given nature of build
	Ponds / Basins	•	•	•	X	Site is a single dwelling plot; not necessary Not suitable given flood setting
	Swales	•	•	•	X	Site is a single dwelling plot; not necessary Not suitable given flood setting
	Infiltration Techniques	•	•		X	Site is a single dwelling plot; not necessary Not suitable given flood setting
	Permeable and Porous Surfaces with discharge to sewer soakaway	•	•		✓	To meet LLFA Scheme can incorporate additional permeable surfaces with areas not covered by building
Least Sustainable	Tanked Systems	•			*	Not required and not sustainable option

Key:
Potentially suitable at the site: * Incorporated in the scheme: ✓ Not suitable / possible at the site: X

9.6 Flood Resilience

The proposed development will utilize the flood resilient techniques recommended in the NPPF Technical Guidance where appropriate and also the recommendations that have previously been issued by various local authorities:

As per previous correspondence with planning officers and as agreed:

The FRA provides the recommended resilient measures that can be incorporated, it will depend on the construction team as to what construction will actually need to be undertaken and what materials are used exactly. This does not invalidate the point and recommendations of this FRA. The FRA cannot simply specify the exact specifications / products to be used; this information is not required of planning.

- Non-return valves as standard for ground
- For the new extension at ground: waterproofing to be tied in to existing and proposed ground floor slab as appropriate; details to be provided at detailed design to building regulations requirements: to reduce the turnaround time for returning the property to full operation after a flood event.
- Waterproofing to be installed above ground level as appropriate
- Plasterboards will be installed in horizontal sheets on ground levels rather than conventional vertical installation methods to minimise the amount of plasterboard that could be damaged in a flood event
- Wall sockets will be raised to as high as is feasible and practicable in order to minimise damage if flood waters inundate the property
- Any wood fixings on ground floor will be robust and/or protected by suitable coatings in order to minimise damage during a flood event
- Airbricks will be raised to as high as is feasible and practicable
- The Damp Proof Membrane / ground waterproofing will be installed above the main floor slab and tied in to the walls where appropriate, to reduce the turnaround time for returning the property to full operation after a flood event
- New electrics to be installed top down as far as is feasible to minimise damage

9.7 Refuge and Evacuation

Based on the likely flood risk and associated warning time, evacuation is usually preferred and feasible at this site, floodwaters are also not likely to enter the building; refuge is a preferred flood response for the upper dwelling.

Range of Flood Events

The site is in FZ3 tidal undefended and not in a rapid inundation zone. The evacuation and flood management does not need to consider this fastest type of flood inundation.

Preferred response is well advanced evacuation which is feasible given tidal flood setting.

Preferred evacuation route is:

- west on Beach Road to reach Beach Green
- Continue west to Saltings Roundabout with the A259
- Then northeast on the A259 over the River Adur and Adur Estuary to reach unrestricted FZ1 by the A283 / West Street heading north

All site users have access to the partly raised ground floor level: **the first floor is also above the extreme event for lifetime of the scheme.**

It is therefore considered likely that there would be sufficient time to seek refuge and/or evacuate to an area outside of the surface water flooding.

The property itself will be a modern protected and resilient dwelling as a result of the scheme and based on the available mapping is not likely to be inundated hence the site users can remain dry within the property for the duration of the likely flood event.



9.8 Annual Monitoring

It is recommended that tenants should contact the EA on an annual basis to confirm the flood status of the property.

If the flood status has changed, the evacuation and refuge plan should be reviewed and updated by suitable flood risk consultants as appropriate.

9.9 Surface Water Runoff – Flood Risk from the Development

In accordance with the NPPF / NPPG, this FRA also considers the risks posed from the development to surrounding areas.

The scheme is **compliant with LLFA SUDS policy – new SUDS strategy**: maximise porous and permeable areas.

The proposals will incorporate new low-water demand devices such that despite no likely increase in peak flow and volume of flow, this can be managed appropriately for the lifetime of the scheme.

Given the small scale of the proposed development it is considered likely that the development will have a negligible effect on surrounding infrastructure. There will not be any significant increase in overland flow from the site.

9.10 Climate Change including New Allowances

The impact of climate change in accordance with the NPPF / PPG is likely to be an increase in the rainfall intensity in the future, which will increase peak storm flows to sewer. The proposed development will incorporate low flush and reduced water demand showers and toilets, such that the combined flows to sewer are likely to have a negligible impact. It is

considered therefore that flows in the future are not likely to have a significant impact, even with an allowance for climate change.

There is unlikely to be an unacceptable impact on the receiving sewers owing to the small scale of the development and the fact that the scheme reduces discharge rates from the site.

The scheme includes new porous / permeable areas to address residual surface water risk and to encourage storage within the site.

The EA data incorporate likely increases in flood levels including an accommodation for climate change.

10.0 Flood Storage

It is considered that flood compensation is not required given the footprint is wholly within tidal floodplain.

11.0 Conclusion

The EA website map, SFRA and available data indicate the proposed development site is within EA Flood Zone 3 but LOW hazard.

The proposed development is categorised as “More Vulnerable” in accordance with the NPPF; it is therefore an appropriate type of development within EA Flood Zone 3 but with the need to pass the Exception Test; it is considered passed by this report.

The proposed scheme has the ability to REDUCE FLOOD RISK OVERALL:

- SUDS strategy commensurate with the scale and sensitivity of the scheme
- Fully NPPF and LLFA compliant
- New modern resilient and resistant building construction techniques
- **Results in better protected and flood future proofed dwelling than existing**

Based on the likely flooding risk, it is considered that the proposed development could be constructed and operated safely in flood risk terms and is therefore appropriate development in accordance with the NPPF/NPPG.

12.0 Appendices

A. Site Location & Existing Layout / Floor Plans / Topo data
B. Proposed Development Plans

Appendix A



SITE LOCATION PLAN
SCALE 1:1250

0 20 50 100M

ADUR & WORTHING
PLANNING SERVICES

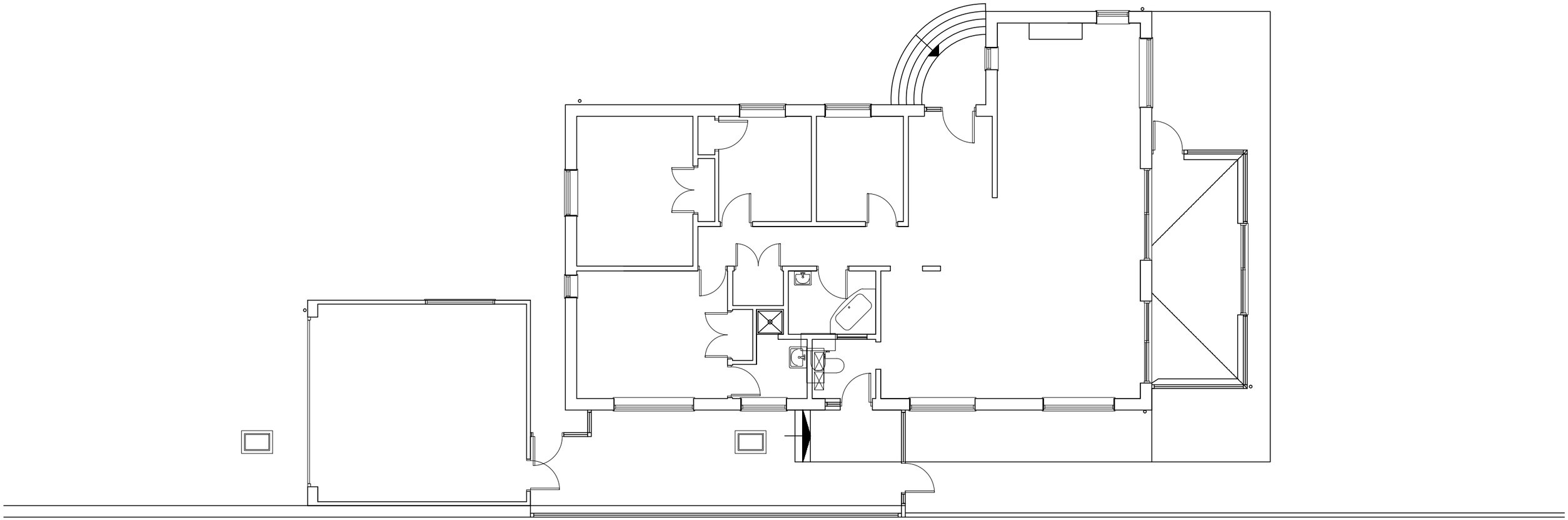
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DATE VALID	21 AUG 2019

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SOUTH BEACH	1 SOUTH BEACH,	SITE LOCATION PLAN	MR JONATHAN PRESSLEY	MV	GE	1/1250 @ A3	26.06.2019
STAGE	SHOREHAM BY SEA,	**STATUS**		**DRAWING NUMBER**			**REVISION**
PLANNING	BN43 5LJ	PRELIMINARY		572.PL.01			B

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E: info @ iptarch.co.uk
IPT ARCHITECTS

SITE BOUNDARY



EXISTING GROUND FLOOR PLAN

SCALE 1:100

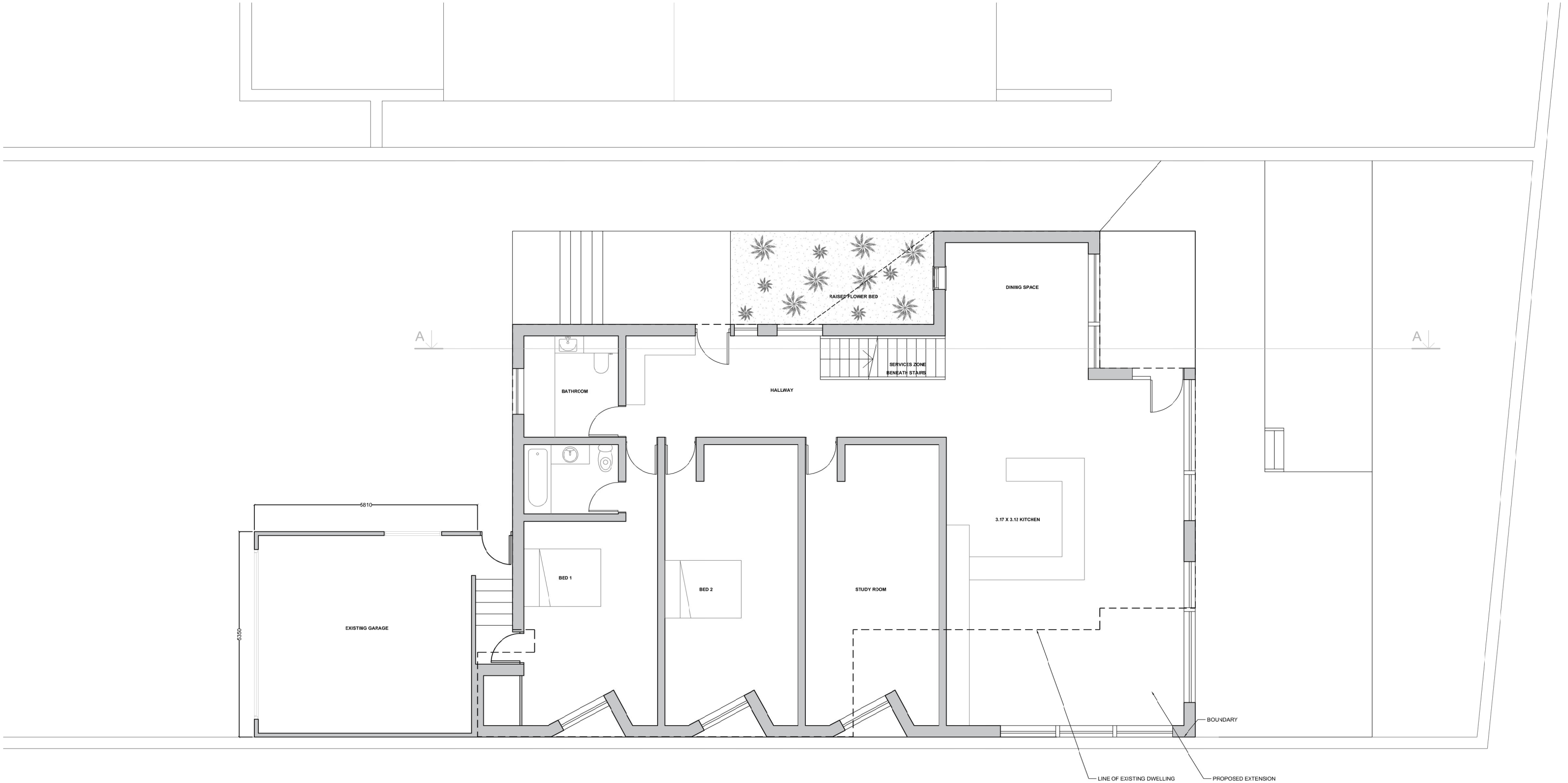
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0 1 2 5 10M

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CLIENT MR JONATHAN PRESSLEY	**DRAWN BY** MV	**CHECKED BY** GE	**SCALE** 1/100@ A3
DATE 27.06.2019	**DRAWING NUMBER** 572.EX.01	**REVISION** -	

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Appendix B



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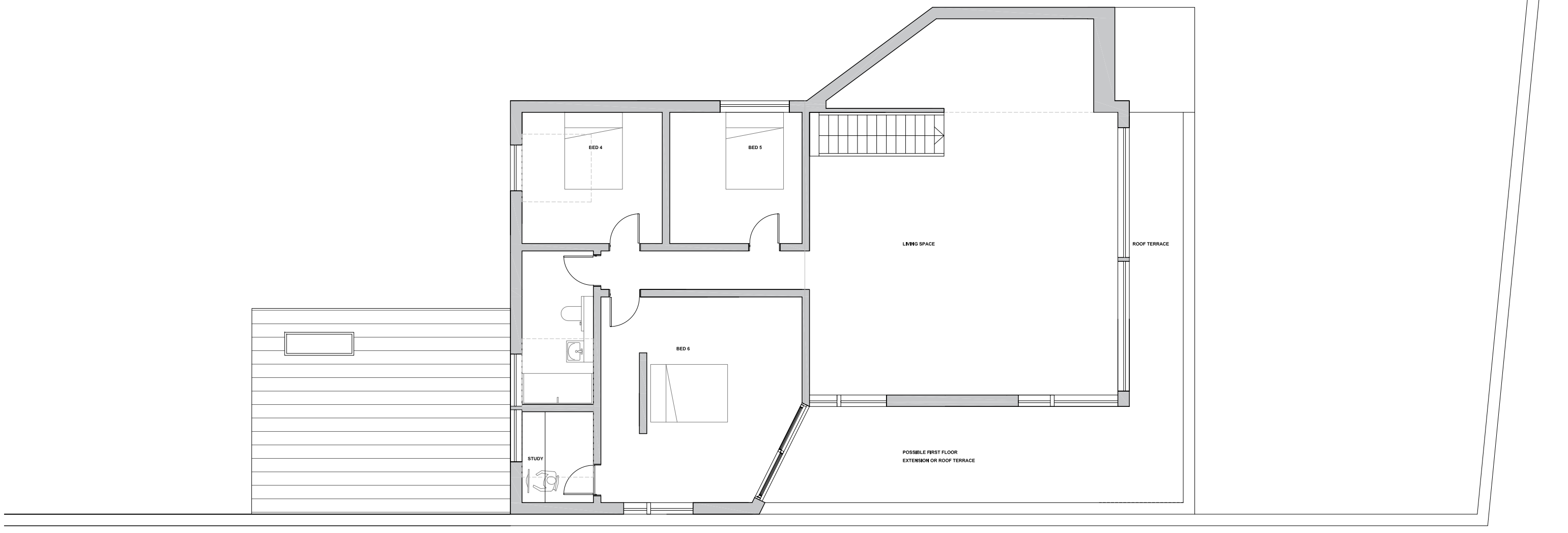
PROPOSED GROUND FLOOR PLAN

SCALE 1:100

0 1 2 5 10M

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SOUTH BEACH	1 SOUTH BEACH,	PROPOSED GROUND FLOOR PLAN	MR JONATHAN PRESSLEY	DP	LT	1/100@ A3	29.01.2020
STAGE	SHOREHAM BY SEA,	**STATUS**		**DRAWING NUMBER**			**REVISION**
PLANNING	BN43 5LJ	PRELIMINARY		572.PL.03			E

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PROPOSED FIRST FLOOR PLAN

SCALE 1:100

N

0 1 2 5 10M

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CLIENT MR JONATHAN PRESSLEY	**DRAWN BY** DP	**CHECKED BY** LT	**SCALE** 1/100@ A3
DATE 29.01.2020	**DRAWING NUMBER** 572.PL.04	**REVISION** C	

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