AMBIENTAL

ENVIRONMENTAL ASSESSMENT

Flood Risk Assessment
4310

3 Lamorna Gardens, Ferring, West Sussex, BN12 5QD

Ambiental Environmental Assessment
Sussex Innovation Centre,
Science Park Square,
Brighton, BN1 9SB

ARUN DISTRICT COUNCIL FG/217/18/HH

Document Issue Record

Project: Phase 1 Flood Risk Assessment

Prepared for: Deadspace Designs

Reference: 4310

Site Location: 3 Lamorna Gardens, Ferring, West Sussex, BN12 5QD

Proposed Development: It is understood that the development is for the construction of small rear extension and loft enlargement to provide greater habitable space.

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Appendix I -

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1. Development Description and Site Area

Proposed Development and Location

1.1 The proposed development is located at 3 Lamorna Gardens, Ferring, West Sussex, BN12 5QD (Figure 1).

1.2 The site is currently a residential dwelling. It is understood that the development is for the construction of small rear extension and loft enlargement to provide greater habitable space.

1.3 Elevations on site vary between approximately 5.1mAOD and 5.782mAOD (2m LiDAR data). Analysis of topographic levels indicates that the site generally slopes to the south.

Figure 1 Location Map, identifying the location of the proposed development (Source: OS)

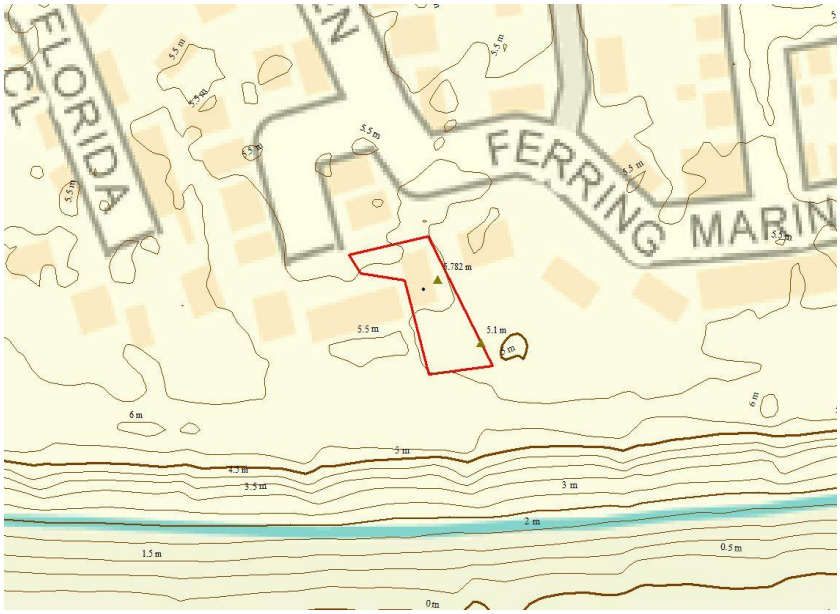

Figure 2 Topography (Source: Global Mappe and EA 2m LiDAR)

Vulnerability Classification

1.4 The Environment Agency (EA) Flood Map for Planning demonstrates that the proposed development lies within Tidal Flood Zone 3 with a high probability of greater than 1 in 200 (0.5%) of flooding from seas or tidal estuaries in any year. See Figure 2.

1.5 According to NPPF guidelines, the existing site is classified as 'More Vulnerable'. Post-development, the NPPF vulnerability is unchanged compared to the existing situation.

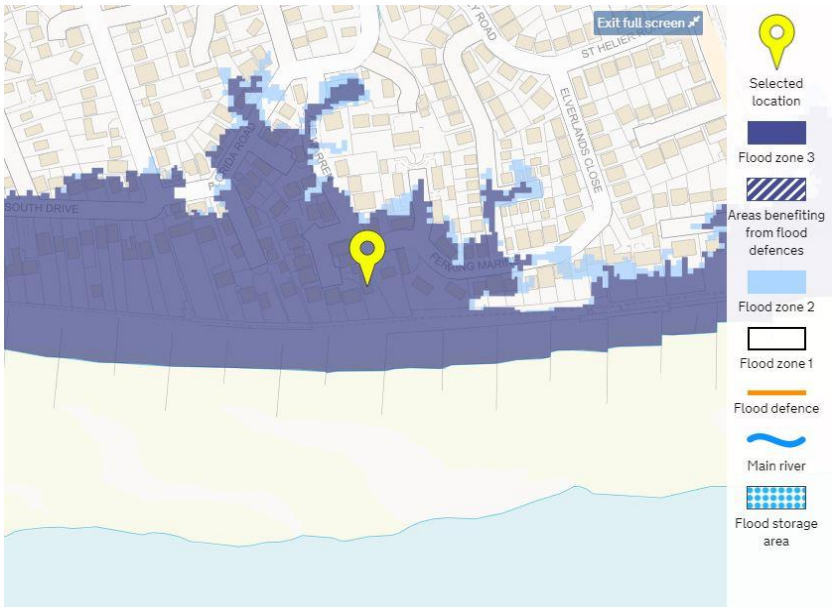

Figure 3 EA Flood Map for Planning

Geology

1.6 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the bedrock underlying the site is Lewes Nodular Chalk Formation comprising chalk.

1.7 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the superficial deposits underlying the site are Storm beach deposits comprising gravel.

2. Sequential Test/Exception Test

2.1 Under the NPPF, all new planning applications should undergo a *Sequential Test*. This test should be implemented by local planning authorities with a view to locating particularly vulnerable new developments (e.g. residential, hospitals, mobile homes etc.) outside of the floodplain.

2.2 The NPPF *Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table* is reproduced below;

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	**Zone 1**	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	×	Exception Test Required	✓
	Zone 3b ***Functional Floodplain***	Exception Test Required	✓	×	×	×

Table 1 The Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table as specified by NPPF. Please note: ✓ means development is appropriate; × means the development should not be permitted.

2.3 Using the principles of the Sequential Test outlined above, the proposed development is 'More Vulnerable'. The site is located within Flood Zone 3a as defined by the EA and the Arun District Council Strategic Flood Risk Assessment (SFRA). Therefore, under the NPPF, would be acceptable if it passed the Exception Test. The development is for an extension (minor development) of the existing use and to be addressed under the EA standing advice.

3. Site Flood Hazards

Sources of Flooding

3.1 The proposed development is located within Flood Zone 3 (high risk of flooding) and is considered to be 'More vulnerable' according to NPPF guidelines. Table 2 summarises the potential sources of flooding to the site:

Source	Description
Fluvial/Tidal	English Channel (tidal) Main River Ferring Rife 500m west
Surface	In surrounding area
Groundwater	Low
Sewer	Low

Table 2 Summary of flood sources.

Fluvial/Tidal

3.2 A main river, the Ferring Rife, is located approximately 500m to the west of the development site.

3.3 The dominant source of flooding on site is tidal by the English Channel to the south. The Arun SFRA provides a map of the flood zones within the council, see Figure 4.

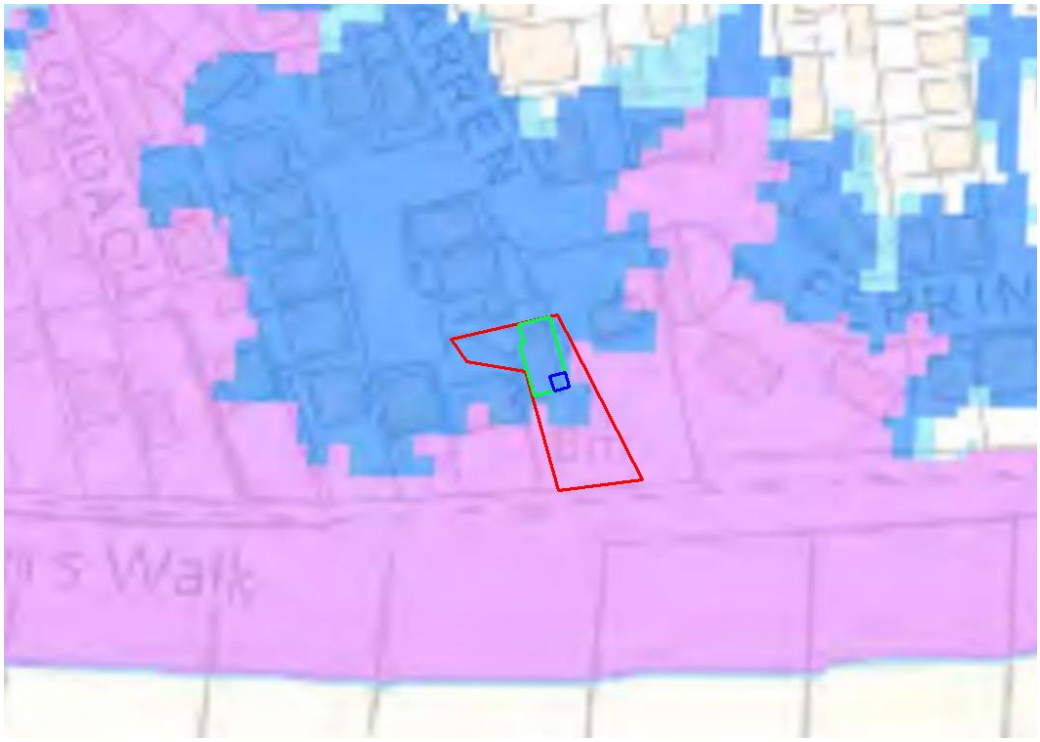

Figure 4 Flood Zones 3a and 3b, building on site shown in red rectangle (Source SFRA). Redline – full site; greenline- existing dwelling; blueline – proposed extension

3.4 As shown in the map from the SFRA (Figure 4), the building within the proposed site is fully within Flood Zone 3a, effectively outside of the functional floodplain as modelled by the SFRA. The site is therefore within the extents of the 1:200 year tidal flood event.

3.5 The proposal is for a minor extension (approximately 20m^2) of the existing use of the house. Being a minor extension (household extension less than 250m^2) in Flood Zone 3, it should follow the guidelines of the EA Standing Advice.

3.6 As such, the proposal is to set the floor levels of the proposed extension no lower than the floor levels of the existing dwelling.

3.7 Therefore, the risk to the site from tidal sources is deemed low to moderate.

Surface Water (Pluvial)

3.8 The Environment Agency Flood Risk from Surface Water web site shows the proposed development to be within an area of 'Very Low' risk of flooding from surface water. Areas identified to be at 'Very Low' risk have a less than 0.1% annual risk of flooding from this source.

3.9 The EA Surface Water Flood Depth Map for the High Risk Scenario indicates that the proposed development is not affected in this event. A small area within the neighbouring site to the east (The Dover House) is shown to experience depths less than 300mm during this scenario.

3.10 The EA Surface Water Flood Depth Map for the Medium Risk Scenario indicates that the proposed development is not affected in this event. An area within The Dover House is shown to experience depths less than 300mm and partially between 300mm and 900mm during this scenario.

3.11 The EA Surface Water Flood Depth Map for the Low Risk Scenario indicates that the proposed development is slightly affected in this event. A patch of land in the south of the site is shown to experience depths up to 300mm. The south end of The Dover House is shown to experience depths between 300mm and 900mm during this scenario.

3.12 As such, the risk from pluvial sources to the site is deemed relatively low.

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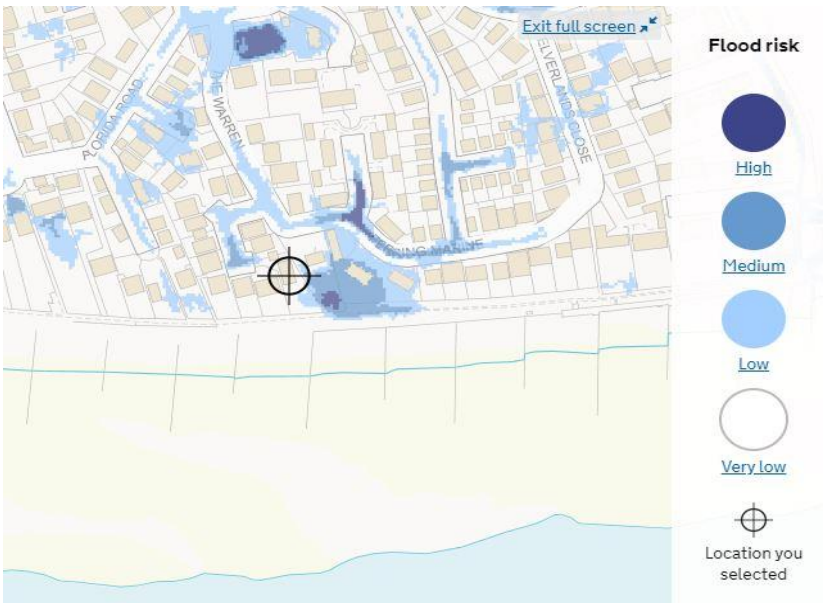


Figure 5 EA Surface Water Flood Risk Map. (Source: EA)

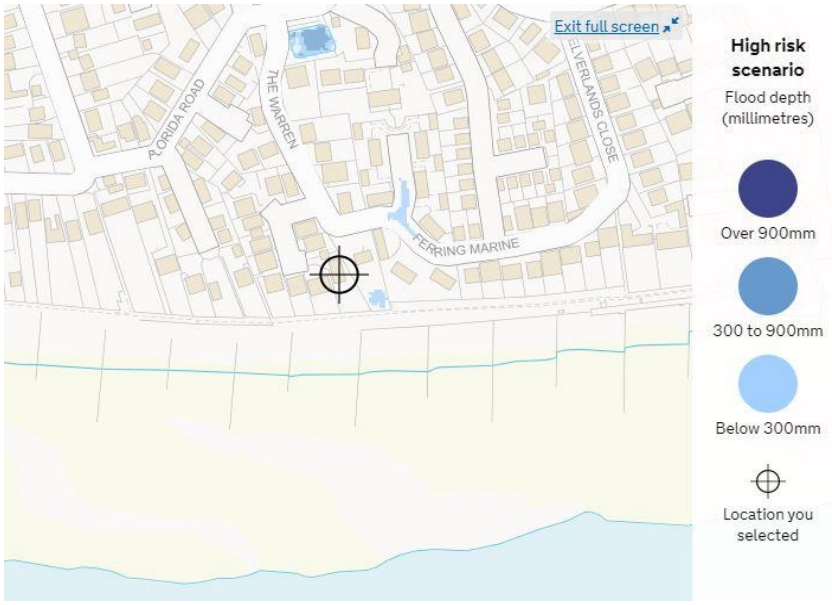


Figure 6 Surface Water Depths for a High Risk Scenario. (Source: EA)

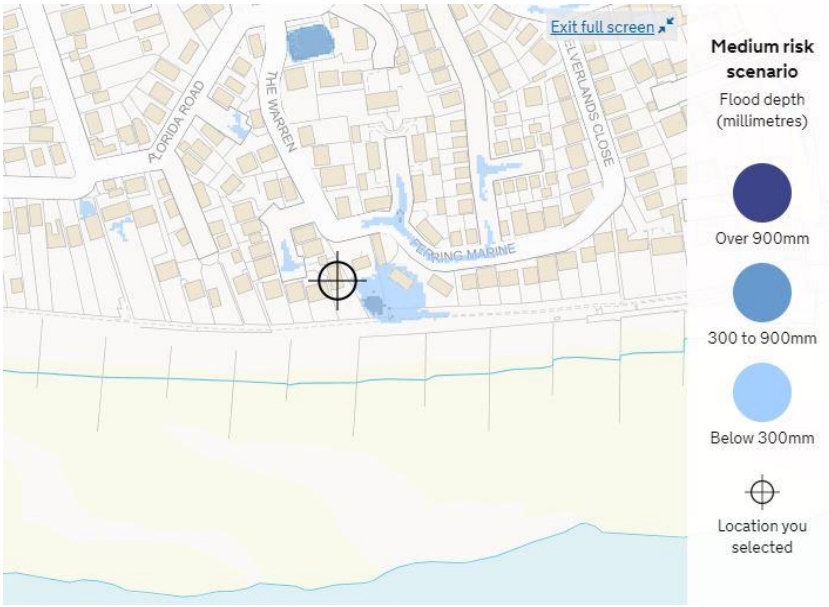


Figure 7 Surface Water Depths for a Medium Risk Scenario. (Source: EA)

Figure 8 Surface Water Depths for a Low Risk Scenario. (Source: EA)

Groundwater

3.13 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the bedrock underlying the site is Lewes Nodular Chalk Formation (Source: BGS). This formation is considered to be a Principal aquifer (Source: EA; Magic Map online resource). A Principal aquifer is highly permeable, supporting water supply and/or river base flow on a strategic scale.

3.14 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the superficial deposits underlying the site are Storm beach deposits comprising gravel. This formation is a Secondary 'A' aquifer

(Source: EA; Magic Map online resource). A Secondary 'A' aquifer is permeable, supporting water supplies at a local scale and may contribute to base flow of rivers.

3.15 This aquifer is considered to be a highly vulnerable principal aquifer, meaning that soils have little ability to attenuate pollutants and therefore pollutants can rapidly reach groundwater.

3.16 The site is not within an EA groundwater Source Protection Zone.

3.17 The Arun SFRA provides a map of the areas susceptible to groundwater. The site is shown to be within a 1km grid area for which a land proportion between 25% and 50% might experience groundwater emergence.

3.18 As such, the risk from groundwater sources to the site is deemed relatively low.

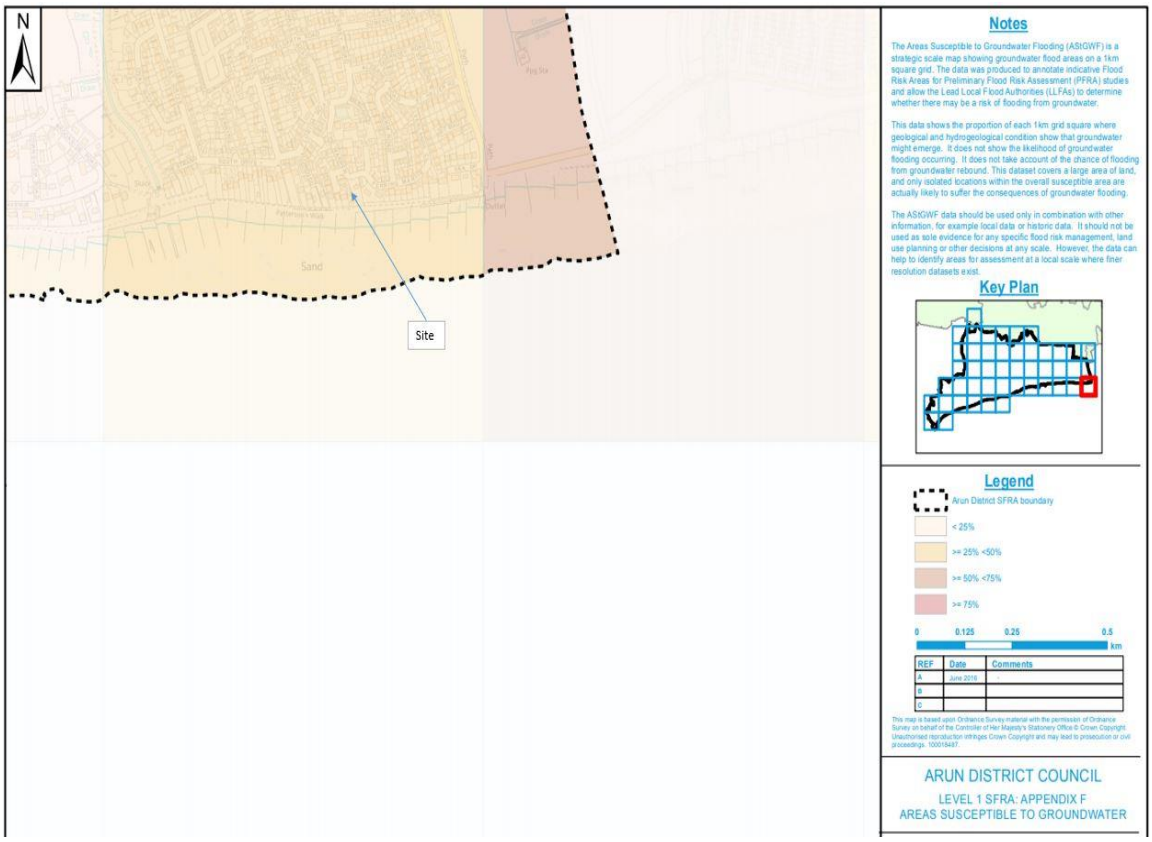


Figure 9 Groundwater Susceptibility. (Source: BGS)

Sewer

3.19 The Arun SFRA provides a table with the Sewer Incident Report Form (SIRF) database on a postcode basis. The site is in a postcode area BN12 5 and the number of recorded flood incidents in this area is 10.

3.20 The total number of recorded incidents with in the Arun SFRA is 315 and the number of postcode areas is 22, the average recorded incidents per postcode area is approximately 14. Therefore, the site is in an area with lower number of recorded sewer incidents than average for the council.

3.21 As such, the risk from sewer sources to the site is deemed relatively low.

Surface Water Drainage Strategy

3.22 The extension is proposed to be within an area that is currently hardstanding. As such, there would be no increase of runoff as a result of the development.

Records of Historical Flooding

3.23 The site is not within an area of historical flooding or in proximity to recorded flooding from other sources according to the SFRA (see Figure 10).

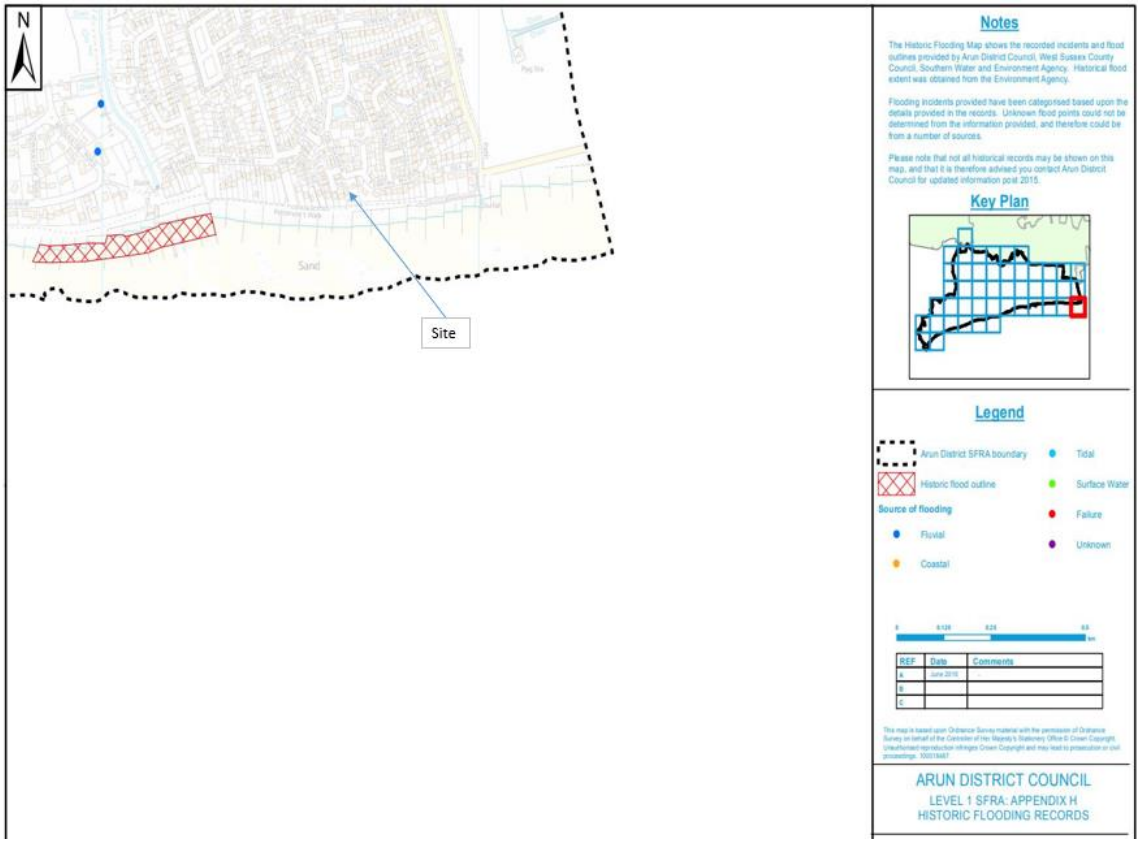


Figure 10 Historical Flooding. (Source: EA)

4. Probability of Flooding

Flood Zones

4.1 According to the EA Flood Map for Planning, the site is located within Flood Zone 3 (high risk of flooding).

4.2 The EA Flood Map for Planning has been produced in part using a relatively coarse, national scale flood modelling strategy, and in part by detailed modelling. It is important to note that only the potential floodplain is modelled; **the mitigating effects of any flood defences currently in place are not considered**. For reference, the definition of the NPPF flood risk zones is included below.

Zone	Description
1	**Low Probability.** This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).
2	**Medium Probability.** This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year.
3a	**High Probability.** This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
3b	**The Functional Floodplain.** This zone comprises land where water has to flow or be stored in times of flood. SFRA's should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the EA, including water conveyance routes).

Table 3 Definition of the NPPF Flood Zones. (Source: EA)

Climate Change on Site

4.3 According to the NPPF, the south-east of England is likely to experience a net sea level rise of 639mm for the year 2085 and 1089mm for the year 2115.

4.4 The NPPF also specifies a 10% increase in peak rainfall intensity from 2025 (and 20% increase from 2055 and a 30% increase from 2085 to 2115) (*Source: Recommended national precautionary sensitivity ranges for peak rainfall intensities, peak river flows, offshore wind speeds and wave heights, Technical Guidance to the NPPF*).

4.5 As such, climate change is likely to increase the risk of flooding on site. However, the proposal is for a minor extension and the finished floor levels would be set no lower than existing. As such, according to the EA Standing Advice, the development should be acceptable.

5. Residual Risks

Identification of Residual Risks

5.1 Residual risks are those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include:

- the failure of flood management infrastructure such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system;
- failure of a reservoir, or;
- a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.

Defence Breach

5.2 The Arun SFRA shows the site to be benefitting from an embankment maintained by the Environment Agency. It is unknown to what level of protection these defences operate. However, the Flood Maps of Planning do not show the site to be benefitting from flood defences. As such, it is deemed that the standard level of protection of these defences is less than 200 years.

5.3 A defence breach has not been modelled for the site. The residual risk of defence breach remains.

Reservoir Failure

5.4 The EA Risk from Reservoir Map demonstrates that the site is outside flood extents in the event of reservoir flooding.

Drainage Exceedance

5.5 In the event of drainage exceedance, the flow of water would be dictated by ground topography on site. the site has a fall to the south towards the sea. As such, this risk is deemed relatively low.

6. Flood Risk Management Measures

Flood Risks

6.1 The proposal is for a minor extension (approximately 20m^2) of the existing use of the house. Being a minor extension (household extension less than 250m^2) in Flood Zone 3, it should follow the guidelines of the EA Standing Advice.

6.2 As such, the proposal is to set the floor levels of the proposed extension no lower than the floor levels of the existing dwelling.

Flood Warning Service

6.3 The EA operates a 24-hour telephone service on 0345 988 1188 that provides frequently updated flood warnings and associated floodplain information. Further information can be found on www.environment-agency.gov.uk/floodline. Floodline Warnings Direct is a free service operated by the EA that provides flood warnings direct to occupants by telephone, mobile phone, fax or pager.

6.4 The proposed development site is located within an EA Flood Warning Service Area. As such, it is recommended that site users sign up to this service.

6.5 Upon receipt of a Flood Warning, site users are advised to evacuate the site to a designated place of safe refuge within Flood Zone 1.

6.6 If flood waters along the proposed evacuation route have exceed 25cm, site users are advised if possible to seek refuge at the upper floors on site. Since the dominant source of flooding is tidal, it is expected that flood water would dissipate with the low tide.

7. Off Site Impacts

Impact to Flood Risk Elsewhere

7.1 The proposal is for a minor extension within a tidally influenced flood zone. As such, it is considered that the proposal would not increase flood risk elsewhere by displacing floodwater.

Generation of Runoff

7.2 The extension is proposed to be within an area that is currently hardstanding. As such, there would be no increase of runoff as a result of the development.

ARUN DISTRICT COUNCIL FG/217/18/HH

8. Conclusion

8.1 Ambiental Environmental Assessment has been appointed by Deadspace Designs to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at 3 Lamorna Gardens, Ferring, West Sussex, BN12 5QD.

8.2 The site is currently a residential dwelling. It is understood that the development is for the construction of small rear extension and loft enlargement to provide greater habitable space (minor development).

8.3 With reference to the Environment Agency (EA) Flood Map for Planning, the proposed development is located within Flood Zone 3. Under the principles of NPPF the proposed development is 'More Vulnerable'.

8.4 The Arun SFRA locates the building in the proposed site fully within Flood Zone 3a, effectively outside of the functional floodplain as modelled by the SFRA. The site is therefore within the extents of the 1:200 year tidal flood event.

8.5 The proposal is for a minor development in the form of an extension (approximately 20m^2) of the existing use(residential dwelling).. Being a minor development (household extension less than 250m^2) in Flood Zone 3, it should follow the guidelines of the EA Standing Advice.

8.6 As such, the proposal is to set the floor levels of the proposed extension no lower than the floor levels of the existing dwelling.

8.7 The risk to the site from tidal sources is deemed low to moderate. The risk from pluvial, groundwater, and sewer sources is deemed relatively low.

8.8 Climate change is likely to increase the risk of flooding on site. According to the NPPF, the south-east of England is likely to experience a net sea level rise of 639mm for the year 2085 and 1089mm for the year 2115. However, the proposal is for a minor extension and the finished floor levels would be set no lower than existing. As such, according to the EA Standing Advice, the development should be acceptable.

8.1 As such and given that:

a) the proposed development is for a minor extension;

b) the site lies within an area of tidal flood risk and therefore is not required to provide compensatory flood storage;

c) given the nature of tidal flooding, prior evacuation can be sought;

d) in terms of flood vulnerability, betterment can be achieved through the implementation of a formal flood warnings/alert and prior evacuation, an area of safe refuge can be provided by internal stairwells to the upper floors;

e) floor levels of the proposed extension would be set no lower than the floor levels of the existing dwelling.

Following the guidelines contained within the NPPF, the proposed development is considered to be suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

ARUN DISTRICT COUNCIL FG/217/18/HH

Appendix I - Site Plans

ARUN DISTRICT COUNCIL FG/217/18/HH

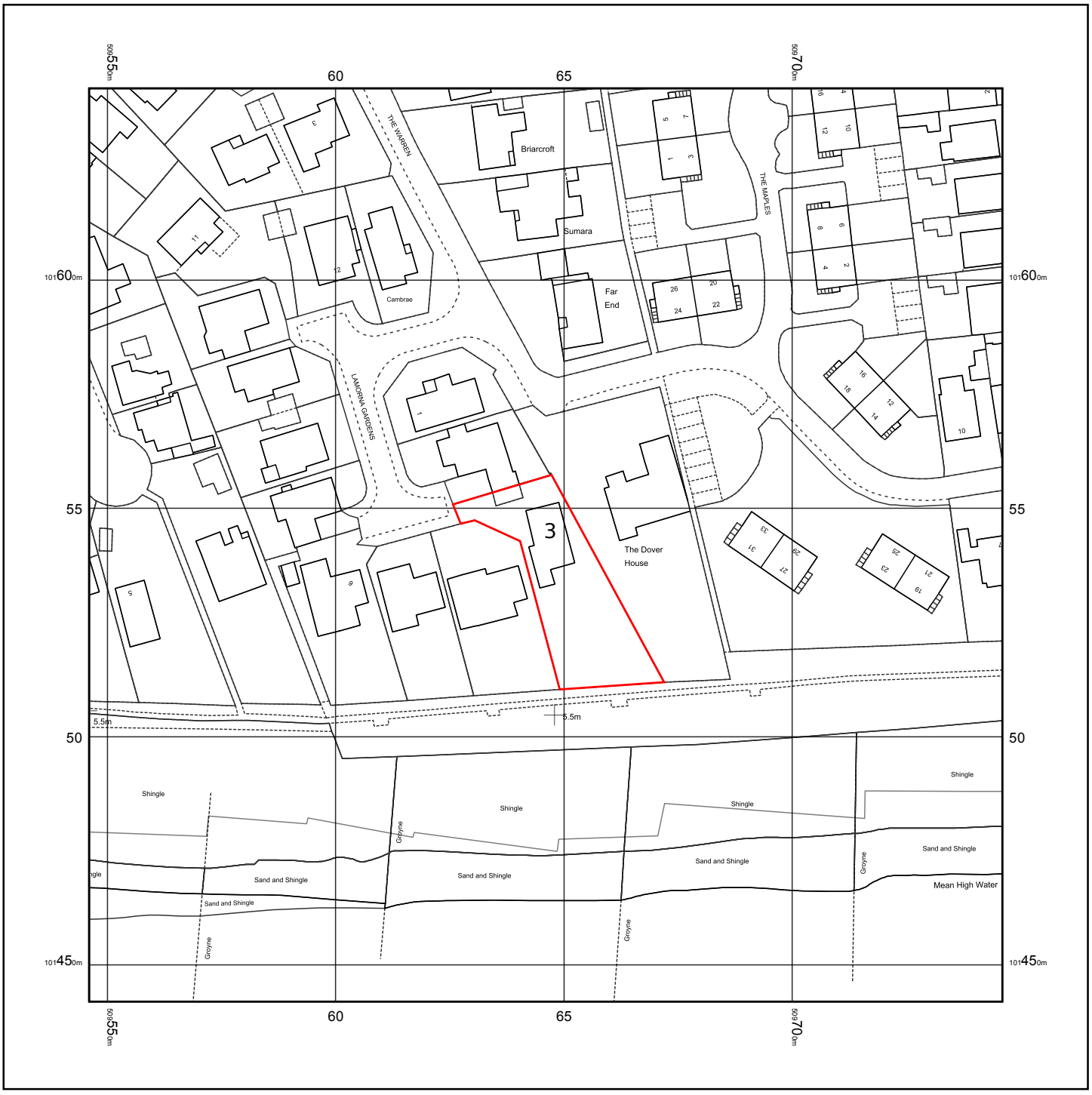
UK MAP CENTRE .com

North

25m

Scale 1:1250

Map data



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Production Date: 05/12/2018 14:41:41

moss

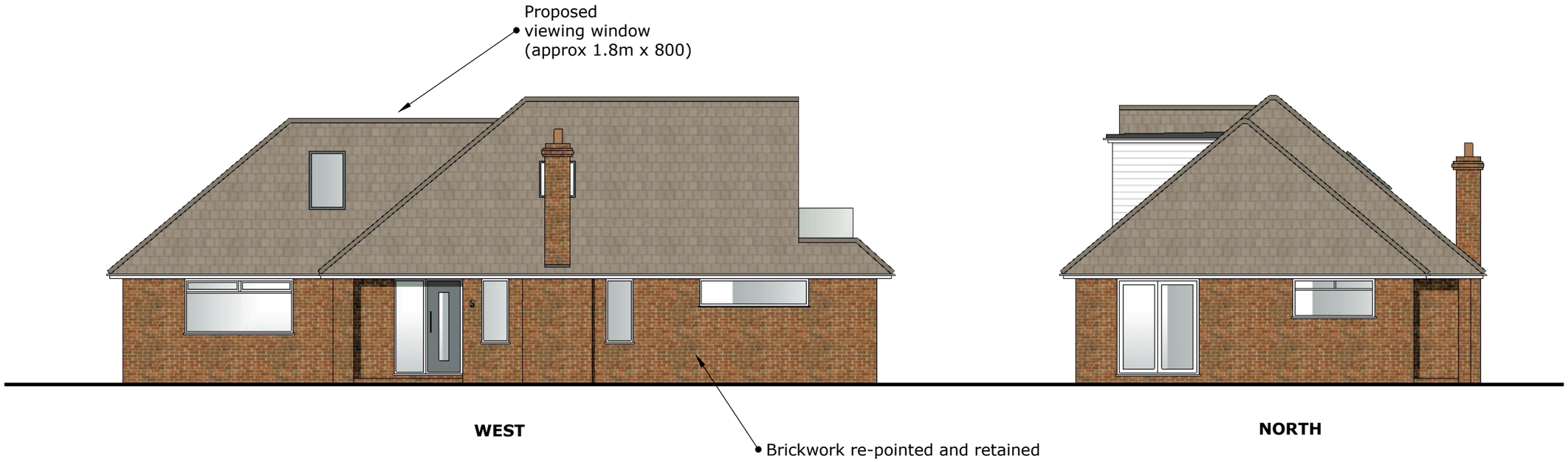
LOCATION PLAN
1:1250 @ A4

DS/LAMORNA/08

27/11/2018

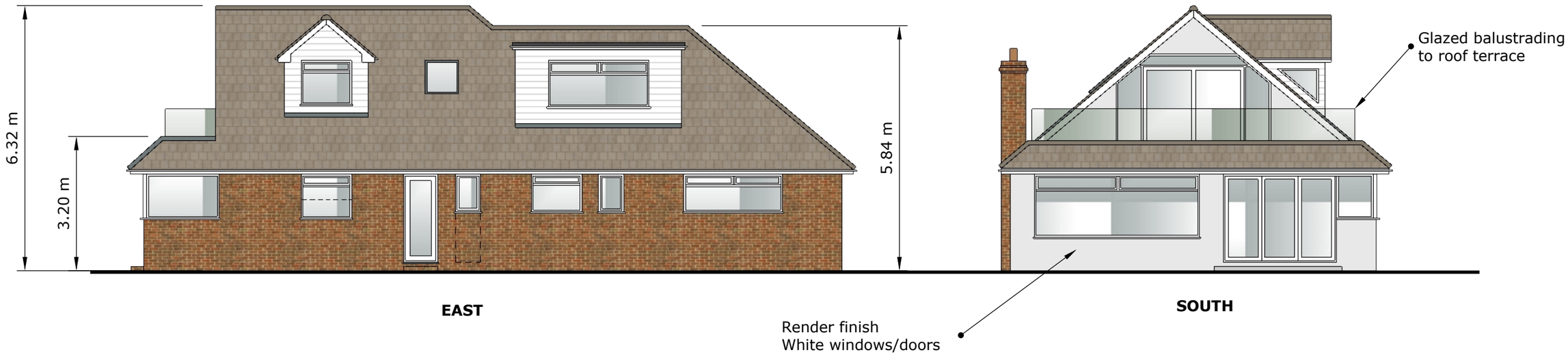
3 LAMORNA GARDENS
FERRING

ARUN DISTRICT COUNCIL FG/217/18/HH



WEST

NORTH



EAST

SOUTH

Revised to show second dormer on North elevation

deadspace DESIGNS

PROPOSED REAR EXTENSION AND RELATED WORKS: 3 Lamorna Gardens, Ferring, BN12 5QD

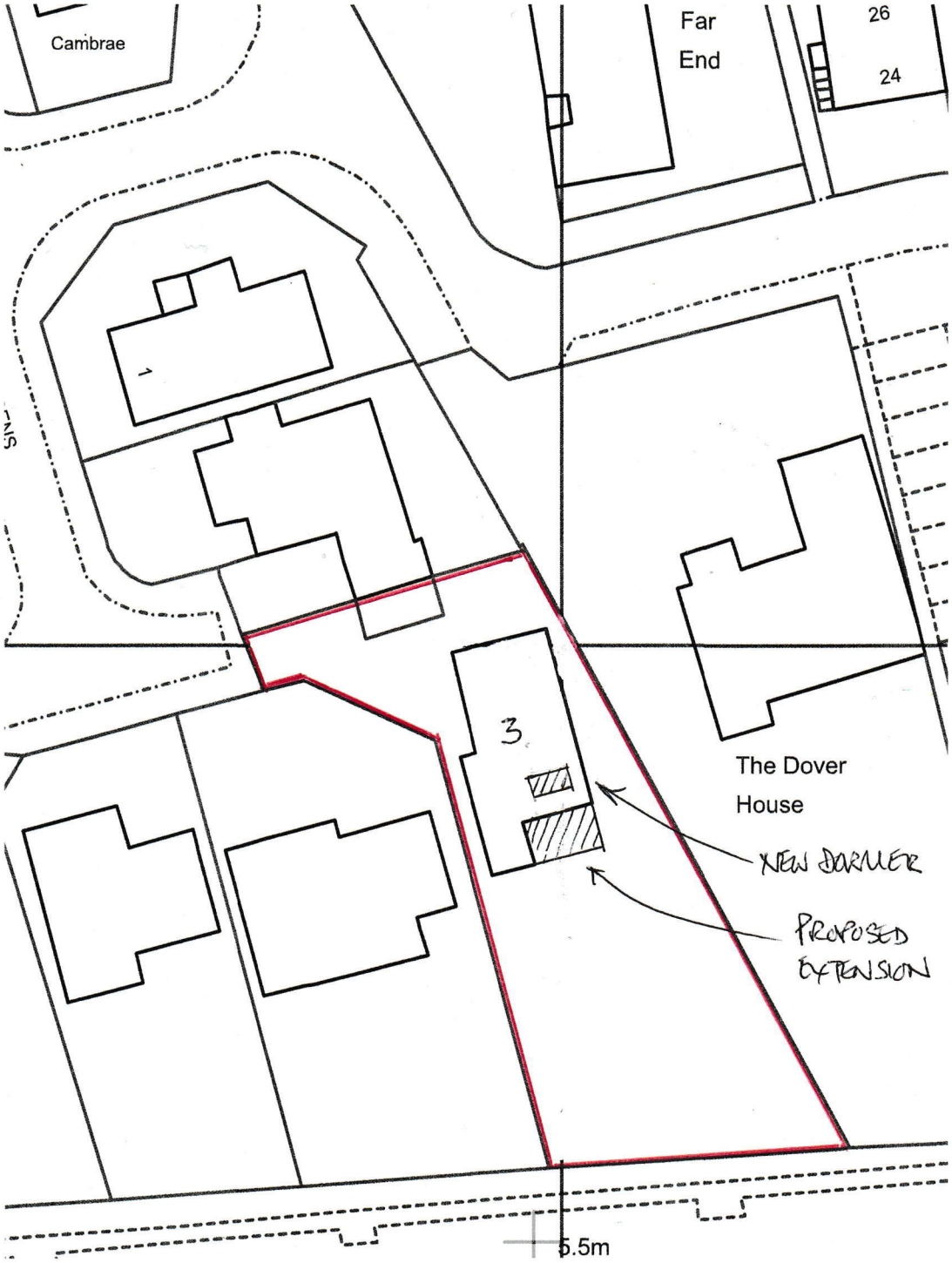
DRAWING: PROPOSED ELEVATIONS **SCALE:** 1:100 @ A3 **DATE:** 11/12/2018 **DRAWING No:** DS/LAMORNA/05rev3

0 1 2 3 4 5m

ARUN DISTRICT COUNCIL FG/217/18/HH

0 10 20 30m.

SCALE BAR



BLOCK PLAN 1:500 @ A4.
27/11/18.
DRWG No. DS/LAMORNA/07.

NORTH.

ARUN DISTRICT COUNCIL FG/217/18/HH

NOTES:
Hatched walls = new (studwork)
Dashed lines = approx 1.8m head-height

Wall set at 1.4m high for headroom in bed

ADDITIONAL EAVES STORAGE

3.72 m

2.90 m

1.99 m

S/L

DRESSING

Galleried Landing

Proposed 1.8m high skylight window

Eaves storage

ROOF TERRACE

7.78 m

3.79 m

4.68 m

BEDROOM

BATH

S/L

2.90 m

1.70 m

wall set at 2m headheight position approx

BEDROOM

1.74 m

1.50 m

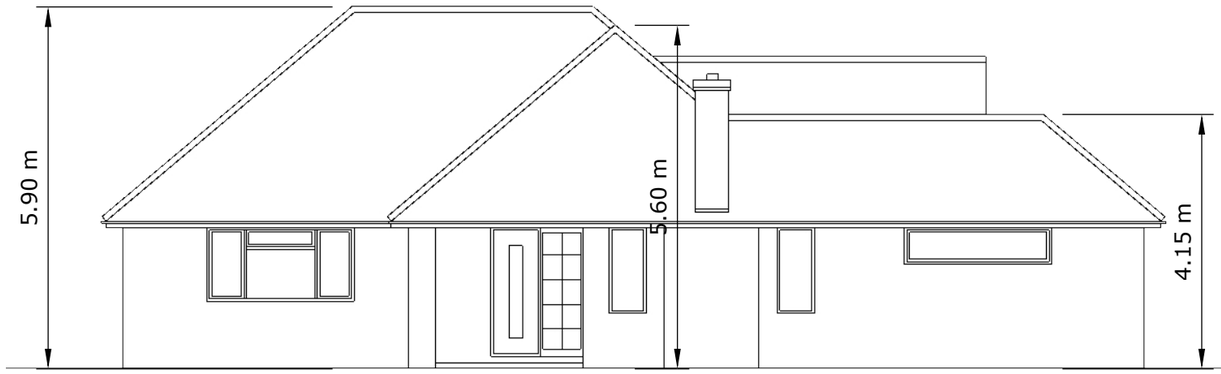
PROPOSED NEW DORMER

deadspace DESIGNS

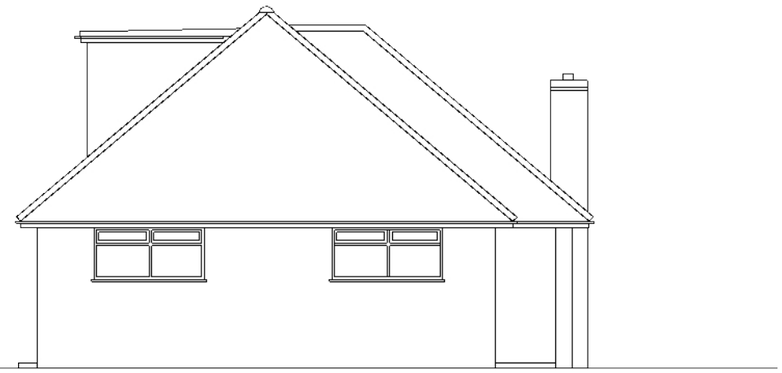
PROPOSED REAR EXTENSION AND RELATED WORKS: 3 Lamorna Gardens, Ferring, BN12 5QD

DRAWING: PROPOSED FIRST FLOOR PLAN **SCALE:** 1:50 @ A3 **DATE:** 27/10/2018 **DRAWING No:** DS/LAMORNA/04/rev2

0 1 2 3m

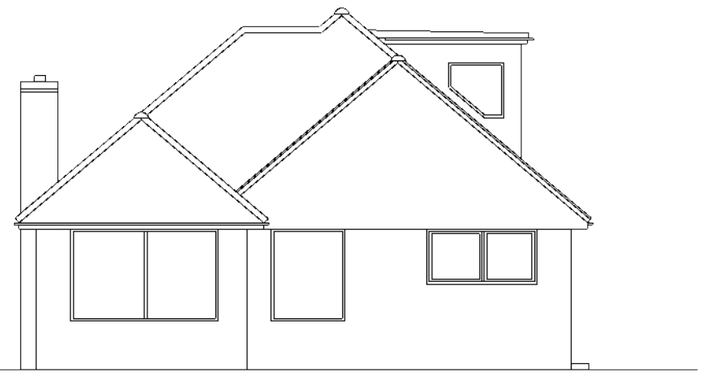


WEST



NORTH

EAST



SOUTH

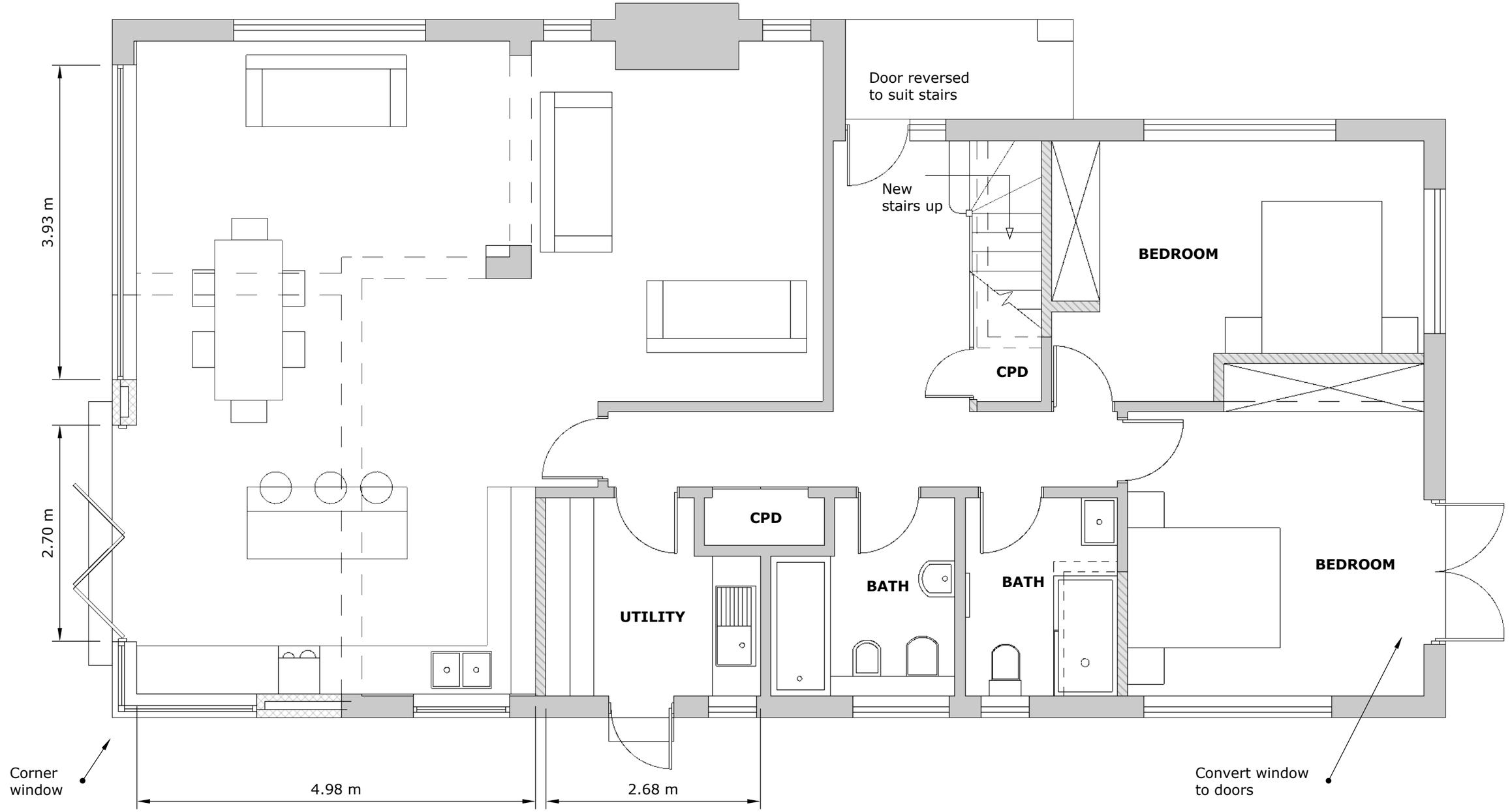
deadspace DESIGNS

PROPOSED REAR EXTENSION AND RELATED WORKS: 3 Lamorna Gardens, Ferring, BN12 5QD

DRAWING: EXISTING ELEVATIONS **SCALE:** 1:100 @ A3 **DATE:** 18/10/2018 **DRAWING No:** DS/LAMORNA/02

0 1 2 3 4 5m

ARUN DISTRICT COUNCIL FG/217/18/HH

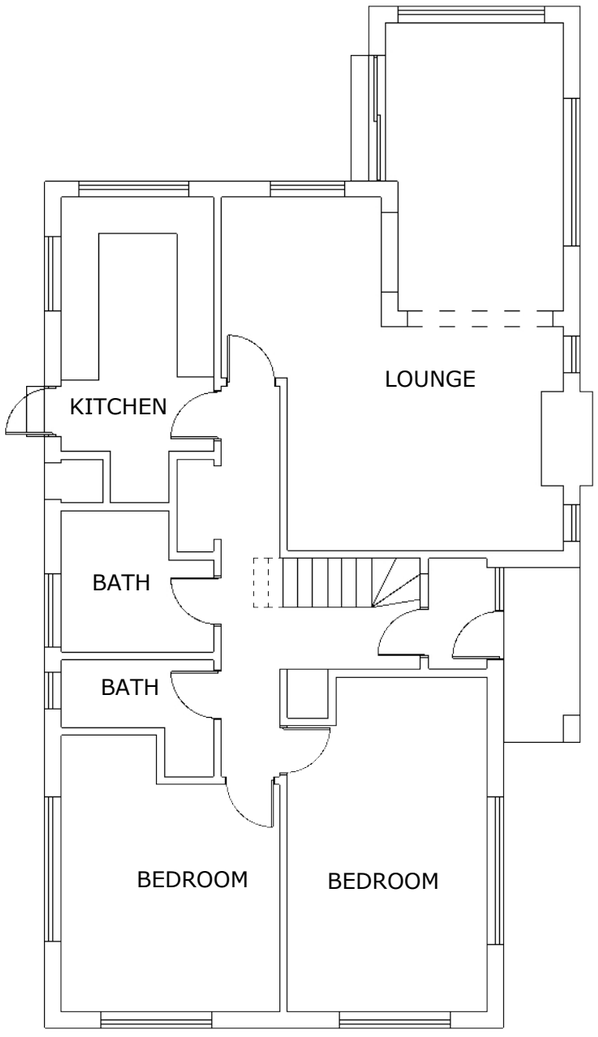


deadspace DESIGNS

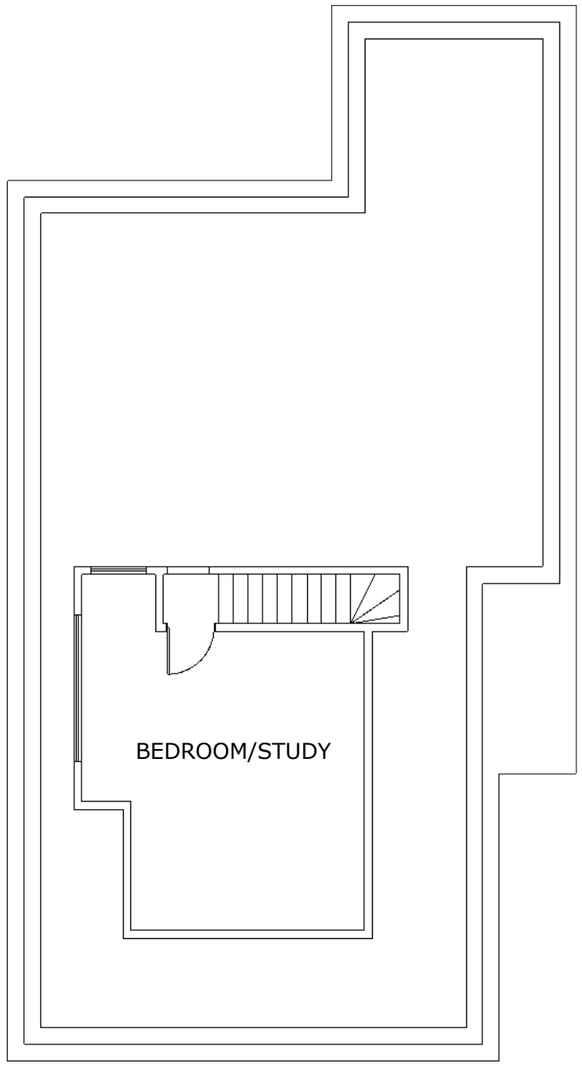
PROPOSED REAR EXTENSION AND RELATED WORKS: 3 Lamorna Gardens, Ferring, BN12 5QD

DRAWING: PROPOSED GROUND FLOOR PLAN **SCALE:** 1:50 @ A3 **DATE:** 18/10/2018 **DRAWING No:** DS/LAMORNA/03

0 1 2 3m



GROUND



FIRST

deadspace DESIGNS

PROPOSED REAR EXTENSION AND RELATED WORKS: 3 Lamorna Gardens, Ferring, BN12 5QD

DRAWING: EXISTING PLANS **SCALE:** 1:100 @ A3 **DATE:** 18/10/2018 **DRAWING No:** DS/LAMORNA/01

0 1 2 3 4 5m

ARUN DISTRICT COUNCIL FG/217/18/HH