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55 Pigeonhouse Lane, BN162BQ

Reference: 195- FRA- 002

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Feb-21

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Rev 1 Produced by: ARD 079 721 44579 arge@rida-reports.co.uk

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FLOOD RISK ASSESSMENT

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Purpose of this report

- 1.1 RIDA Reports Ltd has been appointed by the owner of 55 Pigeonhouse Lane to undertake a Level 1 Screening Flood Risk Assessment for a development located at BN16 2BQ.

Objectives

- 1.2 The objectives of this FRA are to demonstrate the following:
- * Whether the proposed development is likely to be affected by current or future flooding.
 - * Whether the proposed development will increase flood risk elsewhere.
 - * Whether the flood risks associated with the proposed development can be satisfactorily managed.
 - * Whether the measures proposed to deal with the flood risk are sustainable.

Documents Consulted

- 1.3 To achieve these objectives the following documents have been consulted and/or referenced:

The National Planning Policy Framework (NPPF)
CIRIA C753 document The SuDS Manual, 2015
Local Flood Risk Management Strategy (LFRMS)
Level 1 Strategic Flood Risk Assessment (SFRA)
Aerial photographs and topographical survey of the site
British Geological Society Records
Environment Agency flood maps
The CIRIA publication 'C635 Designing for exceedance in urban drainage— Good practice'

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Development Site and Location

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- 2.1 The site is located at Pigeonhouse Lane, Littlehampton. The nearest post code is BN16 2BQ. Refer to appendix A for site location plan.
- 2.2 The current use of the site is the garden of the dwelling. The current use vulnerability classification of the site is More vulnerable. The site is located in the River Flood Zone 1. Refer to Appendix B for more details.

Development Proposals

- 2.3 The proposed development includes the extension of a dwelling. Refer to Appendix B for layout of the proposed development.
- 2.4 The vulnerability classification of the proposed development is More vulnerable with an estimated lifetime between 50 and 100 years.

Site Hydrology and Hydrogeology

- Surface Water 2.5 The English Channel is approximately 240 m away from the development.
- Aquifer 2.6 The development is located within a principle aquifer area. A principle aquifer consists of layers of rock or deposits that provide a high level of water storage. It may support water supply and/or river base flow on a strategic scale. It is likely that principal aquifers are aquifers previously designated as major.
- Source Protection Zone 2.7 The site is not located within a Source Protection Zone.
- Ground Water Levels 2.8 The ground water levels for this site are unknown.

Site Geology

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- Bedrock 2.9 The British Geological Society records of the site show that it is located within the Chalk Formation.
- Superficial Deposits 2.10 The British Geological Society records show that the superficial deposits are Brickearth.
- Contaminated Land 2.11 The contaminated land register has not been consulted. The owner suggested that the site is not contaminated

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National Planning Policy Framework (NPPF)

- 3.1 The NPPF and its technical guidance is a set of planning policies with the key objective to contribute to the achievement of sustainable development. As part of it, they ensure that flood risk and sustainability are taken into account during the planning process. This ensures that developments are not located in flood risk areas and directs developments to lower risk areas. The NPPF applies a sequential risk-based approach to determining the suitability of land for development in flood risk areas. The NPPF also encourages developers to seek opportunities to reduce the overall level of flood risk through the layout of the development and the application of Sustainable Drainage Systems (SuDS). Adoption of these principles at early stages of the project can ensure that the developments take into account appropriate mitigation which is included within the detailed design of the schemes.

The Flood and Water Management Act (2010)

- 3.2 The Flood and Water Management Act aims to reduce the flood risk associated with extreme weather events. It provides a robust management of flood risk for people, homes and businesses and also encourages the use of SuDS for developments. A robust SuDS strategy should take into account the recommendations given in this Flood Risk Assessment. The drainage strategy should incorporate SuDS within the design and also attenuate all flows to either the greenfield or brownfield run off and take into account the risk from other sources as necessary.

Level 1 Strategic Flood Risk Assessment (SFRA)

- 3.3 The SFRA Level 1 identifies flood risk constraints in the local Area. It gives procedures that should be followed in planning to tackle flood risk during any development.

Level 2 Strategic Flood Risk Assessment (SFRA)

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- 3.4 The SFRA Level 2 provides more information on the area identified in the SFRA Level 1, in order to show whether the Exception Test can be passed.



- 4.1 The flood risks were determined by identifying the sources of flooding and assessing their possible impact and likelihood to the development.

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Fluvial Flood Risk - Assessment

- 4.2 Fluvial flood risk was assessed using the Environment Agency Flood Zone Maps and the standing advice approach recommended in the NPPF guidelines. The standing advice takes into account the size of the development and the flood risk vulnerability of land uses.

Standing Advice Applicability

- Step 1** 4.3 The proposed development falls within the remit of the standing advice as it is a minor extension of a household with a floor space of no more than 250 square metres.

Development Size

- Step 2** 4.4 The proposed development does not require a sequential test. The site is not in an area with increased flood risk as a result of multiple minor extensions.

Sequential test

Fluvial Flood Risk - Flood Levels

- 4.5 The site does not benefit from flood defences. The Environment Agency records show that the area around the site has not been flooded in the past.
- 4.6 The 1% AEP level for this site is unknown. The Climate Change allowances for the site is likely to be a central allowance of 500mm.

Fluvial Flood Risk - Resistance and Resilience Plan

- 4.7 The final floor level of the building has been set as per the existing building's ground levels. This level is no lower than existing levels and therefore the following flood proofing could be incorporated should work be carried out within the flood zone areas.
- 4.8 The flood resilience strategy for the development has been based on the CLG 2007 Improving the Flood Performance of New Buildings. See figure 1 below. The strategy is based on the water level within the proximity to the building.
- 4.9 Since the design water depth is unknown. It has been assumed that it is between 300mm and 600mm above the level of the ground level of the building. The water entry strategy approach has been used with a water exclusion strategy for up to 300mm depth flows.

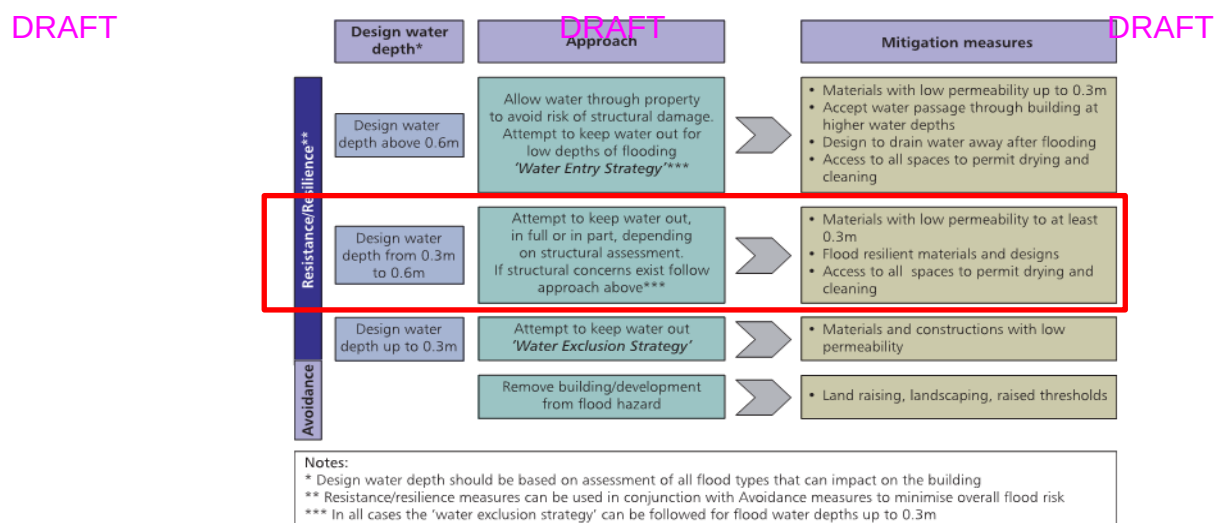
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Figure 1: Rationale for flood resilient and/or resistant design strategies.



4.10 The building should utilise building materials that are suitable for a 'water exclusion strategy'. Materials classified as "Good" (highlighted in red) in Figure 2 shall be used for construction of the new building.

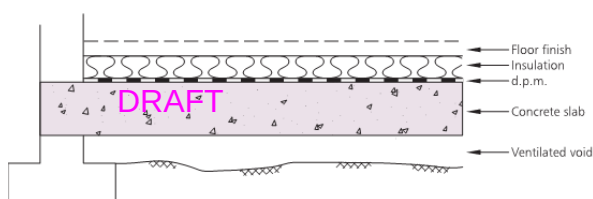
Figure 2: Flood resilience characteristics of building materials (based on laboratory testing)

Material	Resilience characteristics*		
	Water penetration	Drying ability	Retention of pre-flood dimensions, integrity
Bricks			
Engineering bricks (Classes A and B)	Good	Good	Good
Facing bricks (pressed)	Medium	Medium	Good
Facing bricks (handmade)	Poor	Poor	Poor
Blocks			
Concrete (3.5N, 7N)	Poor	Medium	Good
Aircrete	Medium	Poor	Good
Timber board			
OSB2, 11mm thick	Medium	Poor	Poor
OSB3, 18mm thick	Medium	Poor	Poor
Gypsum plasterboard			
Gypsum Plasterboard, 9mm thick	Poor	Not assessed	Poor
Mortars			
Below d.p.c. 1:3(cement:sand)	Good	Good	Good
Above d.p.c. 1:6(cement:sand)	Good	Good	Good

* Resilience characteristics are related to the testing carried out and exclude aspects such as ability to withstand freeze/thaw cycles, cleanliness and mould growth

4.11 Foundations: Suspended concrete floor slabs at least 150mm thick is the preferred option. There should be a minimum space of 150mm ventilated void between the ground level and the bottom of the floor slab. Damp proof membranes should be included in the design. Floor insulation should be of the closed-cell type. Under floor services using ferrous materials should be avoided. Ceramic/concrete-based floor tiles, sitting on a bed of sand, cement render and water resistant grout can be used. See typical detail below:

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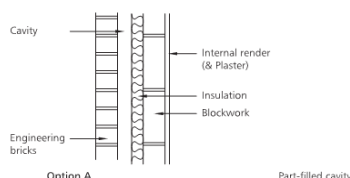


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- Reinforced concrete slab at least 150mm thick and complying with structural requirements for uplift forces
- Damp proof membrane of polythene at least 1200 gauge
- Insulation as rigid closed-cell material
- Ceramic tiles or stone floor finishes and including skirting boards.

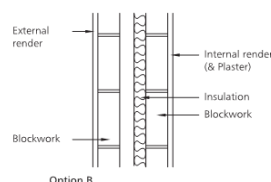
4.12 Concrete blocks used in foundations should be sealed with an impermeable material or encased in concrete to prevent water movement from the ground to the wall construction.

4.13 External Walls: Good quality facing bricks can be used for external face. External renders should not be used. External insulation is better than cavity insulation. See typical options below.



Part-filled cavity – Option A

- External face consisting of engineering bricks up to required level for flood protection (up to 0.6m maximum above floor level plus one course). Other external facing materials can be used above this level, but ensure interface is watertight.
- Rigid insulation.
- Internal face consisting of blocks.
- Internal cement based render, preferably with lime content. Composition depends on masonry; the following mix is effective:
 - 1 cement : 6 sand : 1 lime on Aircrete.
- Ensure stainless steel wall ties are used to minimise corrosion and consequent staining.
- Sacrificial plasterboard can be used, but it needs to be removed between ground floor and flood level. The board should be fitted horizontally to make removal easier. In some cases a dado rail can be used to cover the joints.



Part-filled cavity – Option B

- External cement based render, preferably with lime content. Composition depends on masonry; the following mixes are effective:
 - 1 cement : 4 sand : 1/2 lime on concrete blockwork
 - 1 cement : 6 sand : 1 lime on Aircrete.
- External face consisting of blocks.
- Rigid insulation.
- Internal face consisting of blocks.
- Internal cement based render, preferably with lime content. Composition depends on masonry; the following mix is effective for flood resilience:
 - 1 cement : 6 sand : 1 lime on Aircrete.
- Ensure stainless steel wall ties are used to minimise corrosion and consequent staining.

4.14 Services and fittings (communications wiring, hearing systems, electrical services, water, electricity and gas meters) should be placed at above the flood level. Where possible, all service entries should be sealed (e.g. with expanding foam or similar closed cell material). Closed cell insulation should be used for pipes which are below the predicted flood level.

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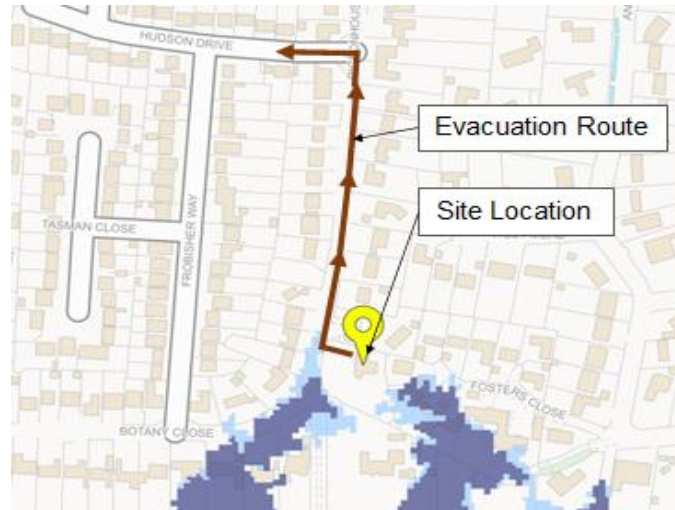
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- 4.15 Fittings should be designed to be replaced after a flood, it is advisable to specify durable fittings that are not appreciably affected by water and can be easily cleaned (e.g. use of plastic materials or stainless steel). The cost of these units may need to be balanced against the predicted frequency of flooding. Avoid wood fibre based carcasses and use easily removable solid wood doors and drawers.

Fluvial Flood Risk - Access and Evacuation

- 4.16 Safe egress is achievable by following Pigeon House Lane towards Hudson Road, which is shown to be beyond the extent of flooding. See figure 3 below for details.
- 4.17 The site is not within an Environment Agency Flood Warning Area. The occupants of the site are encouraged to form an appropriate Flood Management and Evacuation Plan prior to occupation of the site.

Figure 3: General evacuation route



Fluvial Flood Risk - Surface Water Management

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- 4.18 The surface water run-off will be disposed using SuDS techniques. The aim is to provide a sustainable design that accommodates the proposed attenuation volume and replicated the existing drainage regime using the SuDS hierarchy is shown in the figure 4 below.

- 4.19 The SuDS techniques highlighted in red below can be used on site. This assessment is based on the ground conditions and the potential discharge points available.

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Figure 4: The SuDS Hierarchy (Source:EA Thames region, SuDS a practical guide)

Most Sustainable	SUDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
↑	Living roofs	✓	✓	✓
	Basins and ponds - Constructed wetlands - Balancing ponds - Detention basins - Retention ponds	✓	✓	✓
	Filter strips and swales	✓	✓	✓
	Infiltration devices - soakaways - infiltration trenches and basins	✓	✓	✓
	Permeable surfaces and filter drains - gravelled areas - solid paving blocks - porous paviers	✓	✓	
↓ Least Sustainable	Tanked systems - over-sized pipes/tanks - storm cells	✓		

- 4.20 These SuDS techniques should be implemented and sized during the detailed design of the project

Fluvial Flood Risk - Working next to a main river

- 4.21 The development is more than 8 metres of the bank of a main river, or 16 metres if it is a tidal main river. A Flood risk activity Environmental Permit is not required.

Surface water (overland flows) flood risk

- 4.22 The basis of the surface water flood maps is defined by the Environment Agency as follows.

"The nationally produced surface water flood mapping only indicates where surface water flooding could occur as a result of local rainfall

- Ordinary watercourses
- Drainage systems or public sewers caused by catchment-wide rainfall events
- Rivers
- Groundwater.

Due to the modelling techniques used, the mapping picks out depressions in the ground surface and simulates some flow along natural drainage channels, rivers, low areas in floodplains, and flow paths between buildings. Although the maps appear to show flooding from ordinary watercourses, they should not be taken as definitive mapping of flood risk from these as the conveyance effect of ordinary watercourses or drainage channels is not explicitly modelled. Also, structures such as bridges, culverts and weirs) and flood risk management infrastructure (such as defences) are not represented.

The nationally produced surface water flood mapping does not take account of the effect of pumping stations in catchments with pumped drainage. No allowance is made for tide locking, high tidal or fluvial levels where sewers cannot discharge in to rivers or the sea."

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- 4.23 The Environment Agency maps show that the flood risk from surface water is very low. A residual risk of localised ponding remains unlikely.

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Flooding from drainage systems in adjacent areas

- 4.24 There are records of sewer flooding in this area the following interventions are recommended:

- Install a NRV valve on the foul sewer pipe connecting to the public sewer

- 4.25 The site is outside of a critical drainage area. No mitigation required.

Reservoirs Risks

- 4.26 The Reservoir Flood Map (RFM) produced by the Environment Agency do not show the risk to individual properties of dam breach flooding. The maps do not indicate or relate to any particular probability of dam breach flooding. The maps were prepared for emergency planning purposes and can be used to help reservoir owners produce on-site plans and the Local Resilience Forum produce off-site plans, and to prioritise areas for evacuation/early warning in the event of a potential dam failure. The RFM shows that the development could be within the possible dam breach flooding path. It is recommended that the Local Resilience Forum is contacted during detailed design. See Appendix C.

Groundwater flood risk

- 4.27 The strategic flood risk assessment shows that there is potential for groundwater flooding below ground level within the development. Groundwater levels would tend to vary seasonally and are influenced by ground and meteorological conditions and proximity to water features. The groundwater flooding risk for this site is considered to be low; however it is recommended that groundwater resilience measures should be implemented. These will include providing tanking to the building to prevent groundwater ingress to the below ground sections of the building.

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- 5.1 The development fully complies with the NPPF as it has been designed for water entry and be safe for use. The drainage principles should be used in the detailed design of the surface water systems.

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- 5.2 This report demonstrates that the proposal will be safe, in terms of flood risk, for its design life and will not increase the flood risk elsewhere.

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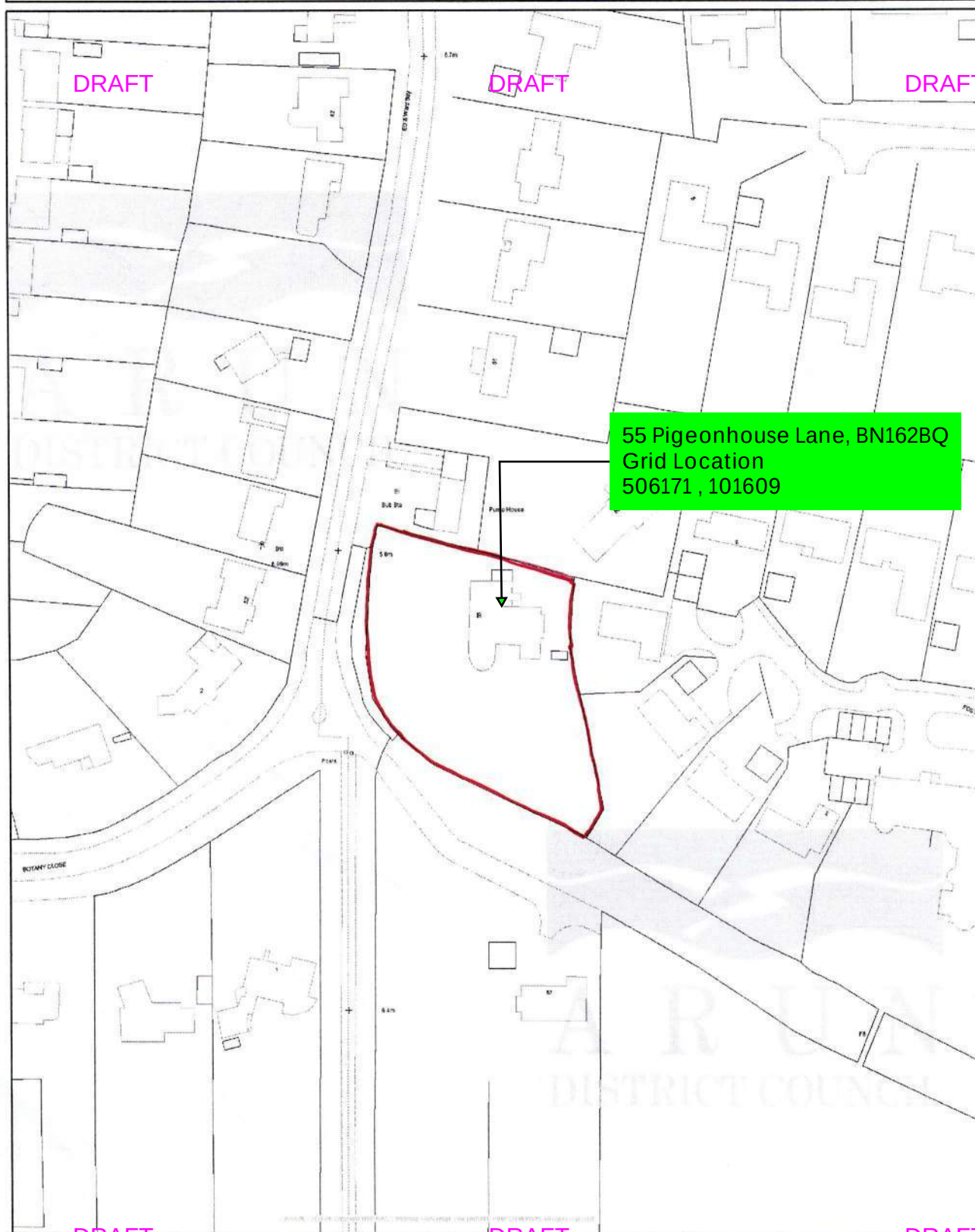
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Appendix A

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Date 16/3/2007
Centre = 506170 E 101616 N

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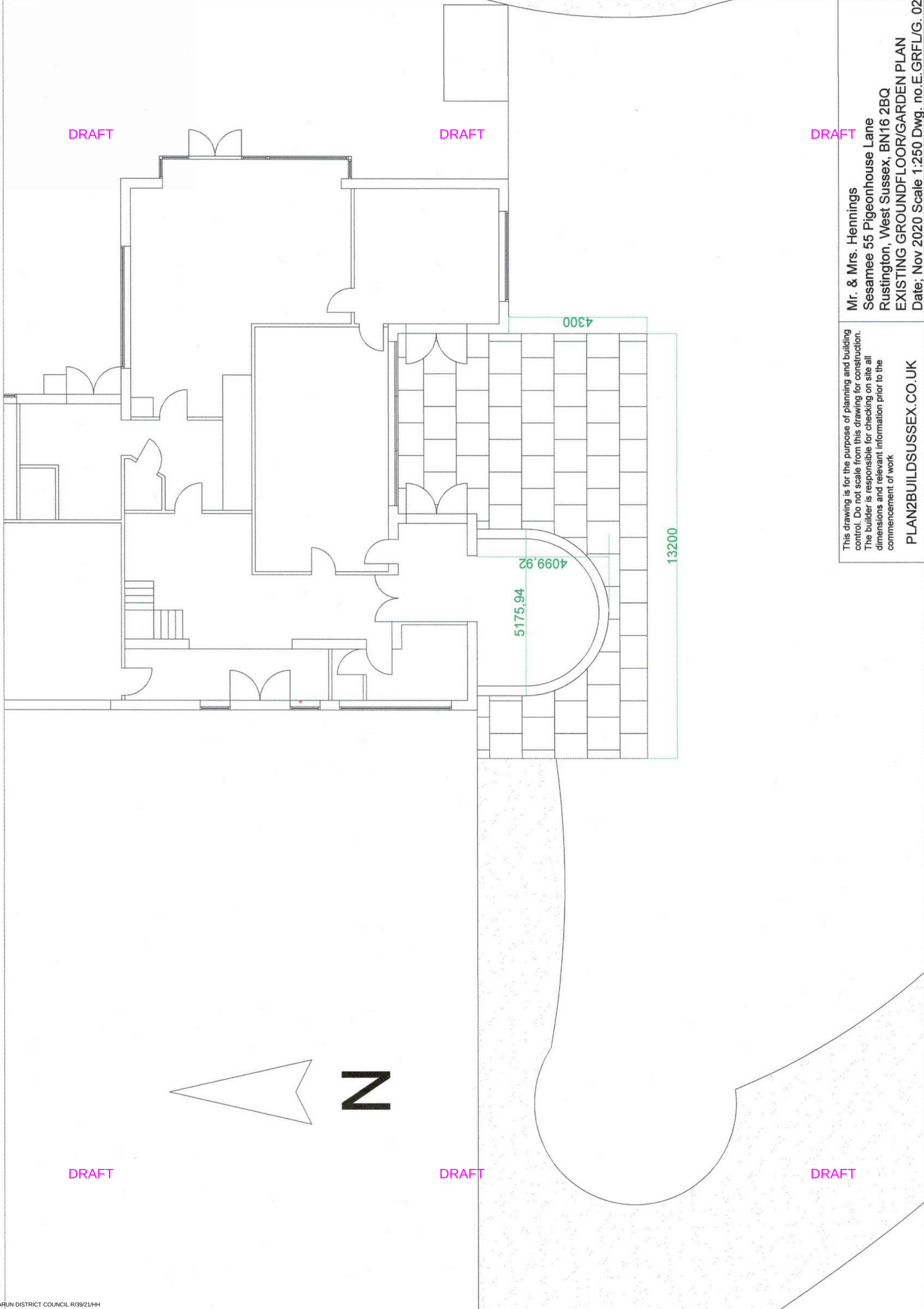
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Appendix B

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This drawing is for the purpose of planning and building control. Do not scale from this drawing for construction. The builder is responsible for checking on site all dimensions and relevant information prior to the commencement of work

PLAN2BUILDSUSSEX.CO.UK

Mr. & Mrs. Hennings
Sesamee 55 Pigeonhouse Lane
Rustington, West Sussex, BN16 2BQ
EXISTING GROUND FLOOR/GARDEN PLAN
Date: Nov 2020 Scale 1:250 Dwg. no.E.GRFL/G. 02

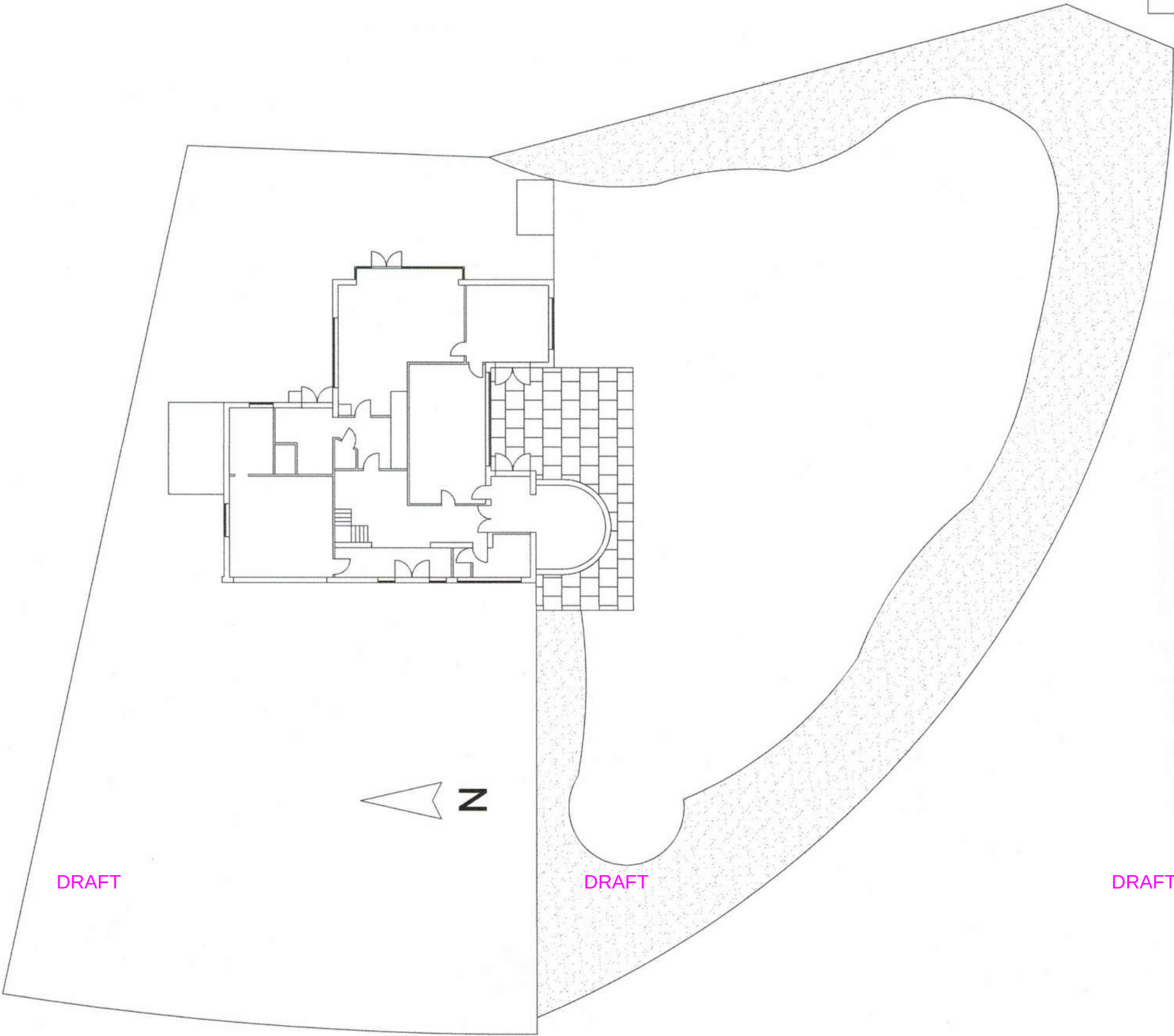
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Mr. & Mrs. Hennings
Sesamee 55 Pigeonhouse Lane
Rustington, West Sussex, BN16 2BQ
EXISTING GROUND FLOOR/GARDEN PLAN
Date: Nov 2020 Scale 1:250 Dwg. no.E.GRFL/G. 02

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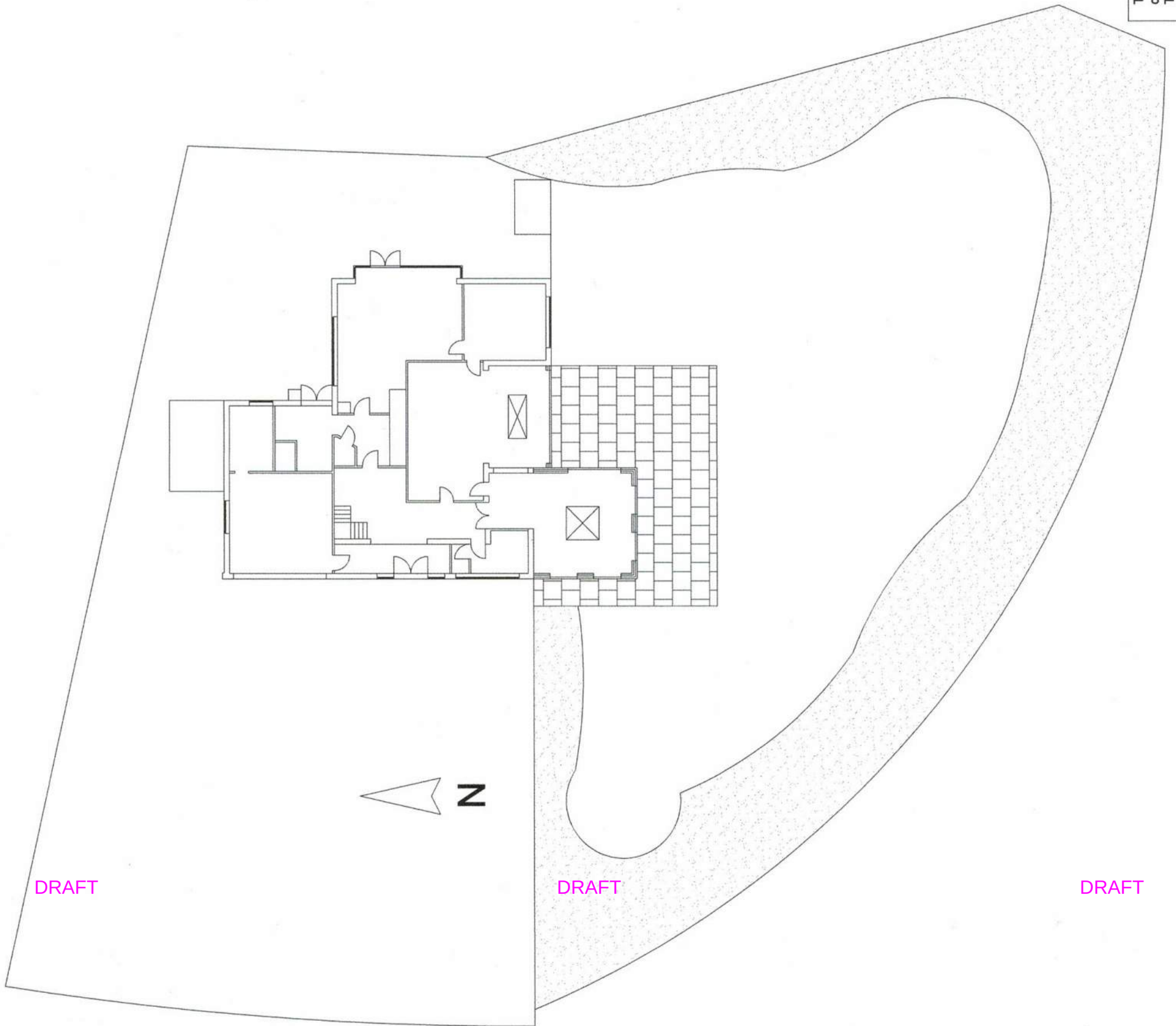
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Mr. & Mrs. Hennings

Sesamee 55 Pigeonhouse Lane
Rustington, West Sussex, BN16 2BQ

PROPOSED GROUND FLOOR GARDEN PLAN
Date: Nov 2020 Scale: 1:250 Dwg. no. PRGRF/G 04

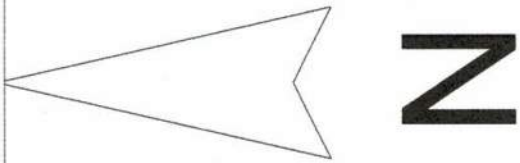
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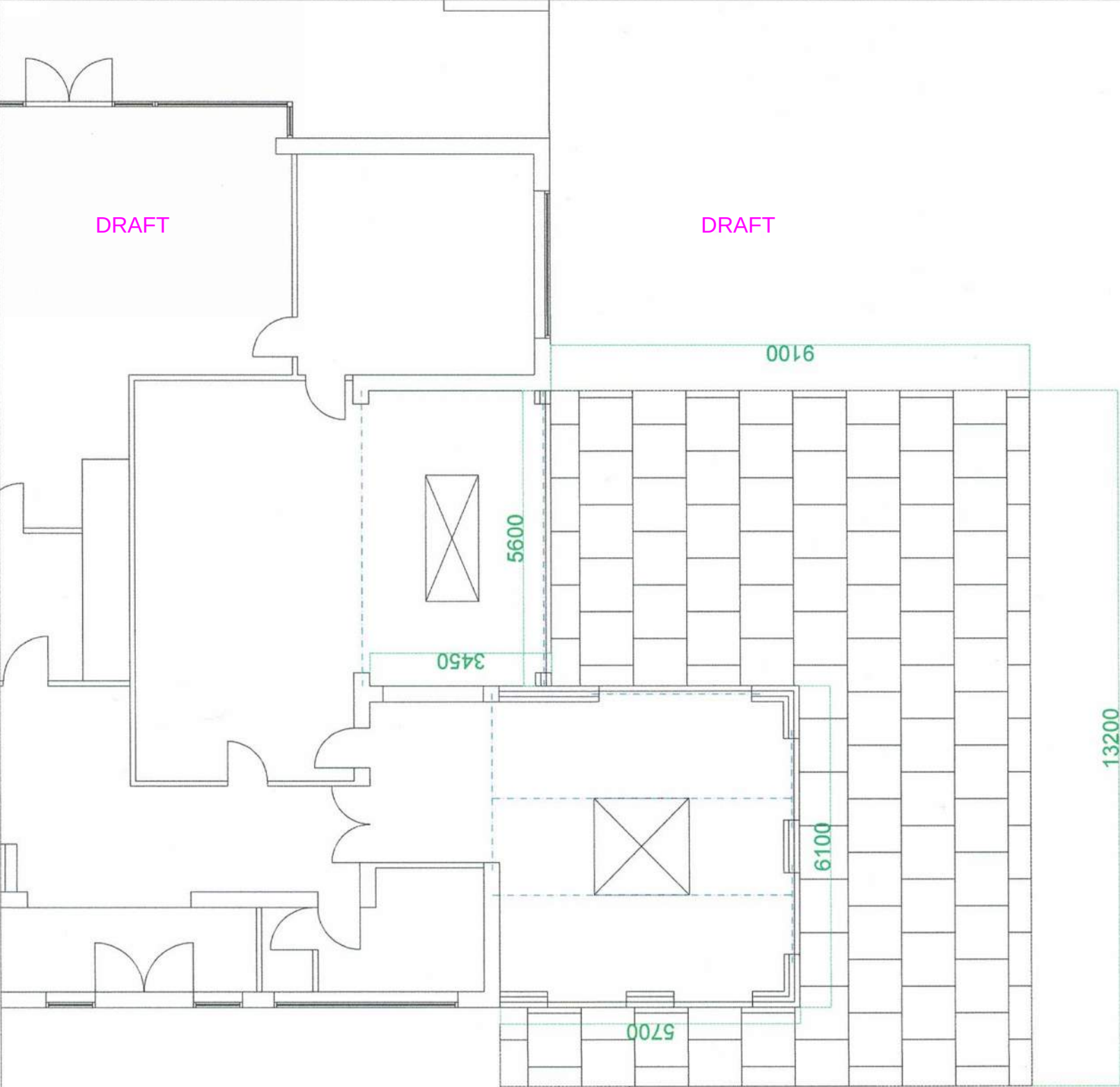
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Mr. & Mrs. Hennings
Sesamee 55 Pigeonhouse Lane
Rustington, West Sussex, BN16 2BQ
PROPOSED GROUND FLOOR GARDEN PLAN
Date: Nov 2020 Scale: 1:250 Dwg. no. PRGRF/G 04

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Appendix C

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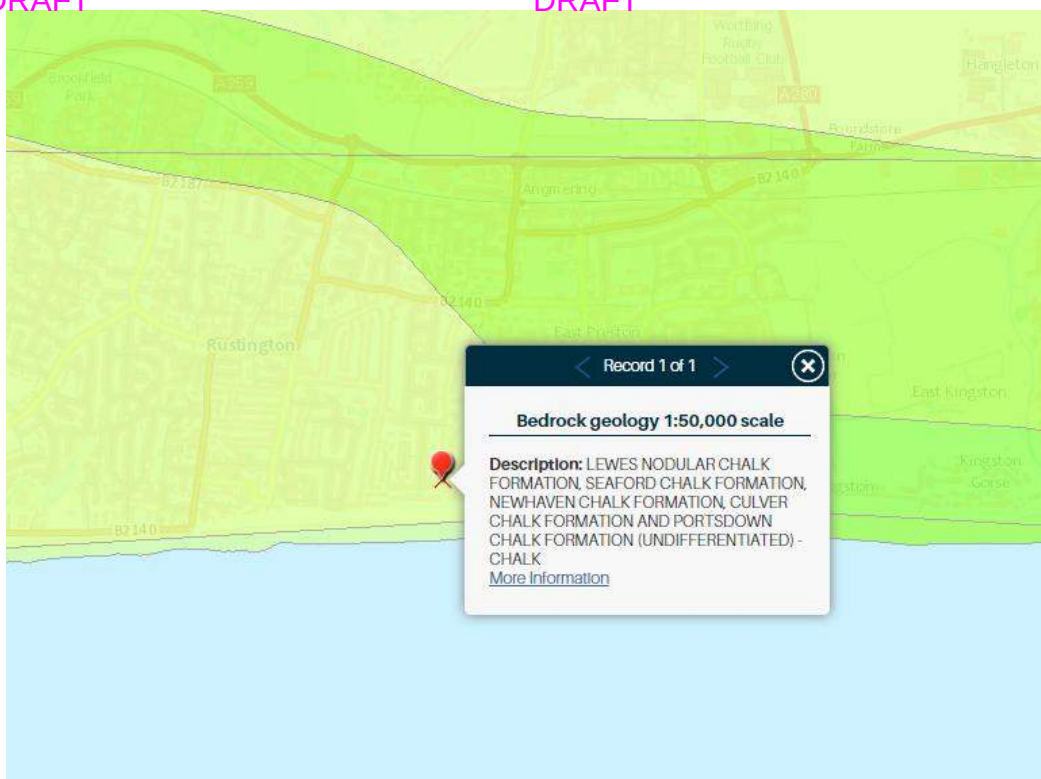
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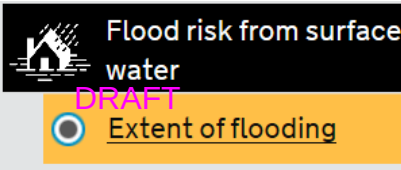


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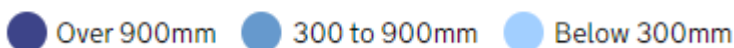
SITE FLOOD RISK



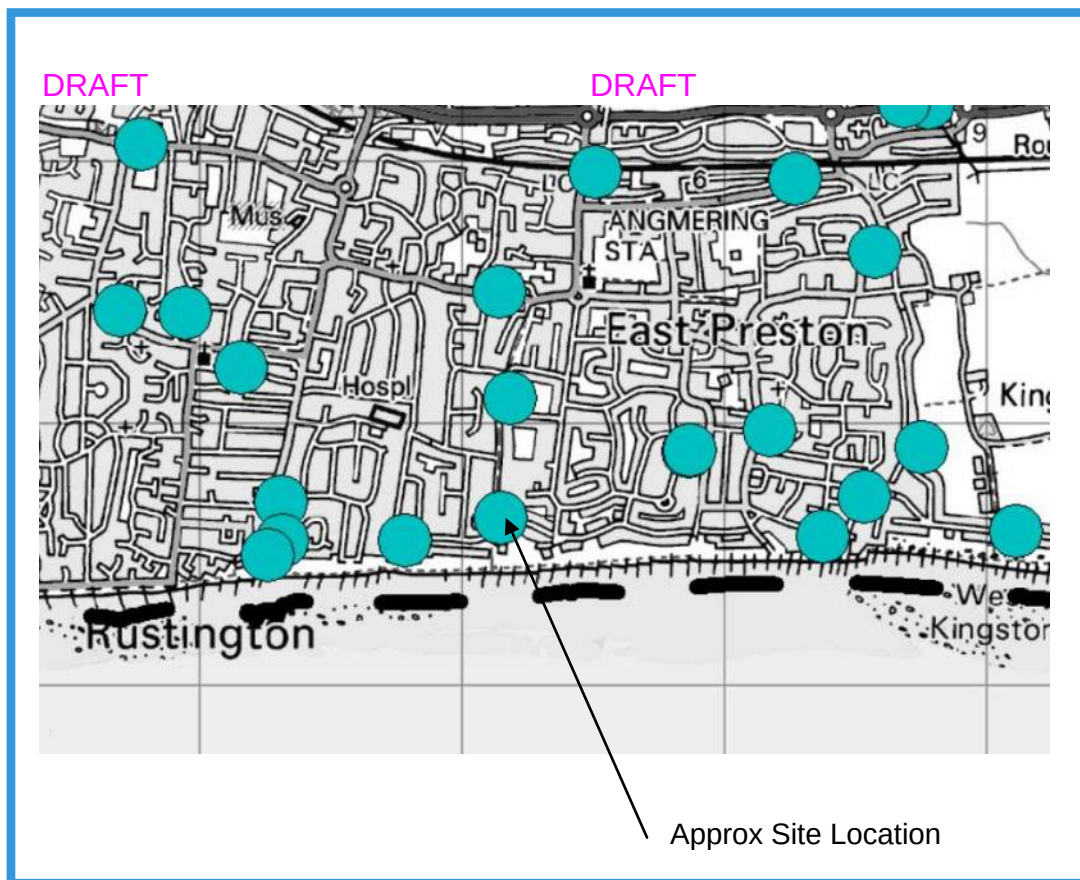
Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.



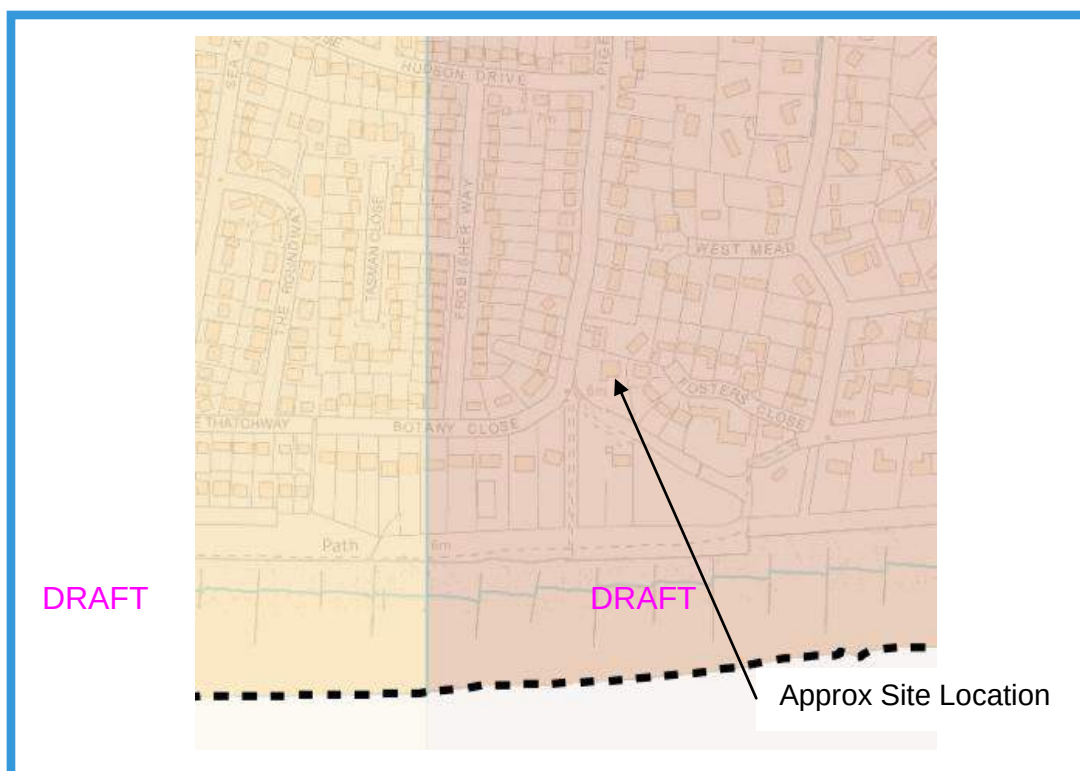
Flood risk



SITE SEWER FLOODING



GROUND WATER FLOOD RISK



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Site Check Results

Site Check Report Report generated on Mon Feb 22 2021

You selected the location: Centroid Grid Ref: TQ06170161

The following features have been found in your search area:

Aquifer Designation Map (Bedrock) (England)	
Typology	Principal
Aquifer Designation Map (Superficial Drift) (England)	
Typology	Secondary A
Source Protection Zones merged (England)	
No Features found	

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OK

Cancel

Print

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 Flood risk from reservoirs

 Extent of flooding



Flood risk

 Maximum extent of flooding

Flood map for planning

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Your reference
BN162BQ

Location (easting/northing)
506170/101616

Created
22 Feb 2021 11:34

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

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Flood map for planning

Your reference
BN162BQ **DRAFT**

Location (easting/northing)
506170/101616

Scale
1:2500

Created
22 Feb 2021 11:34

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefiting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area **DRAFT**

0 20 40 60m

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