FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT
ADJACENT TO BIRCHWOOD, DAWSMERE ROAD, GEDNEY DROVE END

FINAL REPORT

ECL0687-2/G R MERCHANT LTD

DATE FEBRUARY 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 G R Merchant in respect of a proposed residential dwelling adjacent to Birchwood, Dawsmere Road, Gedney Drove End.

A planning application for the proposed development is to be submitted by G R Merchant Ltd.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located on land to the east of Birchwood, Dawsmere Road, Gedney Drove End, Lincolnshire, PE12 9NW. The National Grid Reference of the site is 54589/32954.

The location of the site is shown in Figure 1.



Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is an undeveloped plot on the northern side of Dawsmere Road. There are residential dwellings to the east and west of the site and agricultural land to the north. The area of development is approximately 0.03 hectares.

Environment Agency LiDAR data shows that ground levels within the site range from +3.6m OD on the northern boundary of the site to +4.4m OD. In the area of the proposed dwelling the site level is +4.0m OD. Dawsmere Road adjacent to the site is +4.8m OD. The agricultural land to the north of the site is typically between +3.1m OD and +3.3m OD.

The site is in the South Holland Internal Drainage Board (IDB) District. Surface water at the site would naturally drain through soakaway and hence to the IDB drainage system. There is a riparian drain 100m to the west of the site and an IDB High Priority Watercourse 500m north 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 residential dwelling. The dwelling will have three storeys with no habitable accommodation on the ground floor. 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

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

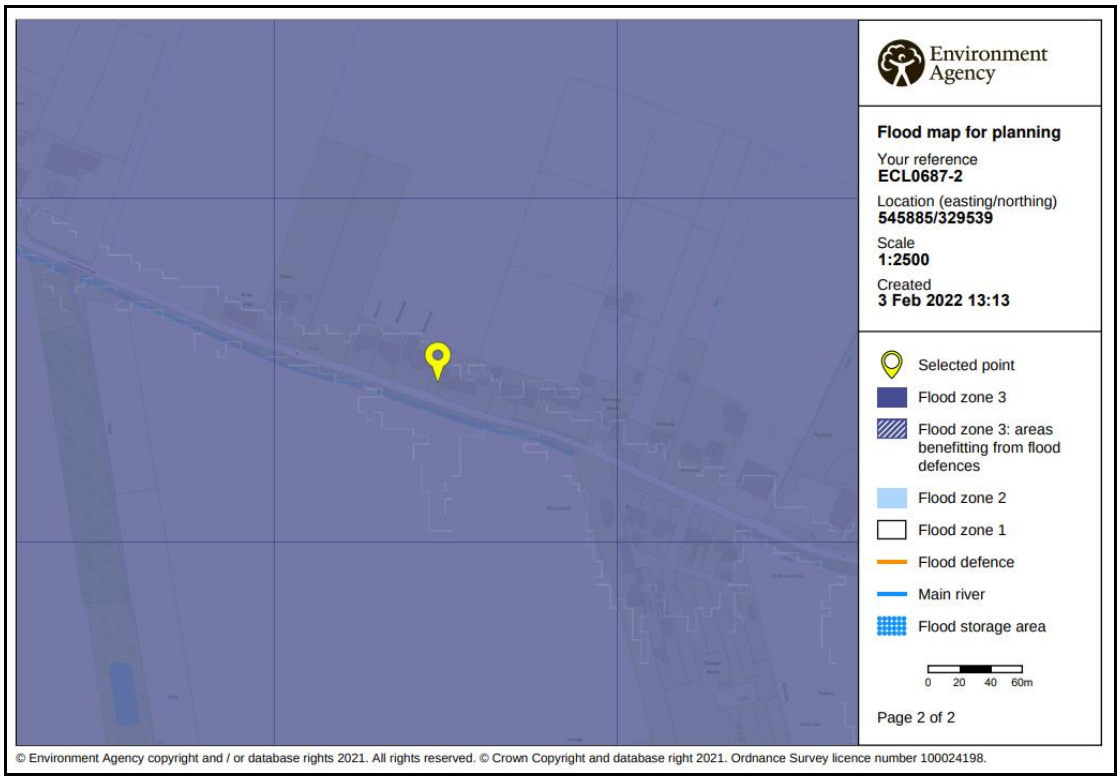


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a medium risk of flooding from rivers or the sea (annual probability between 1% and 3.3%);
- 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 in the 'Danger for All' area	The site is in the 'Danger for All' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal	The site has a peak flood depth between 1.0m and 2.0m.	The site has a peak flood depth between 1.0m and 2.0m.

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 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.

Large parts of the South Holland district between the River Welland and River Nene and close to the Wash lie within Flood Zone 3. As such, opportunities to undertake the development at an alternative site with a lower flood risk are limited. At this location it is not possible to position the development on higher ground within the proposed site.

The SFRA states that as it is necessary to use the refined flood risk information (hazard and depth maps) to assist with the application of the sequential test. The refined flood risk breach information contained within the SFRA demonstrates that during the present day 0.5% tidal breach event, all of Gedney Drove End is at risk with depths between 1m and 2m. Consequently, there would be no sites with a lower risk of flooding within Gedney Drove End as the development is considered to pass the Sequential Test.

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

The Local Plan has a target of a net increase of at least 11,681 dwellings in South Holland over the 25-year local plan period. The Plan considers this new housing is required to ensure the sustainability of the Local Plan area. The proposed development will contribute to this target.

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 Gedney Marsh frontage with embankment levels at a minimum of +7.0m OD. The Wash tidal defences are approximately 900m from the site. The River Nene tidal defences are approximately 4.5km to the south east of the site. Both 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 High Priority Watercourse 500m north of the site. The site and the surrounding land are within the Dawsmere catchment and drains in a north westerly direction to discharge to the Wash at Dawsmere Pumping Station.

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 Dawsmere Pumping Station; and
- overtopping and breaching of the Wash or River Nene 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.

The standard of drainage provided by South Holland IDB is assessed at 2% annual probability (1 in 50 chance each year), compatible with the Department of the Environment, Food and Rural Affairs (DEFRA) target level of service for rural drainage and flood defence works. The risk associated with flooding due to events greater

than 2% annual probability (1 in 50 chance each year) is lowered due to the South Holland IDB high priority watercourses incorporating a freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

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

4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded.

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 and River Nene embankments is 7.0m AOD. During such an event wave and wind action is likely to cause overtopping that has the potential to affect the site. However, the second line defences with embankment levels of 6.0m AOD would further reduce the probability of flood water reaching the development site.

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. These show that when the 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 would be between 1.0m and 2.0m. An extract from this map is shown in Figure 3.



Figure 3 – SFRA 2116 Residual Peak Depth Map

When the depth of flooding in Figure 3 and the Environment Agency LIDAR data are considered together a conservative estimate of the flood level is +5.4m OD. In particular the land around the agricultural holding to the west of the site which is above a level of +3.3m OD has a peak depth of 2.0m. The depth of flooding in the area of the proposed dwelling is estimated to be 1.4m.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Dawsmere Pumping Station 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 the risk to the site from overtopping of the defences is low.

The SFRA considers the residual risk associated with a breach in the defences in 2116. Based upon the maps the peak flood depth at the site is estimated to be 1.4m.

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

5.2 Mitigation Measures

The proposed mitigation measures follow the South East Lincolnshire Standing Advice Matrix. Based upon the information available during the preparation of this flood risk assessment, to mitigate against the remote risk of flooding it is proposed that:

- the dwelling has two storeys with no ground floor habitable accommodation;
- the first floor living accommodation has a minimum floor level of +5.4m OD; and
- there is flood resilient construction to a height of +5.4m OD.

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 provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding. The occupier of the dwelling should register with the Floodline Direct Warnings Service to receive any future flood warnings.

Should there be a failure of Dawsmere Pumping Station 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 proposed that surface water run-off is discharged to a soakaway close to the northern boundary of the site so that 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 a 2 storey residential dwelling adjacent to Birchwood on Dawsmere Road, Gedney Drove End.

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

- The site is located within an Internal Drainage Board catchment with a minimum standard of drainage of 2% annual probability (1 in 50 chance each year) which accords with DEFRA guidelines for rural development. The risk of flooding is lowered further due to the South Holland IDB high priority watercourses incorporating a significant freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

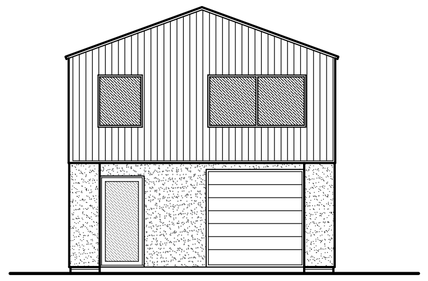
- The site is at risk during a breach of the tidal defences with an estimated breach level of +5.4m OD, a maximum flood depth of 1.4m.

- To mitigate the risk of a breach in the tidal defences it is proposed that there is no habitable accommodation on the ground floor, the first floor is at a minimum level of +5.6m OD and there is flood resilient construction to a level of +5.6m OD.

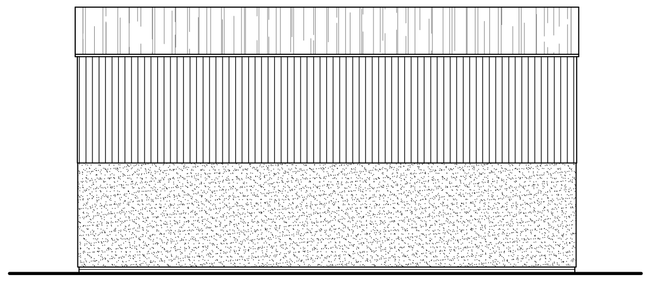
- The development passes the Sequential Test and Exception Test and is therefore suitable for the proposed location.

ATTACHMENT 1

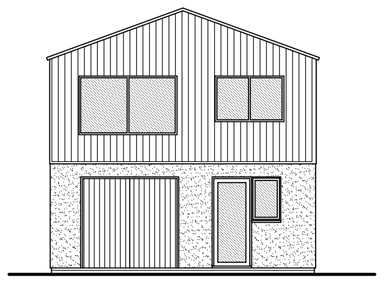
FLOOR PLANS & ELEVATIONS, LOCATION & SITE PLAN (Dwg 3961-21 01)



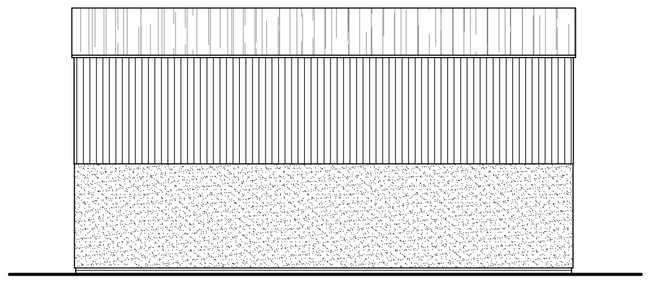
FRONT ELEVATION



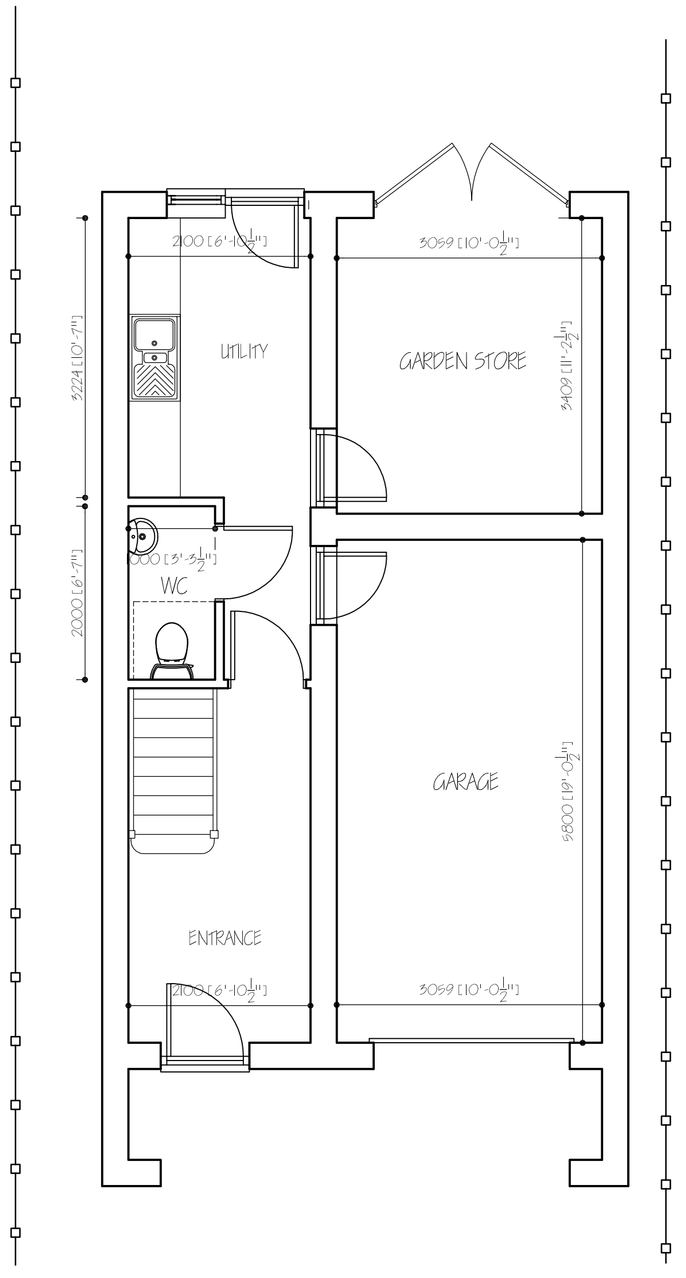
SIDE ELEVATION



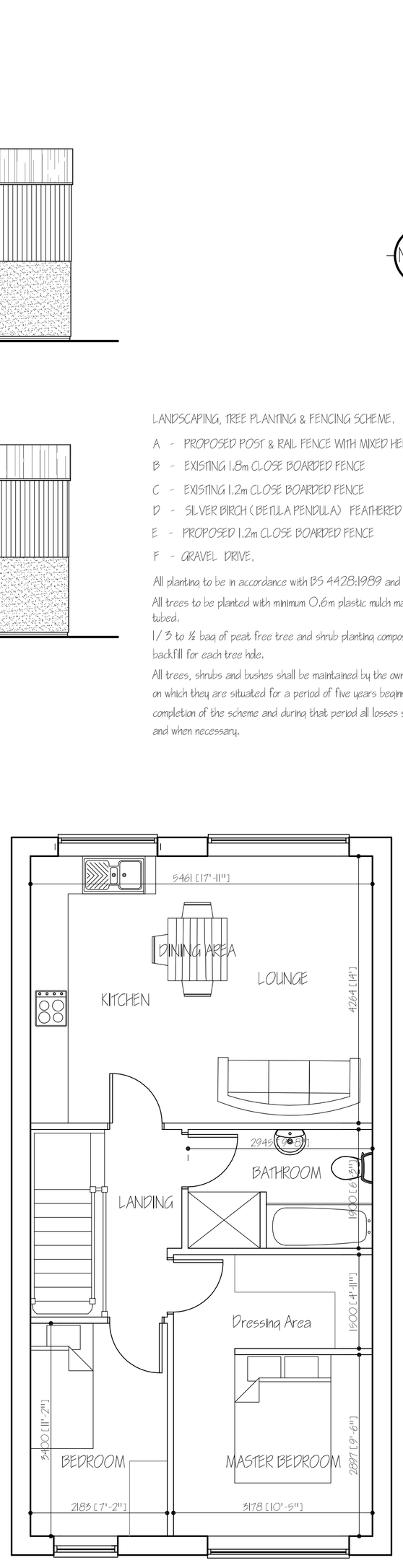
REAR ELEVATION



SIDE ELEVATION



GROUND FLOOR PLAN



FIRST FLOOR PLAN

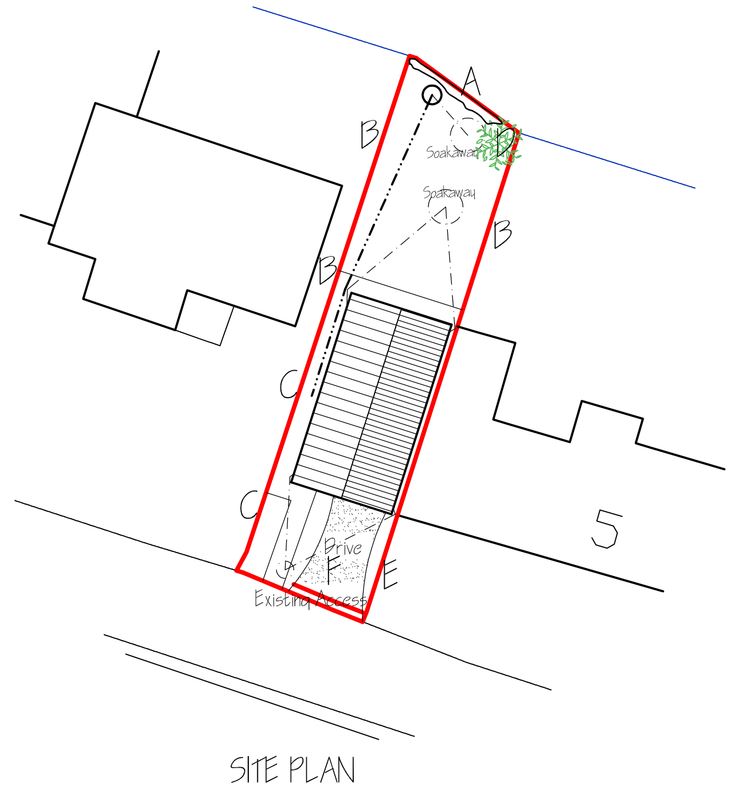


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LANDSCAPING, TREE PLANTING & FENCING SCHEME.

A - PROPOSED POST & RAIL FENCE WITH MIXED HEDGE
B - EXISTING 1.8m CLOSE BOARDED FENCE
C - EXISTING 1.2m CLOSE BOARDED FENCE
D - SILVER BIRCH (BETULA PENDULA) FEATHERED - 1.5m to 1.8m WITH A TERMINAL SHOOT AND LATERAL SHOOTS
E - PROPOSED 1.2m CLOSE BOARDED FENCE
F - GRAVEL DRIVE.

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

NOTE :-
NEW ACCESSES TO BE IN ACCORDANCE WITH THE SPECIFICATION & THE REQUIREMENTS OF L C C HIGHWAYS.

ref:	revision	date

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

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Project
ERECTION OF DWELLING
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DAWSMERE ROAD
GEDNEY DROVE END. LINC'S. PE12 9NW.

Client
MR A. HAY.

Drawing
FLOOR PLANS & ELEVATIONS
LOCATION & SITE PLANS

Job Ref.	Drawing No.
3961-21.	01.
Date	**Drawn**
JANUARY 2022.	SLD.

Scales
1:50 1:100

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