# FLOOD RISK ASSESSMENT
# FOR RESIDENTIAL DEVELOPMENT AT
# HAZELWOOD LANE, FLEET

**FINAL REPORT**

**ECL0892/GR MERCHANT**

**DATE NOVEMBER 2022**

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# 1.0 INTRODUCTION

This Flood Risk Assessment has been prepared in accordance with National Planning Policy Framework (NPPF) and supporting planning practice guidance (PPG) on Flood Risk and Coastal Change.

In areas at risk of flooding or for sites of 1 hectare or more, developers are required to undertake a site-specific Flood Risk Assessment to accompany an application for planning permission. This Flood Risk Assessment has been produced on behalf of GR Merchant in respect of a development that consists of one replacement dwelling at Hazelwood Lane, Fleet.

A planning application for the proposed development is to be submitted by GR Merchant.

# 2.0 SITE LOCATION AND DESCRIPTION

## 2.1 Site Location

The site is located at Gletor, Hazelwood Lane, Fleet, Spalding, Lincolnshire, PE12 8PF. The National Grid Reference of the site is 53738/32432.

The location of the site is shown in Figure 1.




Figure 1 – Location Plan (© OpenStreetMap contributors)

## 2.2 Existing Site

The site is on the southern side of Hazelwood Lane approximately 100m east of the junction with Branch's Lane. The site consists of a bungalow and the surrounding land. Within the site, to the south west of the dwelling, are a series of outbuildings and agricultural sheds. The area of development is approximately 0.20 hectares.

Environment Agency LIDAR shows that ground levels within the site range between +3.1m OD and +3.3m OD. Adjacent to the site the Hazelwood Lane carriageway is at a level of +3.3m OD.

The site is in the South Holland Internal Drainage Board (IDB) District. Surface water at the site drains through the network of local drains and hence to the IDB drain system. There is a riparian watercourse on the eastern side of Branch's Lane and the nearest IDB watercourse is 250m south of the site.

The online British Geological Survey maps indicate that the site is likely to be underlain by Ampthill Clay Formation - Mudstone. The bedrock is shown to be overlain with superficial deposits of clay and silt.

## 2.3 Proposed Development

The proposed development consists of one replacement dwelling. The dwelling will have two storeys. Details of the proposed development are provided in Attachment 1.

## 2.4 Local Development Documents

The South East Lincolnshire Local Plan 2011 – 2036, adopted in March 2019, is the Local Plan for the district. Policy 4: Approach to Flood Risk states the requirements for flood risk reduction.

The South East Lincolnshire Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA) was prepared in June 2017.

The Joint Lincolnshire Flood Risk and Drainage Management Strategy has been prepared by Lincolnshire County Council as the Lead Local Flood Authority. The purpose of the Strategy is to increase the safety of people across Lincolnshire by reducing the number of people at risk of flooding, increasing the resilience of local communities, and reducing the impact of flooding

## 2.5 Flood Zones

An extract from the Environment Agency Flood Map for Planning is shown in Figure 2. The site is located within Flood Zone 3, an area with a high probability of flooding.

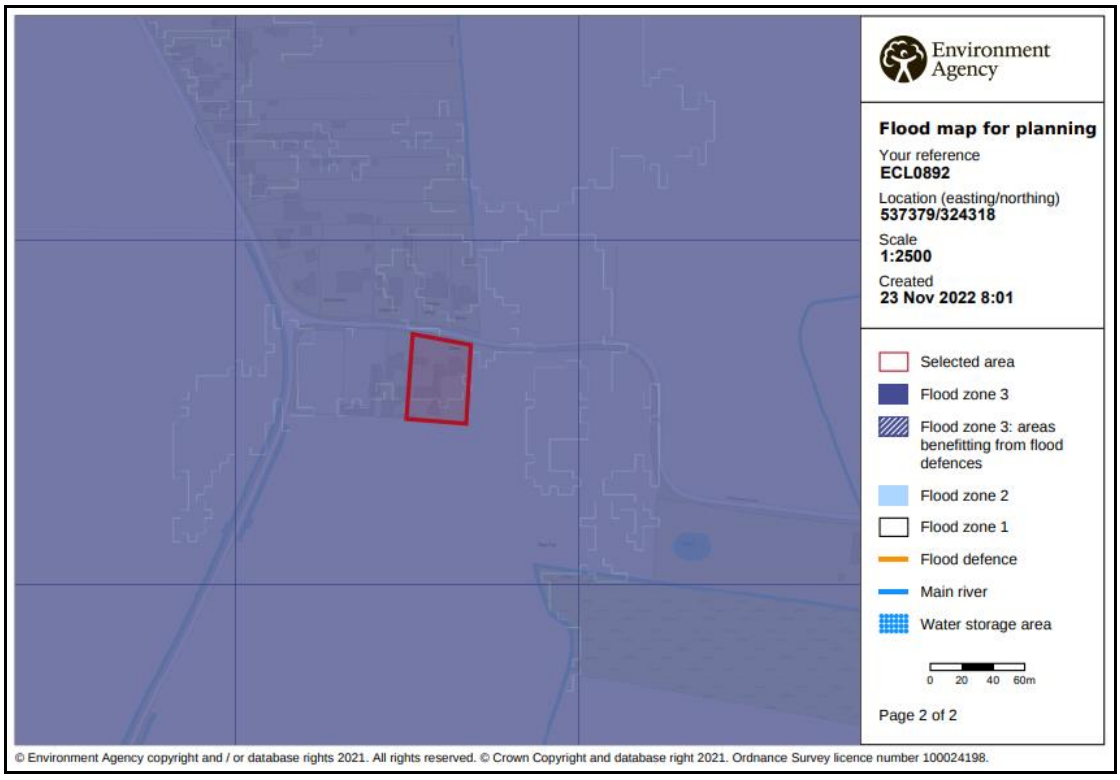



Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a low risk of flooding from rivers or the sea (annual probability between 0.1% and 1%);
- the site has a very low risk of surface water flooding (annual probability less than 0.1%); and
- the site is not within an area at risk of reservoir flooding.

Table 1 shows the level of risk at the site within the South East Lincolnshire SFRA.

| SFRA Map | Present Day | 2116 |
|---|---|---|
| Residual Flood Hazard Map for the 1% fluvial and 0.5% tidal event | The site is outside the 'Low Hazard' area | The site is in the 'Low Hazard' area |
| Residual Peak Depth Map for the 1% fluvial and 0.5% tidal | The site is outside the area at risk of flooding. | The site is at risk with a depth between 0.0m and 0.25m |

Table 1 – Flood Risk within SFRA Maps

# 3.0 FLOOD RISK VULNERABILITY

## 3.1 The Sequential and Exception Test

The NPPF requires the application of a Sequential Test to ensure that new development is in areas with the lowest probability of flooding.

The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

## 3.2 Vulnerability Classification

Table 2 of the PPG Flood Risk and Coastal Change categorises different types of uses and development according to their vulnerability to flood risk. The proposed development is covered by the description of buildings used for dwellings and is classified as 'More Vulnerable'.

Table 3 of the PPG Flood Risk and Coastal Change sets out Flood Risk Vulnerability and flood zone 'compatibility'. The site is in Flood Zone 3 and the development is 'More Vulnerable' therefore it is necessary to complete the Exception Test.

PPG Flood Risk and Coastal Change defines that the lifetime of the development in terms of flood risk and coastal change is 100 years.

## 3.3 Application of the Sequential Test and Exception Test

It is for the Local Planning Authority, using the evidence provided and taking advice from the Environment Agency as appropriate, to consider whether an application passes the Sequential Test.

The proposed development is a replacement dwelling and therefore it is not necessary to apply the Sequential Test to the development.

The Exception Test requires consideration of the wider sustainability benefits of a development and that the development would be safe and residual risks managed.

Section 5 of this Flood Risk Assessment describes the flood mitigation measures and the management of the residual risks, demonstrating that this development will be safe and not increase flood risk elsewhere. The development is considered to pass the Exception Test.

# 4.0 SITE SPECIFIC FLOOD RISK

## 4.1 Local Flood Assets

The South Holland IDB district is protected by the Wash tidal defences along the Holbeach Marsh frontage with embankment levels at a minimum of +7.0m OD. The Wash tidal defences are approximately 10km from the site. The River Nene tidal defences are 11.1km to the east of the site. The River Welland tidal defences are approximately 9.5km to the north west of the site. All three defences are the responsibility of the Environment Agency.

There is a long-term strategy for the maintenance of the Environment Agency defences which is reviewed and updated periodically.

There is an extensive local drainage network managed by South Holland IDB. There is an IDB Ordinary Watercourse 250m south of the site. The site and the surrounding land are within the Lutton Leam catchment which discharges to the tidal River Nene at Lutton Leam Tidal Sluice.

During the operation and maintenance of its pumping stations, associated structures, and channel systems, the IDB seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Boards assets are commensurate with the standard of protection that is sought.

Current maintenance standards of the South Holland Internal Drainage Board and the Environment Agency are generally good.

## 4.2 Sources of Flooding

The potential sources of flooding that have been identified during this assessment are:

- local blockages to the IDB drainage system;
- an event in the local drainage network that exceeds the standard of protection;
- failure of Lutton Leam Tidal Sluice; and
- overtopping and breaching of the Wash, River Nene, or River Welland tidal defences.

## 4.3 Probability of Flooding

The probability of flooding associated with blockages in the South Holland IDB drainage system is low due to the maintenance standards achieved and managed by the IDB.

Through the operation and maintenance of the pumping stations and the channel system the Board seek to maintain a general standard capable to providing flood

protection to agricultural land and developed areas of 1 in 20 years and 1 in 100 years, respectively. The risk associated with flood events that exceed the standard of protection provided is lowered due to the South Holland IDB main drains incorporating freeboard. This freeboard provides storage during the exceedance events.

The site is within an area benefitting from defences. The flood embankments to the Wash and the River Nene and River Welland tidal defences provide protection during a 0.5% annual probability (1 in 200 chance each year) event. The flood risk from the Wash is lowered further by second line defences and various informal banks constructed during the reclamation of Holbeach Marsh.

## 4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded. Previous historic rainfall events of 1968 and 1978, estimated to be greater than 1% annual probability (1 in 100 chance each year), caused no flooding to any residential properties.

## 4.5 Climate Change

Climate change is likely to impact the site through increased rainfall intensity and duration affecting the local drainage network and increased tide levels.

The tidal flood level during the 0.5% annual probability (1 in 200 chance each year) event inclusive of climate change to 2115 is estimated to be 7.2m AOD. The minimum defence level of the Wash, River Nene, and River Welland embankments is 7.0m AOD. During such an event it is likely that wave and wind action would cause overtopping of the tidal defences. However, the second line defences with embankment levels of 6.0m AOD would further reduce the probability of flood water reaching the development site.

In summary the site is not at risk for the design life of the development (i.e., 100 years).

## 4.6 Residual Risk

The South East Lincolnshire SFRA includes maps demonstrating the impact of climate change in 2116. The Residual Peak Depth maps within the SFRA indicate the maximum flood depths associated with a breach of the tidal defences. When climate change allowances are applied to the combination of a 1% annual probability (1 in 100 chance each year) fluvial event and a 0.5% annual probability (1 in 200 chance each year) tidal event the peak depth at the site from direct overtopping together with breach failure is 0.0m-0.25m. An extract from this map is shown in Figure 3 below.

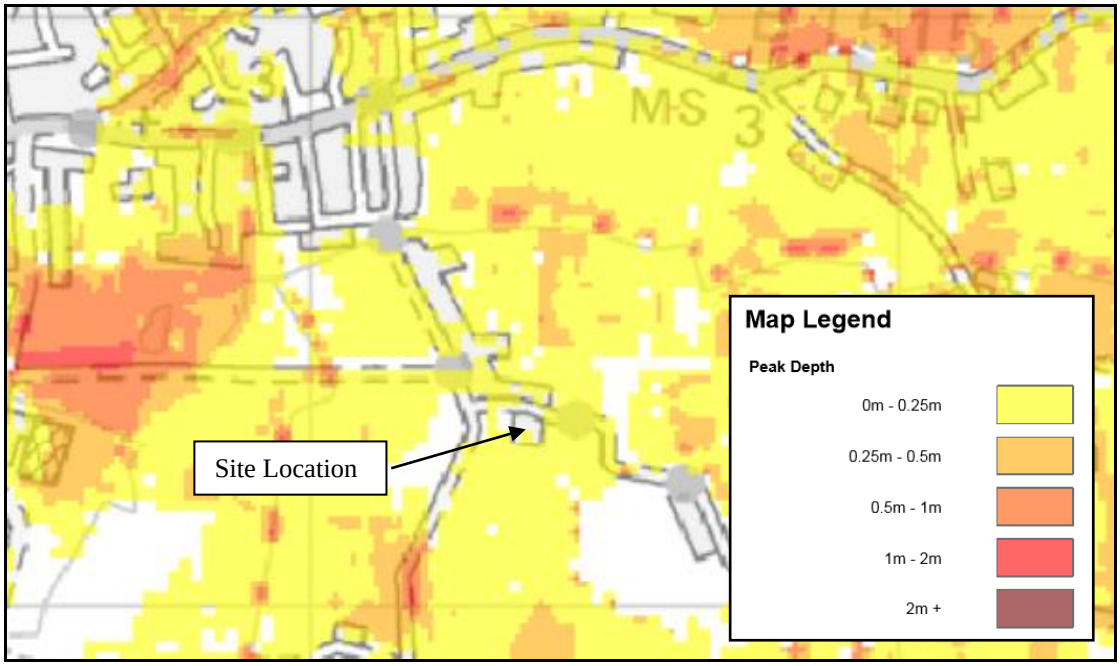



Figure 3 – SFRA 2116 Residual Peak Depth Map

# 5.0 FLOOD RISK MITIGATION

## 5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Lutton Leam Tidal Sluice could lead to an increased level of risk at the site.

The probability of the site flooding from any Environment Agency system is less than 0.5% annual probability (1 in 200 chance each year) because of the standards of the existing flood defences. Over time there will be a gradual increase in risk to the site due to climate change. During the design life of the development, it is not anticipated that the site would flood from overtopping of the defences.

The SFRA considers the residual risk associated with overtopping and a breach in the defences in 2116. During the 0.5% annual probability (1 in 200 chance each year) plus climate change event the maximum flood depth at the site is between 0.0m and 0.25m.

The proposed arrangement increases the impermeable area and therefore there will be an increased volume of surface water that has the potential to increase flood risk.

## 5.2 Mitigation Measures

The site has a low 'actual risk' of flooding. Based upon the information available during the preparation of this flood risk assessment it is recommended that the floor level of the dwelling is 0.5m above surrounding ground levels. Furthermore, it is recommended that there is 0.3m of flood resilient construction above finished floor level.

The risk of flooding is lowered as the proposed dwelling is 2 storeys with all sleeping accommodation on the first floor.

The developer should ensure that the eventual occupier of the dwelling is sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency operates a flood warning system for properties at risk of flooding to enable householders to protect life or take actions to manage the effect of flooding on property. Floodline Warnings Service is a national system run by the Environment Agency for broadcasting flooding warnings. The occupier of the dwelling should register to receive flood warnings.

Should there be a failure of Lutton Leam Outfall Sluice and conditions were such to put properties and land at risk of flooding, the Internal Drainage Board would take emergency action to maintain the drainage level of service by using temporary pumping equipment.

It is recommended that surface water run-off is managed so that stormwater from the development will not affect any adjoining properties or increase the flood risk elsewhere.

# 6.0 CONCLUSIONS

As a result of the assessment, the following conclusions have been reached.

- The proposed development consists of one replacement dwelling at Gletor, Hazelwood Lane, Fleet, Spalding.

- The site is located within an Internal Drainage Board catchment and through the operation and maintenance of the pumping stations and the channel system the Board seek to maintain a general standard capable to providing flood protection to agricultural land and developed areas of 1 in 20 and 1 in 100 years, respectively.

- The proposed development is in Flood Zone 3. The site benefits from defences on the Wash, River Nene, and River Welland that provide protection during the 1% annual probability (1 in 100 chance each year) fluvial event and 0.5% annual probability (1 in 200) tidal event including climate change.

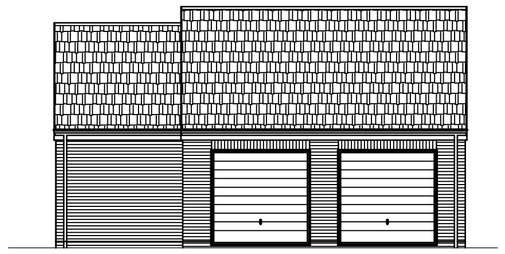
- The site could experience depths of between 0.0m and 0.25m arising from a breach in the defence during a tidal event that has a 0.5% annual probability (1 in 200 chance of occurring in any one year) up to 2115.

- It is recommended that the floor level of the dwelling is 0.3m above surrounding ground levels and there is 0.3m of flood resilient construction above finished floor level.

- The development passes the Sequential Test and Exception Test and is therefore suitable for the proposed location.

# ATTACHMENT 1

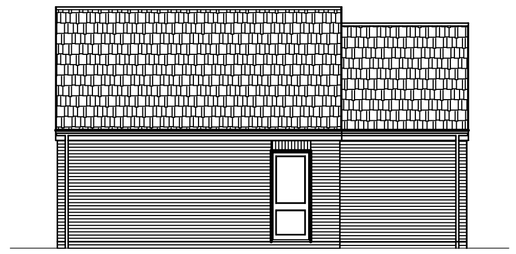
# SITE & LOCATION PLAN
# (Dwg 4053-22 01C)



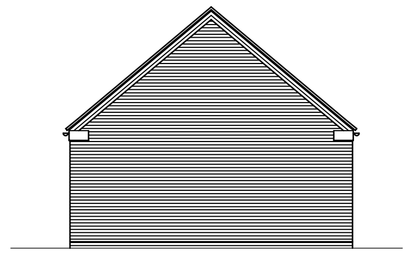
FRONT ELEVATION



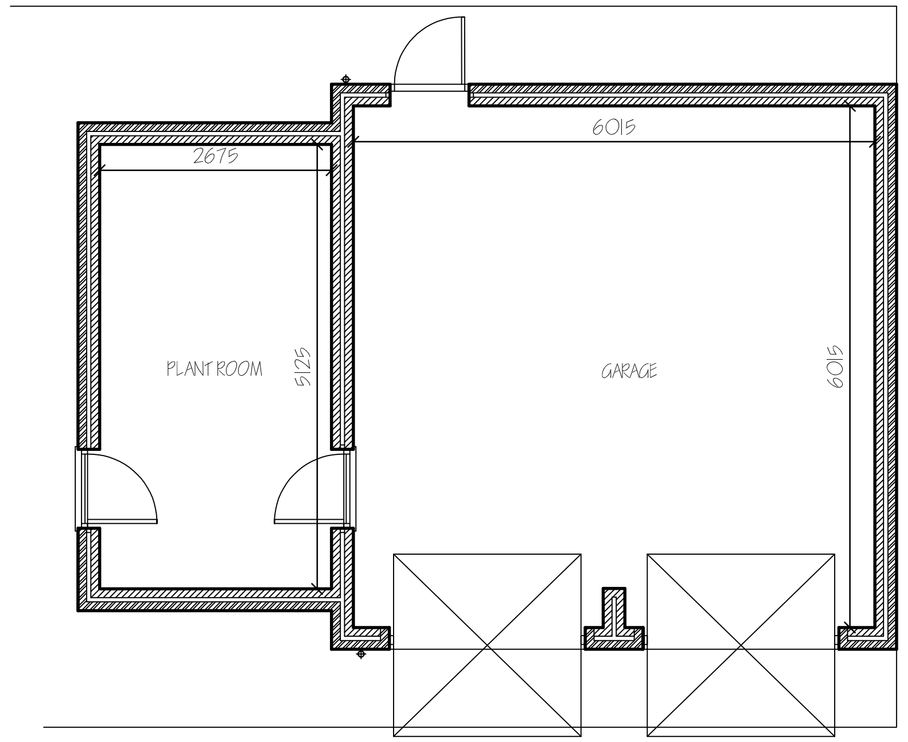
SIDE ELEVATION



REAR ELEVATION



SIDE ELEVATION




FLOOR PLAN.




LOCATION PLAN
1/1250

LANDSCAPING, TREE PLANTING & FENCING SCHEME.

A - 1.8 Metre High Close Boarded Fence - Reducing to 1.2metre at Road.

B - SILVER BIRCH ( BETULA PENDULA) FEATHERED - 1.5m to 1.8m WITH A TERMINAL SHOOT AND LATERAL SHOOTS

C - EXISTING TREES AND PERIMETER HEDGE TO REMAIN.

D - BLACK POWDER COATED ESTATE FENCING

E - SHRUBBERY AREA

F - GRAVEL DRIVE

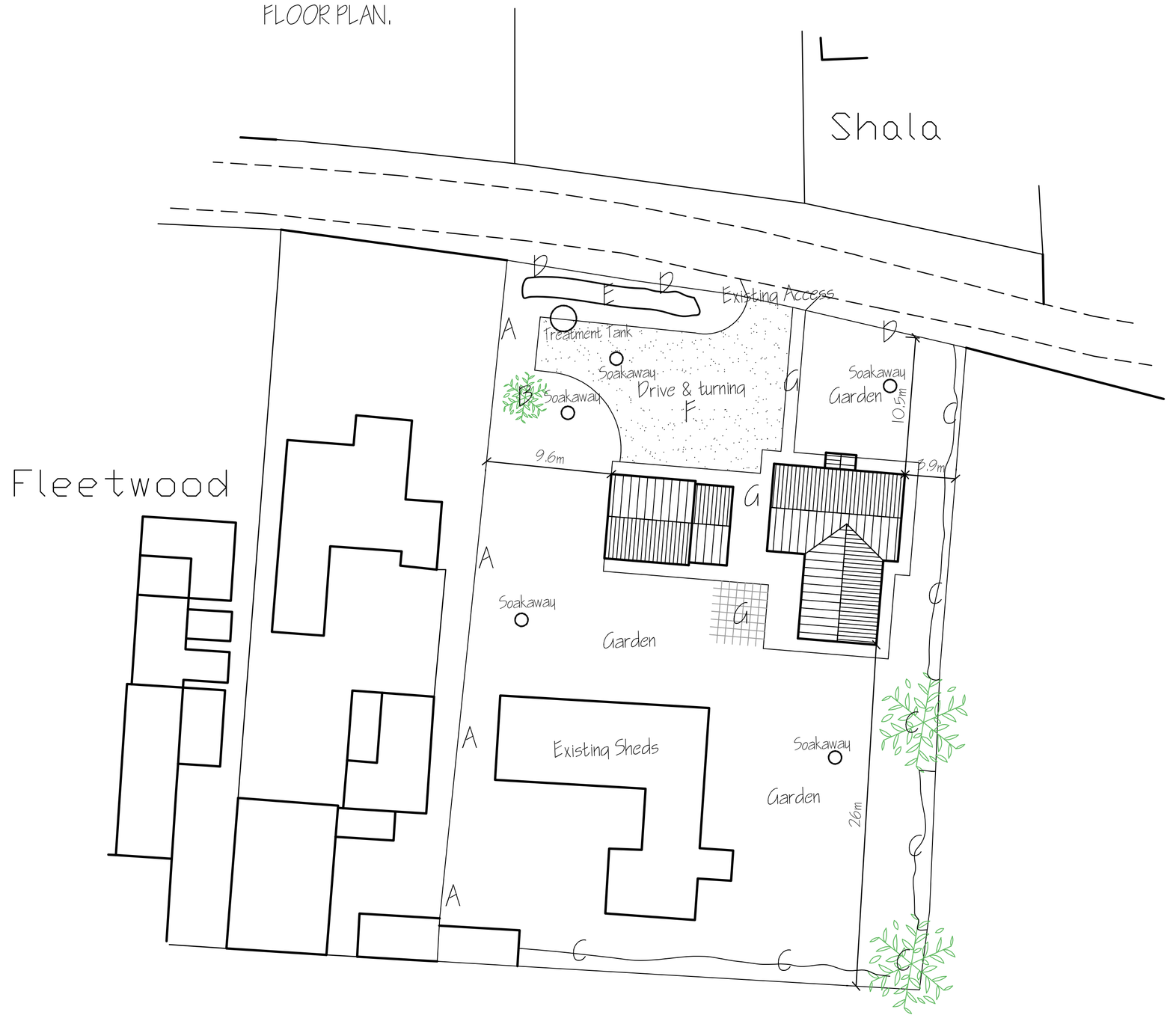
G - SLABBED FOOTPATHS & PATIO

All planting to be in accordance with BS 4428:1989 and amendment No. 1 (1991)

All trees to be planted with minimum 0.6m plastic mulch mat and to be staked, tied and tubed.

1/3 to ½ bag of peat free tree and shrub planting compost to be incorporated into backfill for each tree hole.

All trees, shrubs and bushes shall be maintained by the owner or owners of the land on which they are situated for a period of five years beginning with the date of completion of the scheme and during that period all losses shall be made good as and when necessary.




SITE PLAN
1/250

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| | | |
| C | CLIENTS AMENDMENTS | NOV '2022. |
| B | CLIENTS AMENDMENTS | OCT '2022. |
| A | CLIENTS AMENDMENTS & GARAGE MOVED | SEPT '2022. |
| ref: | revision | date |


**G. R. MERCHANT LTD.**
**I.ENG AMICE FIWO**

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**Project**
REPLACEMENT DWELLING
GLETOR
HAZELWOOD LANE, FLEET
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**Client**
MR A THORPE

**Drawing**
SITE & LOCATION PLANS

| Job Ref. | Drawing No. |
|---|---|
| 4053-22 | 01C. |
| **Date** | **Drawn** |
| AUGUST 2022. | SLD |

**Scales**
1/50. 1/100.


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