

# FLOOD RISK ASSESSMENT

Proposed Conversion of Inn to Apartments  
& New Residential Development  
The Mermaid Inn  
Gosberton Road  
Surfleet  
Spalding  
PE11 4AB



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# FLOOD RISK ASSESSMENT PROPOSED CONVERSION OF INN TO APARTMENTS & NEW RESIDENTIAL DEVELOPMENT THE MERMAID INN, GOSBERTON ROAD, SURFLEET, SPALDING. PE11 4AB

## INTRODUCTION

The Government has placed increasing priority on the need to take full account of the risk associated with flooding at all stages of the planning and development process. This seeks to reduce the future damage to property and the risk to life from incidents of flooding. Their expectations relating to flooding are contained in the National Planning Policy Framework July 2021, (NPPF), which identifies how the issue of flooding is dealt with in the drafting of planning policy and the consideration of planning applications by avoiding inappropriate development in areas at risk from flooding and to direct development away from areas at highest risk.

The NPPF provides that development in areas at risk of flooding should be avoided and seeks to direct development away from areas at highest risk. There is a sequential, risk-based approach to the location of development avoiding where possible, flood risk to people and property managing any residual risk and taking account of the impacts of climate change.

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## APPLICATION SITE

The site is located on land at The Mermaid Inn, Gosberton Road, Surfleet, within the administrative area of South Holland District Council. The National Grid Reference is TF25085 28167. **Plan 1**

This flood risk assessment has been prepared for the conversion of the Mermaid Inn to provide 5 No apartments (Plots 1 to 5) and the erection of 3 No two-storey detached dwellings (plots 6, 7 & 8) within the rear garden and car park. **Plans 2, 3, 4, 5 & 6**

The proposed Plots 6 & 7 have been set back 10m from the brink of the riverbank.

The National Planning Policy Framework Guidance NPPG defines three levels of flood risk depending upon the annual probability of fluvial flooding occurring.

- Zone 1 – Low Probability (<0.1%)
- Zone 2 – Medium Probability (0.1 – 1.0%)
- Zone 3 – High Probability (>1.0%)

The majority of the proposed development site is shown to be within Flood Zone 1 'Low Probability' with the area alongside the riverbank in Flood Zone 3 'High probability' as detailed on the Environment Agency's Flood Zone Maps **without defences**.



**Table 1: Flood Zones Definition (Ignoring the presence of defences)**

Flood Zone 1- Low Probability
<p><b>Definition</b> This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (&lt;0.1%). Appropriate uses. All uses of land are appropriate in this zone.</p>
<p><b>Flood risk assessment requirements</b> For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a flood risk assessment. This need only be brief unless the factors above or other local considerations require particular attention.</p>
<p><b>Policy aims</b> In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems.</p>

Applying the Flood Risk Vulnerability Classification in Table 2 of NPPG, the proposed development use for the site is considered to be 'More Vulnerable'. Table 2 of NPPG states that such uses are permitted in these zones.

**Table 2: Flood Risk Vulnerability Classification**

More Vulnerable
<ul style="list-style-type: none"><li>• Hospitals</li><li>• Residential institutions such as residential care homes, children's homes, social services homes, prisons, and hostels.</li><li>• Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels</li><li>• Non-residential uses for health services, nurseries, and educational establishments</li><li>• Landfill and sites used for waste management facilities for hazardous waste.</li><li>• Sites used for holiday or short-let caravan and camping, subject to a specific warning and Evacuation Plan.</li></ul>

### Site Levels

From the topographical survey the site levels around the Mermaid Inn vary between 5.0 – 5.5mODN, the ground levels for Plots 6/7 average 4.70mODN and for Plot 8 they average 4.90mODN. Stockhouse Lane at the site entrance is 4.78mODN with Gosberton Road averaging 5,70mODN. The levels on the southern boundary alongside the river vary from 5.35mODN East to 4 57mODN West. A brick wall with piers forms this boundary and the top of the wall is 5.28mODN. The landing stage in front of this has a decking level of 3.39mODN **Plan 7**

### DRAINAGE AUTHORITIES

#### Environment Agency

The Environment Agency has permissive powers for reducing the risk of flooding from designated main rivers and from the sea.

The following potential sources of flooding affecting the development site has been identified as:

- River Glen (Fluvial)
- River Welland (Tidal)
- Welland & Deepings Internal Drainage Board system

#### Flood Zones

The Flood Zone Map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood event with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also shows the extent of the Extreme Flood Outline which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater. In some locations, there are many kilometres of raised flood defences. To meet the requirements of the National Planning Policy Framework,

these defences are removed in their entirety to produce the Flood Map for Planning (Rivers and Sea). The map therefore shows the full extent of areas that would be at risk of flooding if no defences existed, and water could spread out across the floodplain.

In some locations, such as around the fens and the large coastal floodplains, showing the area at risk of flooding assuming no defences may give a slightly misleading picture in that if there were no flood defences, water would spread out across these large floodplains. This flooding could cover large areas of land but to relatively shallow depths and could leave pockets of locally slightly higher land as isolated dry islands. It is important to understand the actual risk of the flooding to these dry islands, particularly in the event of defence failure.

### Flood Zones

The Flood Map represents areas at risk of flooding for present day only and does not take account of climate change. In this area the main risk of flooding is from a breach to the tidal defences along the coastline that could affect the site. These maps show that the proposed development site is considered at no risk from flooding as it is all located within an area zoned as Flood Zone 1. **Map 1**

### Risk of Flooding from Rivers & Sea

The Risk of Flooding from Rivers and Sea Map shows that the site for the proposed dwelling is at Very Low risk of flooding. Very low means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%). This takes into account the effect of any flood defences that may be in this area. Flood defences reduce, but do not completely stop the chance of flooding as they can be overtopped or fail. **Map 2**

### River Glen

The River Glen is located alongside the southern boundary of the site, which discharges into the tidal River Welland at Surfleet Seas End. To stop tidal/saltwater entering the River Glen there is a tidal sluice (Surfleet Sluice) located adjacent to Reservoir Road. There are high embankments along the tidal Welland to defend against flooding from extreme high tides and surge.

There are no formal flood defences reducing the risk of flooding to this site. The nearby 'river' channel provides a nominal level of protection.

### Surfleet Reservoir

Surfleet Reservoir lies downstream of the site, immediately upstream of Surfleet Sluice on the River Glen, located close to the confluence of the River Glen and River Welland, and is classified as Flood Zone 3b or Functional Floodplain.

During periods of high tide, the River Glen cannot discharge water into the River Welland as it is 'tide-locked' – the

tide levels in the River Welland are higher than the level of water in the River Glen. During periods of tide-lock the water from the River Glen catchment cannot discharge into the River Welland and it is stored in Surfleet Reservoir to avoid flooding of agricultural land. In most conditions this water remains within the channel flowing through the reservoir, however there are occasions where the reservoir fills, and flooding occurs. This is typically when high flows in the River Glen (such as following prolonged rainfall) coincide with high or surge tides. In these instances, flooding of the berm can and does occur.

### Fluvial Flood Levels (mODN)

The Fluvial flood levels for the model nodes shown on the attached map are set out below. They are measured in metres above Ordnance Datum

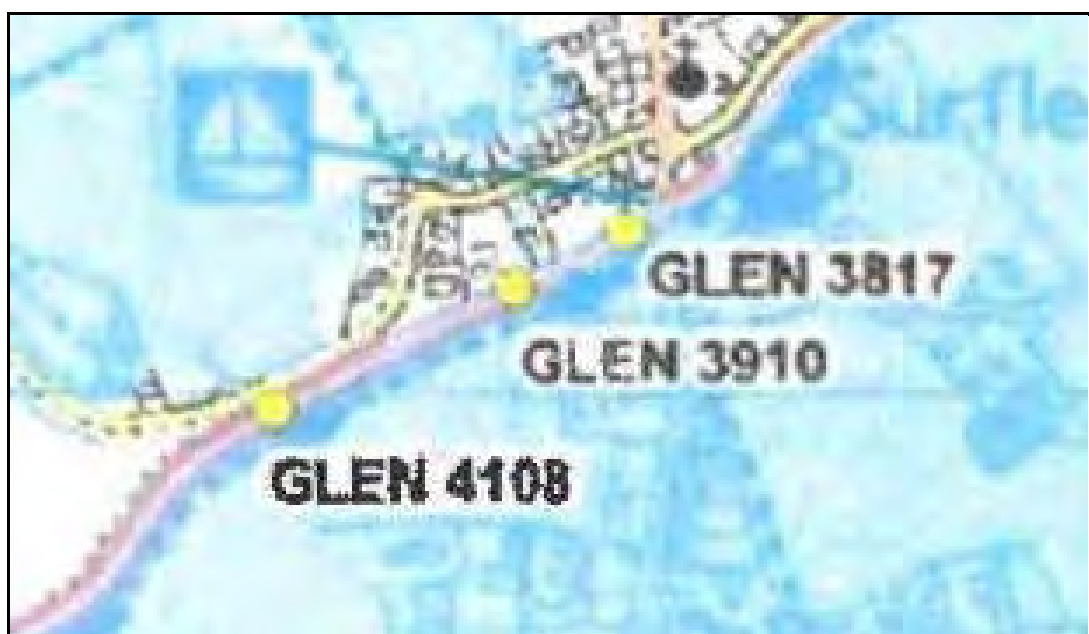
		Annual Exceedance Probability – Maximum Water levels (mODN)											
Node Point	Easting	Northing	1 in 2 50%	1 in 5 20%	1 in 10 10%	1 in 25 4%	1 in 50 2%	1 in 75 1.33%	1 in 100 1%	1 in 100 1%+20%CC	1 in 200 0.5%	1 in 1000 0.1%	1 in 1000 0.1% + 20%CC
Glen 3817	525080	328118	3.75	4.01	4.11	4.17	4.19	4.21	4.23	5.12	4.26	4.35	5.26
Glen 3910	524998	328075	3.75	4.01	4.12	4.18	4.20	4.22	4.24	5.12	4.27	4.36	5.27
Glen 4108	524821	327987	3.75	4.02	4.12	4.18	4.21	4.23	4.25	5.12	4.28	4.38	5.276

### Fluvial Flood Flows (m<sup>3</sup>/sec)

The Fluvial flood levels for the model nodes shown on the attached map are set out below. They are measured in metres above Ordnance Datum

		Annual Exceedance Probability – Maximum Flows (m <sup>3</sup> /sec)											
Node Point	Easting	Northing	1 in 2 50%	1 in 5 20%	1 in 10 10%	1 in 25 4%	1 in 50 2%	1 in 75 1.33%	1 in 100 1%	1 in 100 1%+20%CC	1 in 200 0.5%	1 in 1000 0.1%	1 in 1000 0.1%+20%CC
Glen 3817	525080	328118	20.00	24.57	27.92	30.58	31.67	32.59	133.72	44.09	35.09	40.21	50.34
Glen 3910	524998	328075	19.95	24.52	27.87	30.53	31.62	32.54	33.67	44.01	35.05	40.21	50.26
Glen 4108	524821	327987	19.76	24.37	27.72	30.36	31.47	32.38	33.51	43.65	34.90	40.22	50.06

The above flood levels for the return periods have been taken from data supplied by the Environment Agency taken from the Welland Catchment Strategic Model 2016.



River Glen Node Map

## Climate Change

The above results have a climate change increase of 20% added to the peak river flows whereas the updated guidance (27 July 2021) the Central allowance (17%) should be used for More Vulnerable uses in flood zone 3a and 2 should be added for developments in Anglian RBD/ Welland management catchment.

Given the scale and nature of the proposed development it is considered that additional hydraulic modelling is not appropriate to determine the revised river levels. Using the Linear method to ascertain the climate change levels the following results have been used for this assessment.

<b>Adjusted Climate Change Allowances</b>			
<b>Flood AEP</b>	<b>Scenario</b>		
	<b>Central</b>	<b>Higher Central</b>	<b>Upper</b>
<b>1%/1:100</b>	24.89 %	38.75 %	70.24 %
<b>0.1%/1:1000</b>	21.41 %	35.27 %	66.76 %

<b>Adjusted Calculated Levels</b>			
<b>Flood AEP</b>	<b>Climate Change Scenario</b>		
	<b>Central</b>	<b>Higher Central</b>	<b>Upper</b>
<b>1%/1:100</b>	4.75 mAOD	4.98 m AOD	5.50 mAOD
<b>0.1%/1:1000</b>	5.07 mAOD	5.35 m AOD	5.97 mAOD

The River Glen flood levels at this location is very much influenced by the tidal River Welland and the Surfleet Reservoir and without modelling the exploration of flows and river levels are unpredictable. Therefore, the modelled 1 in 100year with 17% climate change added has been adopted to determine the finished floor level for the development. This flood level of 4.75mODN will remain in channel.

## South Holland District Council

In order to inform the process of risk assessment and site selection the District Council commissioned Haskoning UK Ltd Consultants to prepare a Strategic Flood Risk Assessment in December 2002. They have carried out an update of this report and this report was published in January 2010, and this was further updated in February 2017.

This Flood Risk Assessment has taken the results of the (2017) updated South Holland Strategic Flood Risk Assessment (SHSFRA) into account in its findings.

The whole of the tidal flooding information has been replaced by the mapping from the latest Environment Agency Tidal Hazard mapping. Where the mapping for an area contains both fluvial and tidal components, the more severe of the two has been presented.



Taking the precautionary approach, the Hazard Rating following a breach which in Flood Risk Assessment (FD 2320) Guidance for New Development Phase 2 R& D Technical Report these are classified as low <0.75, moderate 0.75-1.25, significant 1.25-2.50 and extreme >2.50 based upon an empirical measure of velocity and depth.

$$HR = d \times (v + 0.5) + DF$$

Where V = Flood flow velocity (m/sec) D = Flood depth (m)

DF = A debris factor included to represent the greater damage, or risk of injury to people, that can occur if debris is swept along with the water. = 0.5 for depths <0.25 or 1.0 for depths.

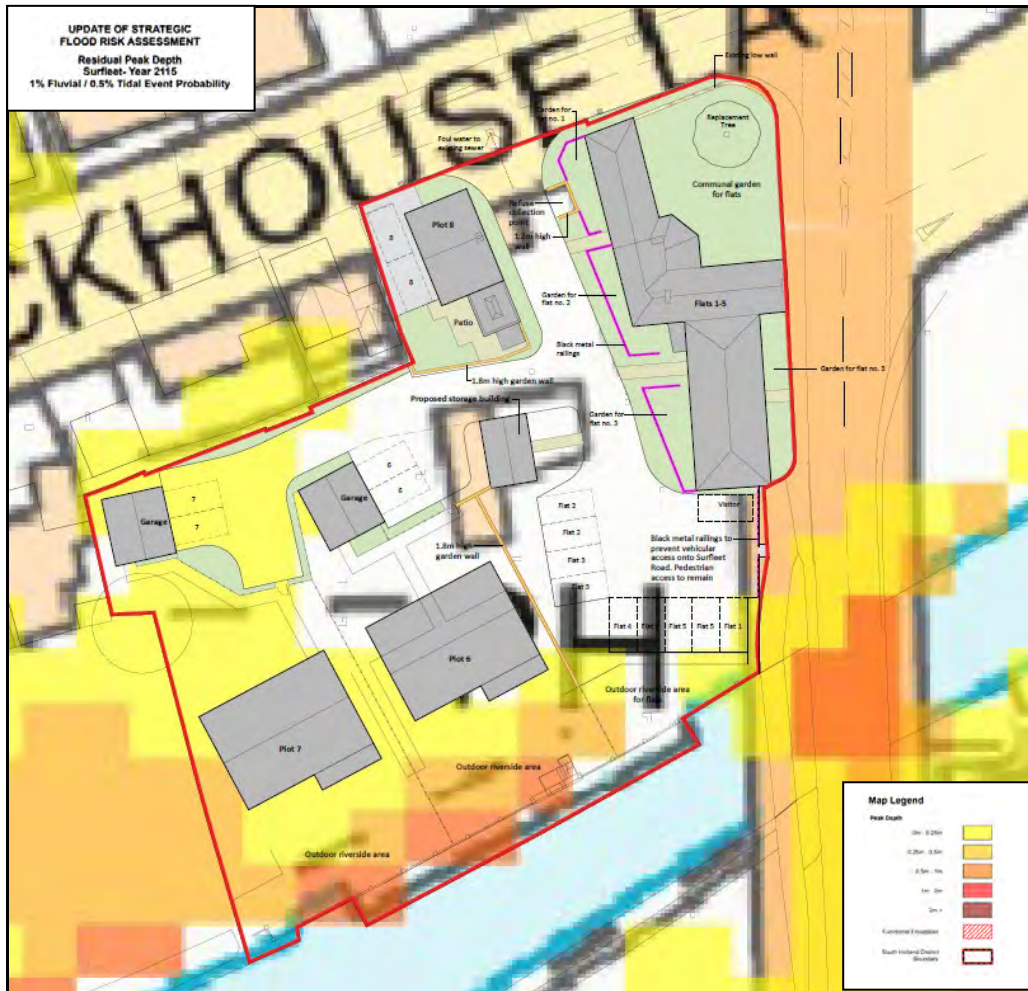
For the degree of Flood Hazard to be classified as low HR must be <0.75

Flood Hazard			Description
	<0.75	Low	<b>Caution</b> – Flood Zone with shallow flowing water or deep standing water.
	0.75 – 1.25	Moderate	<b>Danger for Some</b> - (i.e. children) Danger Flood Zone with deep or fast flowing water.
	1.25 – 2.0	Significant	<b>Danger for Most</b> – Danger Flood Zone with deep fast flowing water.
	>2.0	Extreme	<b>Danger for All</b> – Extreme Danger Flood Zone with deep fast flowing water.

The 2017 Update to SHDC, SFRA has carried out a Tidal & Fluvial Hazard Mapping, for Surfleet, following a breach to the defences. The present-day Residual Flood Hazard, Surfleet – present day 0.1% fluvial and 0.5% Tidal Event Probability Maps show that the site where the proposed development is not located in a low hazard area. **Map 3**

From the Residual Flood Hazard, Depth and Velocity Surfleet - Year 2115 0.1% Tidal Event Probability maps, from the update of strategic flood risk assessment for South Holland District Council, the apartments (Plots 1 -5) and Plot 8 are not affected from a breach to the flood defences. Plots 6 and 7 are mostly within a Low Hazard Rating Area, Depth 0m – 0.25m and velocity 0 –0.3m/sec. **Maps 4, 5 & 6**

The following map shows the 1% fluvial / 0.5% tidal 2115 residual depth map overlay on the proposed site plan.



## Finished Floor Levels

The Environment Agency recommended that for housing developments the minimum mitigation measures required for single storey developments or developments that do have any ground floor sleeping shall be determined by the flood depths arising from the 2115 (0.1%) breach scenario. Any proposals that do not included ground floor sleeping shall be determined by the flood depths arising from the 2115 (0.5%) breach scenario.

They also recommended that for housing development the finished floor level should be informed by the predicted flood depth maps. For depths of between 0 – 0.25m the FFL should be set 300mm above the ground level.

It is therefore proposed, in accordance with the Environment Agency’s recommendations that the ground floor habitable accommodation for Plots 6 & 7 be raised 300mm above the existing ground level set at 5.00mODN Plot 8 will be 150mm above the existing ground level and the conversion apartments (Plots 1 – 5) in the Mermaid Inn the ground floor will remain at the existing level.

## WELLAND & DEEPINGS INTERNAL DRAINAGE BOARD

The proposed development site is located within the catchment area of Welland & Deepings Internal Drainage

Board. The Board is responsible to operate and maintain the arterial fluvial system.

The site is within Board's Surfleet Village catchment. There are no Boards maintained drains in the vicinity of the site.



Welland & Deepings IDB Drainage Map

## FLOODING FROM OTHER SOURCES

Flooding is a natural process and can happen at any time from sources other than watercourses and the sea.

- Flooding from land can occur from intense rainfall, often over short duration of time that is unable to soak into the ground or enter the drainage system. However, with the natural topographic nature of the ground having no high ground around the site and with the proposed ground floor levels being set above the existing ground floor level this will not cause any rapid inundation of the site.
- The area is not known to suffer from any groundwater problems.
- Flooding from sewers can occur from overloading from heavy rainfall caused by blockages or having inadequate capacity. However, with the natural topographic nature of the ground having no high ground around the site and with the proposed ground floor levels being set above the existing ground level this will not cause any rapid inundation of the site.
- Non-natural or artificial sources of flooding such as reservoirs, lakes, or canals where water is stored above

natural ground level could cause flooding if the structure fails or is over topped. There are no known sources within the vicinity of the site.

## SURFACE WATER FLOODING

The whole of the site for the proposed units is not shown on the Low-Risk scenario Surface Water flood maps, for the 1 in 1000-year event, to be affected from surface water flooding. This type of flooding is usually short lived and associated with heavy downpours of rain, thunderstorms etc. **Map 7**

The maps for surface water and revised maps for river and sea flooding define the risk as High, Medium, Low and Very Low. The chance of flooding for the area defined in any given year is shown below:

- **High:** greater than 1 in 30 (3.3%).
- **Medium:** between 1 in 100 (1%) and 1 in 30 (3.3%).
- **Low:** between 1 in 1000 (0.1%) and 1 in 100 (1%).
- **Very Low:** less than 1 in 1000 (0.1%)

Unlike the fluvial mapping, which is based on a detailed hydraulic model, this mapping is based purely on applying rainfall to a digital terrain model. As such this mapping serves to represent a worst-case scenario which may well overstate the actual probability of flooding in this area.

There is a caveat on the Defra Data website, as to the use of these maps and that they are not to be used to identify that an individual property will flood. Because of the way they have been produced and the fact that they are indicative, these maps are not appropriate to act as the sole evidence for any specific planning or regulatory decision or assessment of risk in relation to flooding at any scale without further supporting studies or evidence.

The Environment Agency and the Lead Local Flood Authority (custodians of the surface water flood risk dataset) have subsequently confirmed that the published high-level data should not be used on a site-specific basis and that mapping is only suitable for National to County Scale use.

## SEQUENTIAL APPROACH

When applying the sequential approach for flood risk in accordance NPPF the site would fall into Zone 1 (Low Probability) as shown on the Environment Agency's Flood Map without defences in place.

The Environment Agency categorise land into one of three Flood Zones.

- Flood Zone 1 is Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
- Flood Zone 2 is Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding: or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)

- Flood Zone 3a is Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)

Applying the Flood Risk Vulnerability Classification in Table 2 of NPPG, the proposed use is classified as, “More Vulnerable” use, Table 1 of NPPG states that such uses are appropriate in this zone subject to the exception test, (as summarised in Table 3 NPPG)

**TABLE 3: Flood Risk Vulnerability and Flood Zones ‘Compatibility’**

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

### Sequential & Exception Test

NPPF Guidance Paragraphs 159 - 169 requires development within high areas of flood risk be determined using a sequential risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account the impacts of climate change.

As set out in the National Planning Policy Framework Technical Guidance (para.169), change of use should not be subject to the sequential and exception tests but will still need to meet the requirements of a site-specific flood risk assessment.

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. The NPPF states that development should not be permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. It is important to note that the Sequential Test does not specifically mean that sites such as this cannot be developed, rather that sites at less risk should be developed first.

This windfall site for the 3 No plots is located within the settlement boundary for Surfleet, a Minor Service Centre as set out in the Southeast Lincolnshire Local Plan (2019). Policy 1 (Spatial Strategy) of the Local Plan. This states that within the settlement boundaries of these centres, development will normally be limited to allocated and committed sites and infill.

The NPPF requires the application of the Sequential Test to steer new development to areas with the lowest probability of flooding. If, following the application of the Sequential Test, it is not possible, consistent with wider

sustainability objectives, for the development to be located in zones with a lower probability of flooding, the Exceptions Test can be applied if appropriate.

With most of the site being constructed within the area shown on the Environment Agency Flood Map (without defences) to be in Flood Zone 1, it need not be considered further in relation to the Sequential or Exception Tests for the location of new development with respect to flood risk. Examination of Table 3 shows that for Flood Zone 1, **all** vulnerability classifications are appropriate for development.

This Flood Risk Assessment in terms of making the development safe, would result in finished floor levels being set at least 5.00mODN. This would be sufficient to mitigate against flood risk and demonstrates that the development will be safe for its lifetime, and it will not increase flood risk elsewhere.

Given the above, it is concluded that the Sequential and Exceptions Test are satisfied.

## **DRAINAGE STATEMENT**

### **Surface Water Drainage**

This drainage statement, for the site, proposes to utilise infiltration techniques to reduce the storm water discharge from the proposed development and to minimise the impact of the development on the surrounding area and to comply with guidelines, which require at least one workable solution for managing surface water.

In accordance with recognised guidance, National Planning Policy Framework 2012, there is a hierarchy of where surface water should discharge. This hierarchy should be followed where practicable, and is as follows:

- 1) Infiltration
- 2) Watercourse
- 3) Public sewer

### **Infiltration**

It is proposed that surface water from the roofs of the 3 No proposed dwellings will be discharged to soakaways, designed in accordance with BRE Digest 365. The roof water from the roof of the Mermaid Inn will continue to discharge to the existing outlets which have operated for many years without causing any problems.

The access and car parking areas which are existing.

### **Foul Water Drainage**

The foul drainage from the properties will be collected in underground pipes designed in accordance with Building Regulations. Document H. and be connected into the Anglian Water sewer serving the area in Stockhouse Lane.

## CLIMATE CHANGE

Global warming is now recognised that it is likely to affect the frequency and severity of extreme events as both tidal and fluvial flooding. The Climate change allowances in the NPPF Guidance was updated on the 27<sup>th</sup> of July 2021.

### Peak River Flow Allowances

For flood risk assessments use the Management Catchment Climate Changes for the peak river flow map. Management catchments are sub-catchments of River Basin Districts.

The site is located within the Welland Management Catchment within the Anglian River Basin District, for sites within Flood Zone 2 or 3a and for “More Vulnerable” land uses, the Central allowances figures, in the Table below, should be used.

<b>Peak River flow allowances within the Management Catchment Allowances</b>				
River Basin District /Management Catchment	Allowance category	Total potential change anticipated for '2020s' (2015 to2039)	Total potential change anticipated for '2050s' (2040 to2069)	Total potential change anticipated for '2080s' (2070 to2115)
Anglian/ Welland	Upper End	22%	26%	53%
	Higher Central	10%	10%	28%
	Central	5%	4%	17%

The effect of global warming on peak rainfall allowances is given in Table 1.

**Table 1 Peak Rainfall Intensity**

<b>Table 1 Peak rainfall intensity allowance in small and urban catchments (1961 to1990 baseline)</b>			
Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper End	10%	20%	40%
Central	5%	10%	20%

The annual sea rise due to climate change is given in NPPF and the recommended contingency allowances are stated in Table 2.

**Table 2 Peak Sea Level Rise**

<b>Table 2 Peak Sea level allowance for each epoch in (mm) per year with cumulative sea level rise for each epoch in brackets (use 1981to 2000 baseline)</b>						
Area of England) (Use River Basin	Allowance	2000 to 2035	2036 to 2065	2066 to 2095	2096 to 2125	Cumulative Rise 2000 to 2125 (m)
Anglian	Higher Central	5.8 (203mm)	8.7 (261mm)	11.6 (348mm)	13 (390mm)	1.20m
Anglian	Upper End	7 (245mm)	11.3 (339mm)	15.8 (474mm)	18.1 (543mm)	1.6m

## FLOOD PROTECTION

Any impact of damage to the properties (Plots 6/7) can be foreseen and mitigated against by relatively simple design and construction techniques. There are two forms of flood protection works: -

- **Flood-resistance or proofing works:** - these try to reduce the amount of water entering a building.
- **Flood-resilient works:** - these reduce the amount of damage caused by water entering the building.

The proposed development will have the following resilient measures incorporated in the construction in accordance with "Improving the flood performance of new buildings" CLG (2007).

- The ground floor living accommodation for Plots 6, 7 & 8 are to be raised 300mm above the existing average ground level, to be set at a level of 5.00mODN. The conversion of the Mermaid Inn (Plots 1 -5) will remain at the same level.
- Water, electricity, and gas meters: should be located above the predicted flood level. Electrical services: electrical sockets, heating systems: boiler units and ancillary devices should be installed at least 500mm above the ground floor level to minimise damage to electrical services Electric ring mains should be installed at first floor level with drops to ground floor sockets and switches.
- The ground floor to be constructed with a solid concrete floor with no voids beneath and no low-level wall vents. However, if a beam type floor is to be used, provision should be incorporated for draining the under-floor voids. The wall vents are to be fitted with 'Flood Angel' air bricks which allow air to free pass through as a usual, (complying with BS493:1995) but under flood conditions it shuts down when in contact with water. A removable mesh prevents the passage of debris which may otherwise impinge on the moving part.
- Avoid the use of absorbent cavity insulation to the ground floor level and use the closed cell type.
- Plasterboard to be fixed horizontally to the ground floor area, for ease of replacement.
- 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.
- As this site is in an area that is capable of receiving flood warnings from the Environment Agency Floodline Warning Direct system. It is recommended that the property Owner contact the Environment Agency's Floodline on 0845 988 1188 to register the property to receive advance warning of flooding by telephone, mobile, fax, SMS text, email or pager. The Environment Agency aim to issue a 'severe flood warning' approximately 2 hours before existing defences are overtopped.



## CONCLUSION

- The site does have the protection of flood defences which are well maintained by the Environment Agency.
- The proposed development site is shown to be within Flood Zone 1 'Low Probability' with the area alongside the riverbank within Flood Zone 3 'High probability' as detailed on the Environment Agency's Flood Zone Maps without defences
- The Flood Risk Vulnerability Classification in Table 2 of NPPG the proposed residential development is classified as "More Vulnerable", with Table 1 of NPPG stating that such uses are appropriate in this zone.
- The 2017 Update to SHDC, SFRA Tidal & Fluvial Hazard Mapping, for District following a breach to the defences for the present day the site is not within a hazard area. From the Residual Flood Hazard, Depth and Velocity Surfleet - Year 2115 1% maps, the apartments (Plots 1 -5) and Plot 8 are not affected from a breach to the flood defences. Plots 6 and 7 are mostly within a Low Hazard Rating Area, depth of flow 0m – 0.25m and velocity of flow 0 –0.3m/sec
- The ground floor living accommodation for Plots 6, 7 & 8 are to be raised 300mm above the existing average ground level, to be set at a level of 5.00mODN. The conversion of the Mermaid Inn (Plots 1 -5) ground floor will remain at the same level.
- Any impact of damage to the properties (Plots 6/7) can be foreseen and mitigated against by relatively simple design and construction techniques. They will be constructed using materials which are flood resilient construction as outlined in the report.
- Flooding from other sources is unlikely to affect the site.
- No obvious constraints have been identified that may impact the proposed development and the type of mitigation measures that can be used to reduce the flood risk, there is no increase in the flood risk to others. Following the guidelines contained within the NPPF, the proposed development is considered to be suitable assuming appropriate mitigation is maintained for the lifetime of the development.
- It is therefore concluded that the proposed development can be constructed, safely and sustainably, to meet the requirements of NPPF.

\*\*\*\*

# Flood map for planning

Your reference  
**Surfleet**

Location (easting/northing)  
**525081/328153**

Created  
**16 Aug 2021 16:51**

**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.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2021 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>

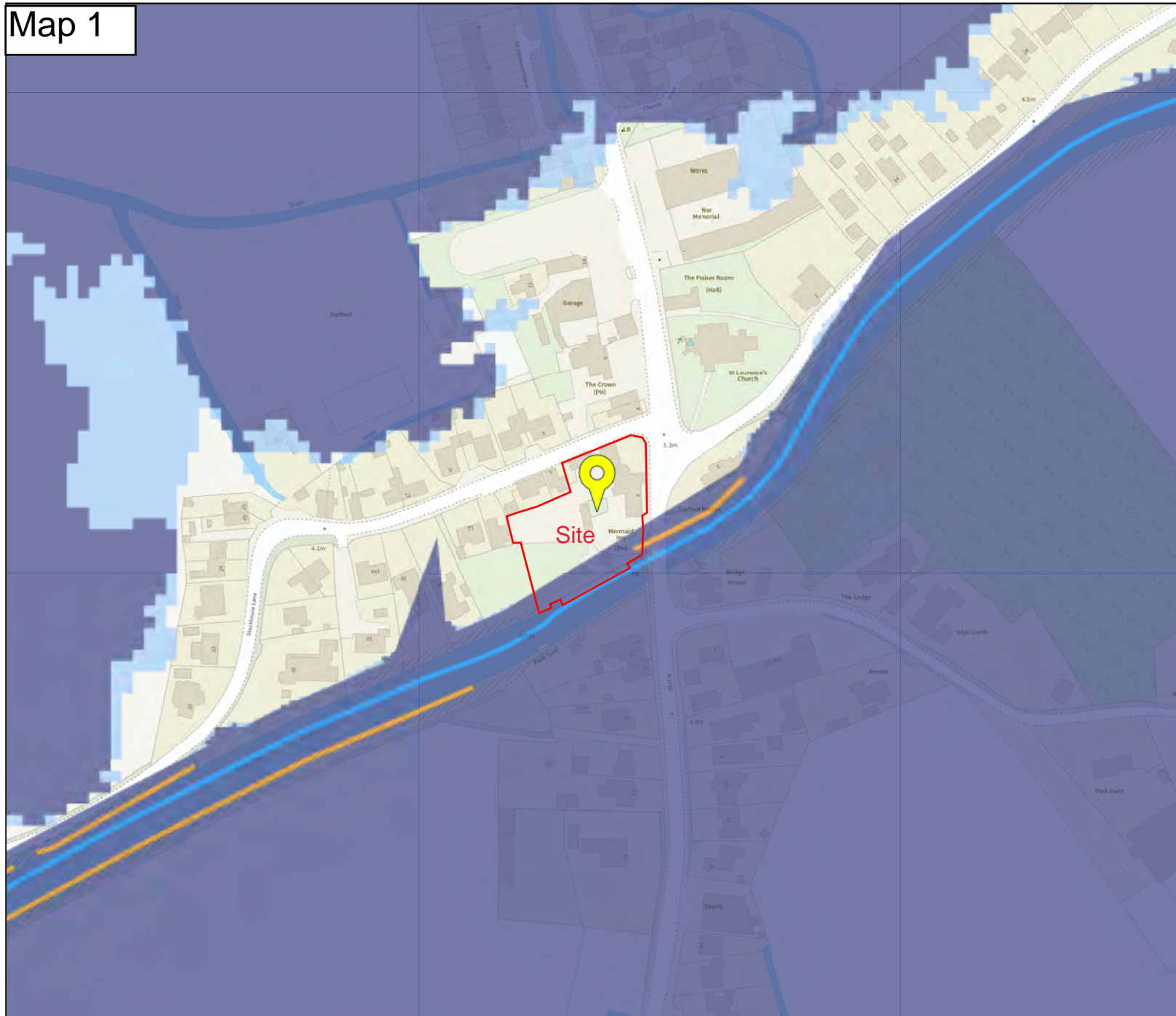
### Flood map for planning

Your reference  
**Surfleet**

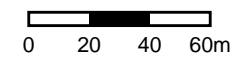
Location (easting/northing)  
**525081/328153**

Scale  
**1:2500**

Created  
**16 Aug 2021 16:51**



-  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



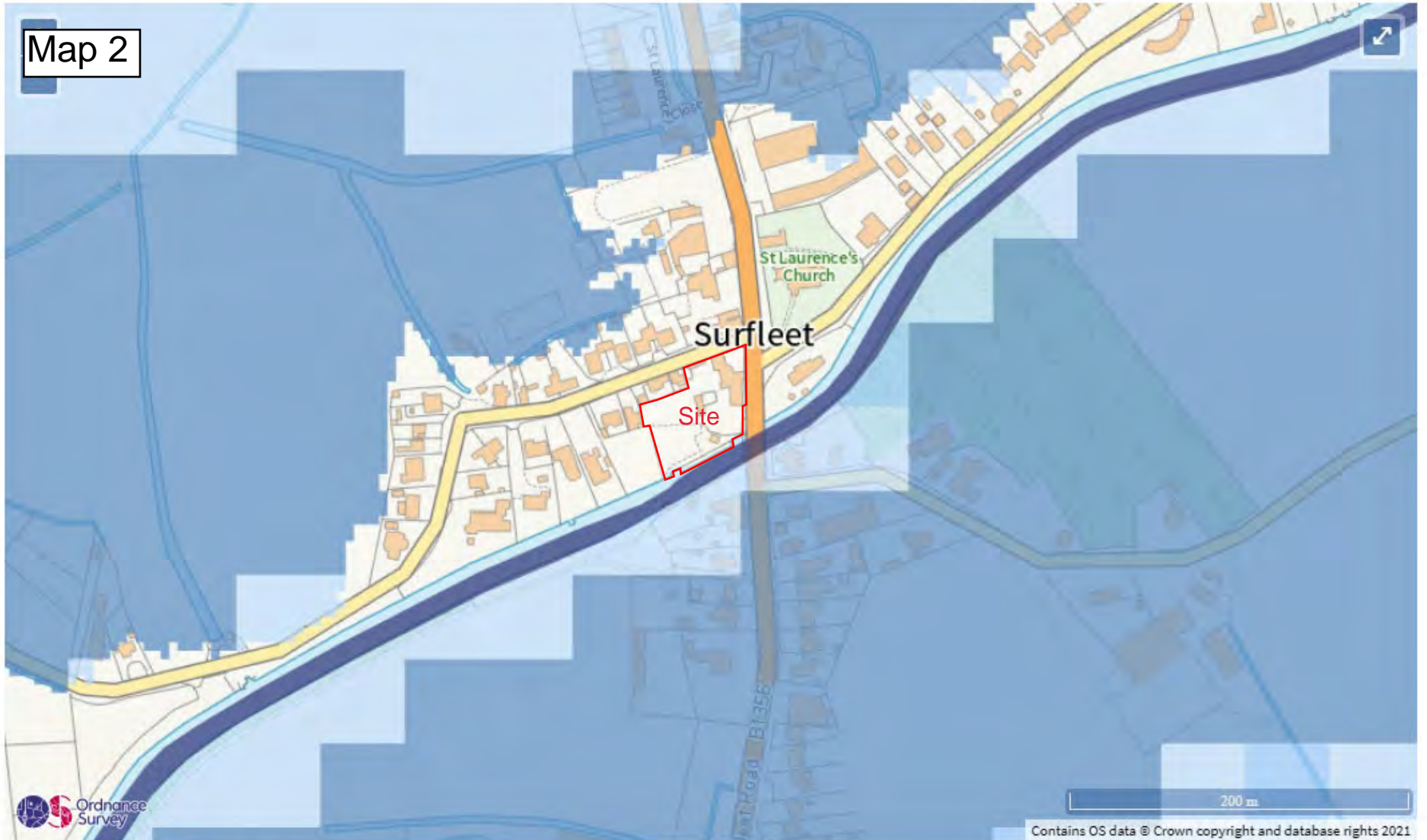
Flood risk

Extent of flooding

Location

Surfleet

Map 2



Extent of flooding from rivers or the sea

- High
- Medium
- Low
- Very low

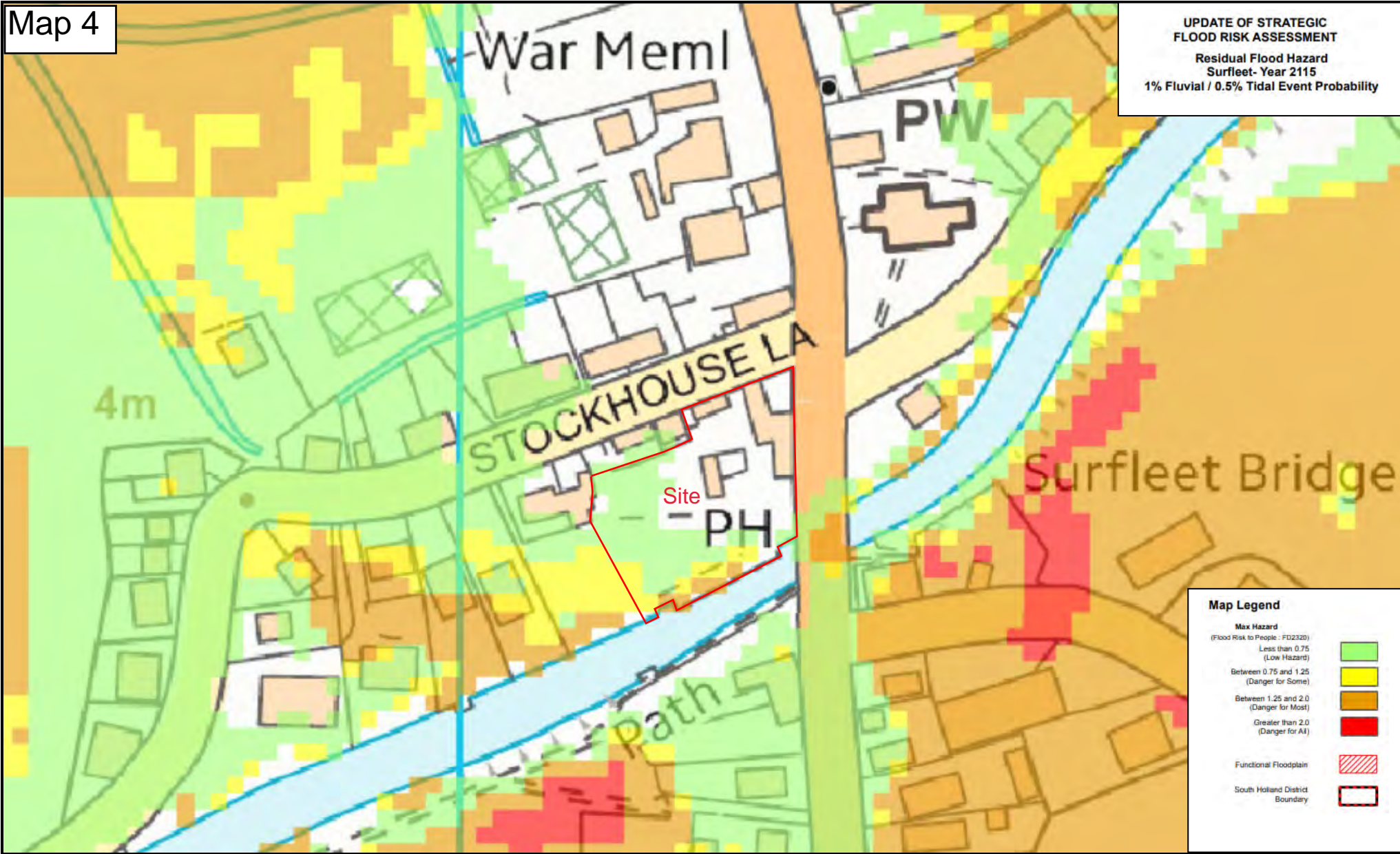
Map 3

UPDATE OF STRATEGIC  
FLOOD RISK ASSESSMENT  
Residual Flood Hazard  
Surfleet- Present Day  
1% Fluvial / 0.5% Tidal Event Probability



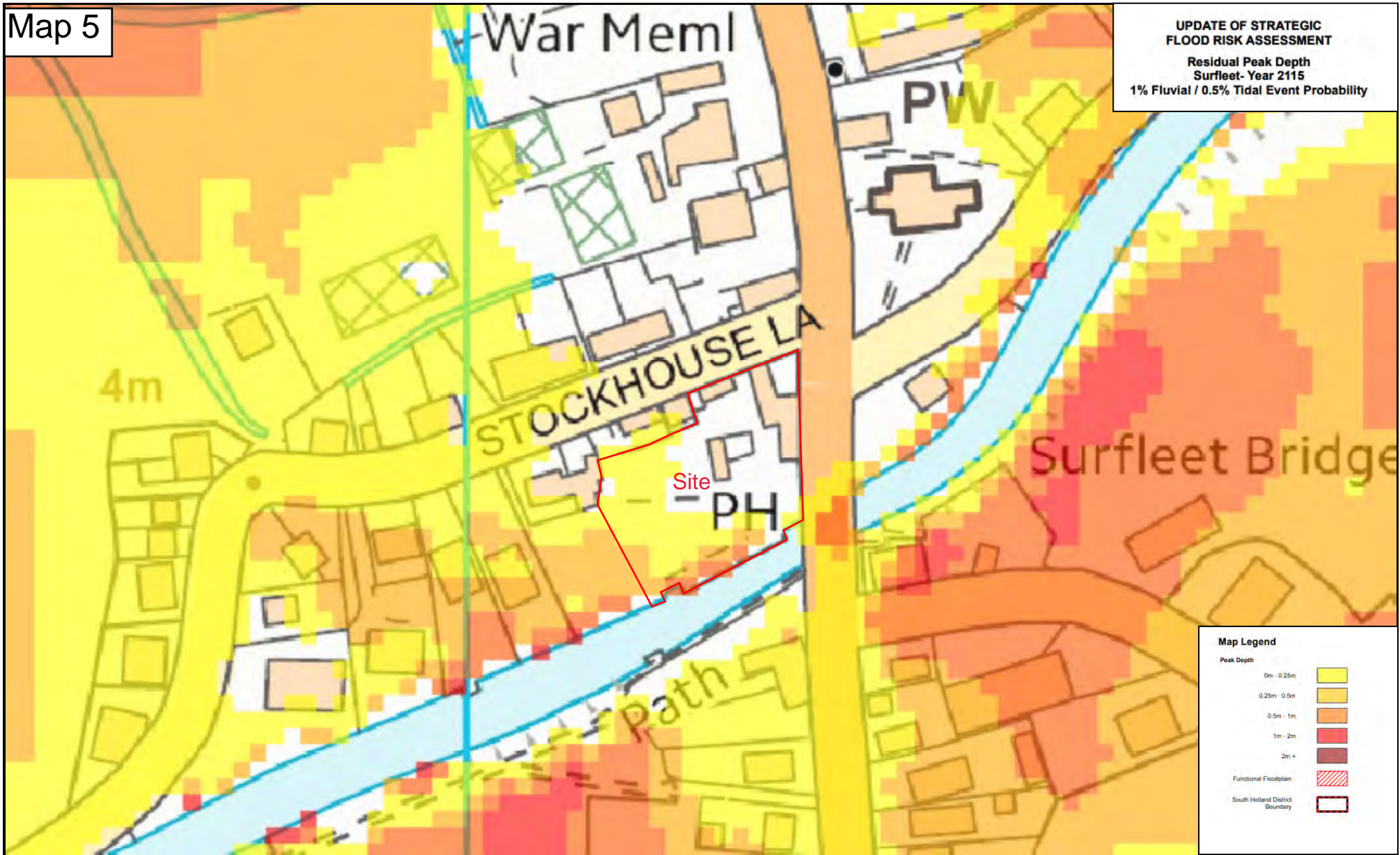
Map 4

UPDATE OF STRATEGIC  
FLOOD RISK ASSESSMENT  
Residual Flood Hazard  
Surfleet- Year 2115  
1% Fluvial / 0.5% Tidal Event Probability

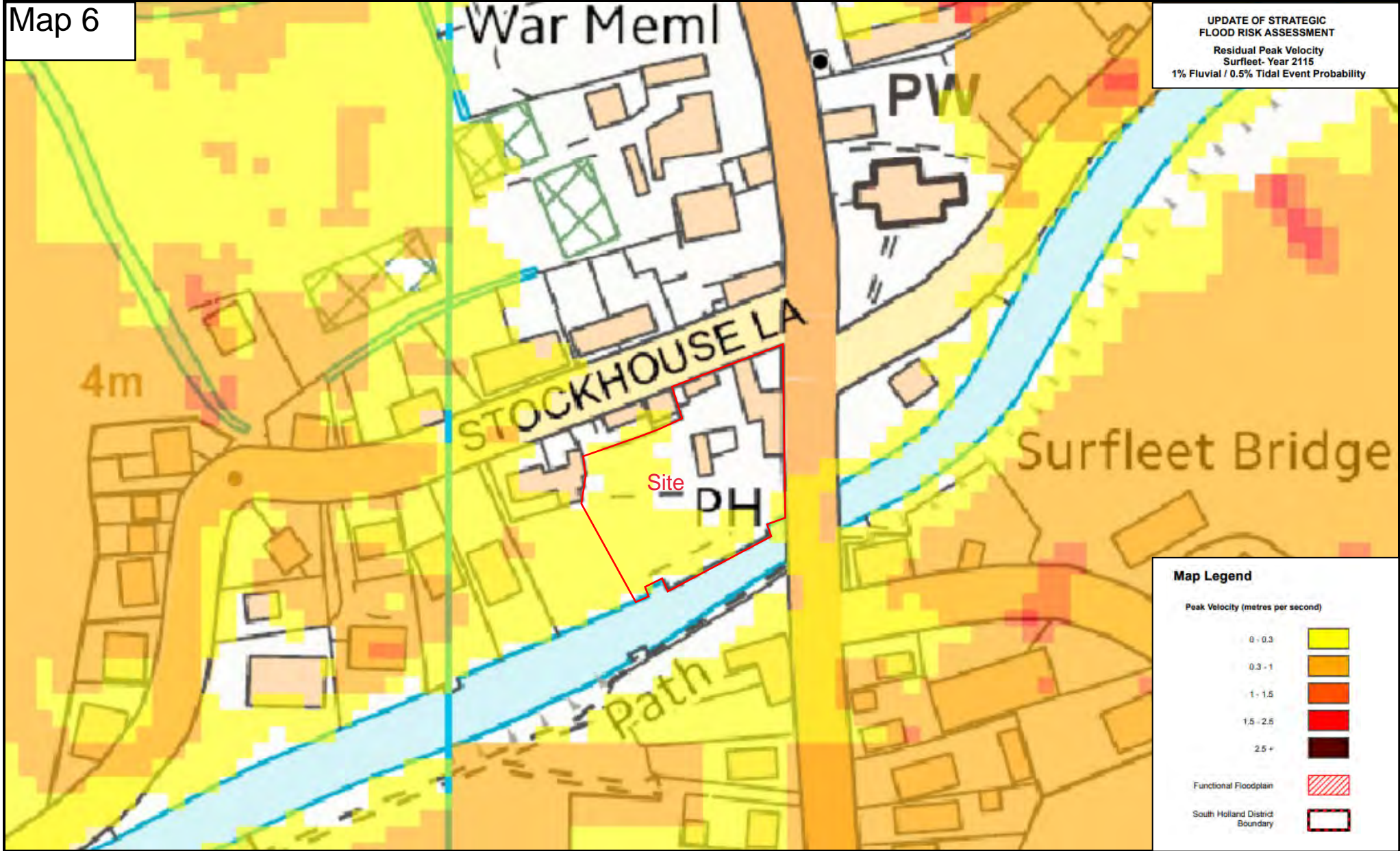


Map 5

UPDATE OF STRATEGIC  
FLOOD RISK ASSESSMENT  
Residual Peak Depth  
Surfleet - Year 2115  
1% Fluvial / 0.5% Tidal Event Probability



Map 6





Flood risk

Location

Low risk: depth

Surfleet

Map 7



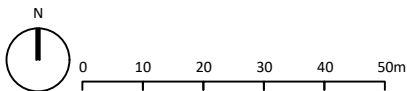
Surface water flood risk: water depth in a low risk scenario

Flood depth (millimetres)

- Over 900mm
- 300 to 900mm
- Below 300mm

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# Plan 1



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**Client**  
 GJK & KF Swindells

**Project**  
 The Mermaid Inn  
 Surfleet

**Drawing**  
 Location Plan

<b>Scale @ A4</b> 1: 1250	<b>Date</b> 17/08/21
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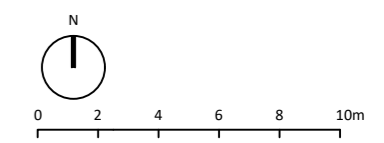
<b>Drawn By</b> WW	<b>Checked By</b> LMS
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<b>Job Number</b> 1447-1	<b>Status</b> PL	<b>Purpose of Issue</b> Planning
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<b>Drawing No.</b> 1447-1_PL_LP01	<b>Rev</b> -
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- Brick wall  
1.2m or 1.8m high as shown
- Close boarded fence  
1.8m high
- Black metal railings  
1.2m high
- Post & rail fence  
1.2m high
- Indicative soft landscaping

Rev	Description	Date
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**Client**  
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**Project**  
 The Mermaid Inn  
 Surfleet

**Drawing**  
 Proposed Site Plan

<b>Scale @ A2</b> 1: 250	<b>Date</b> 17/08/21
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<b>Drawn By</b> WW	<b>Checked By</b> PSS
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<b>Job Number</b> 1447-1	<b>Status</b> PL	<b>Purpose of Issue</b> Planning
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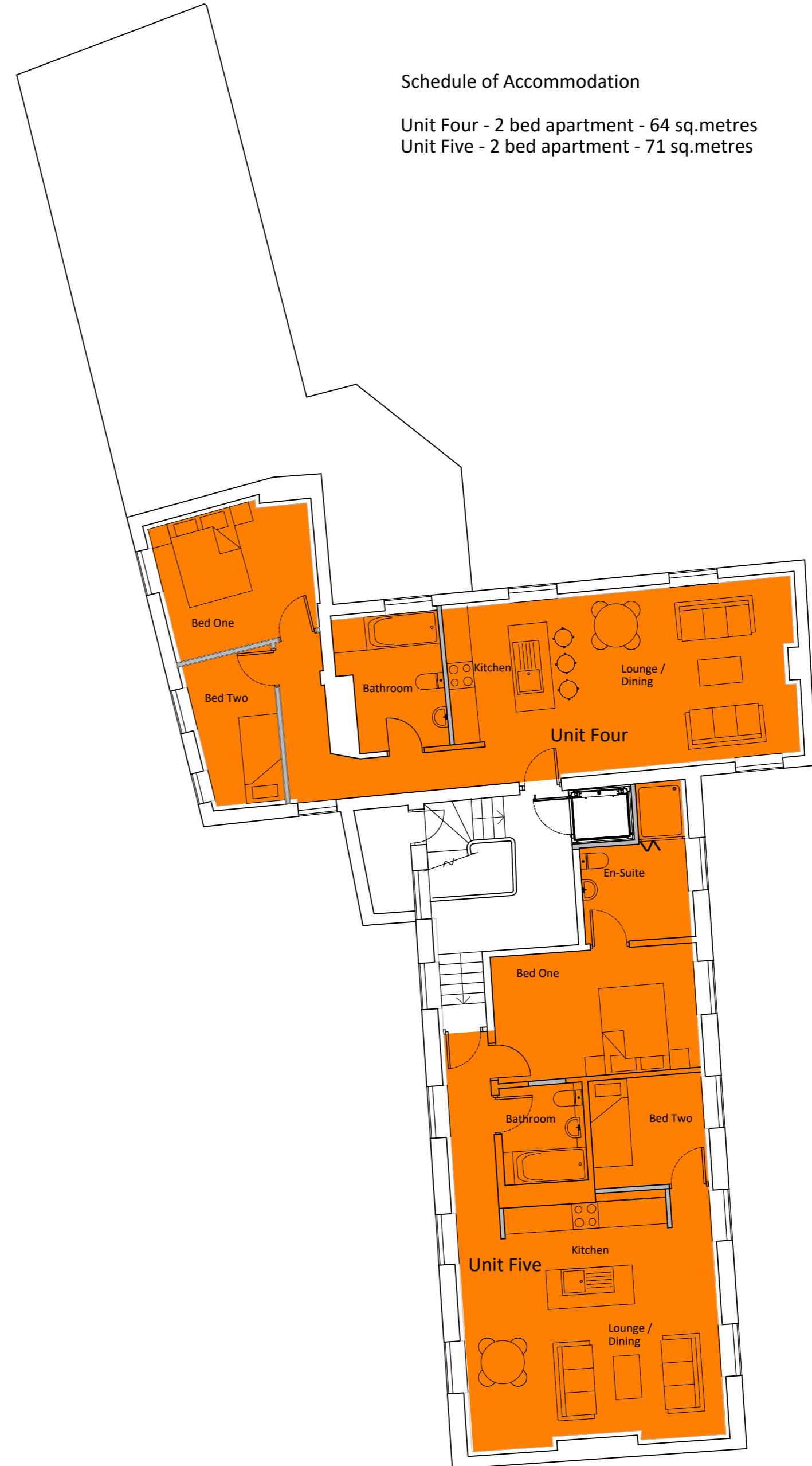
<b>Drawing No.</b> 1447-1_PL_SP01	<b>Rev</b> -
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Schedule of Accommodation

- Unit One - 1 bed apartment - 47. sq.metres
- Unit Two - 2 bed apartment - 63 sq.metres
- Unit Three - 2 bed apartment - 68 sq.metres

PROPOSED GROUND FLOOR PLAN



Schedule of Accommodation

- Unit Four - 2 bed apartment - 64 sq.metres
- Unit Five - 2 bed apartment - 71 sq.metres

PROPOSED FIRST FLOOR PLAN

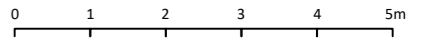
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GJK & KF Swindells

**Project**  
The Mermaid Inn  
Surfleet

**Drawing**  
Proposed Ground and First Floor Plans

<b>Scale @ A2</b> 1: 100	<b>Date</b> 14/07/21
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<b>Drawn By</b> PSS	<b>Checked By</b> PSS
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<b>Job Number</b> 1447-1	<b>Status</b> PL	<b>Purpose of Issue</b> Planning
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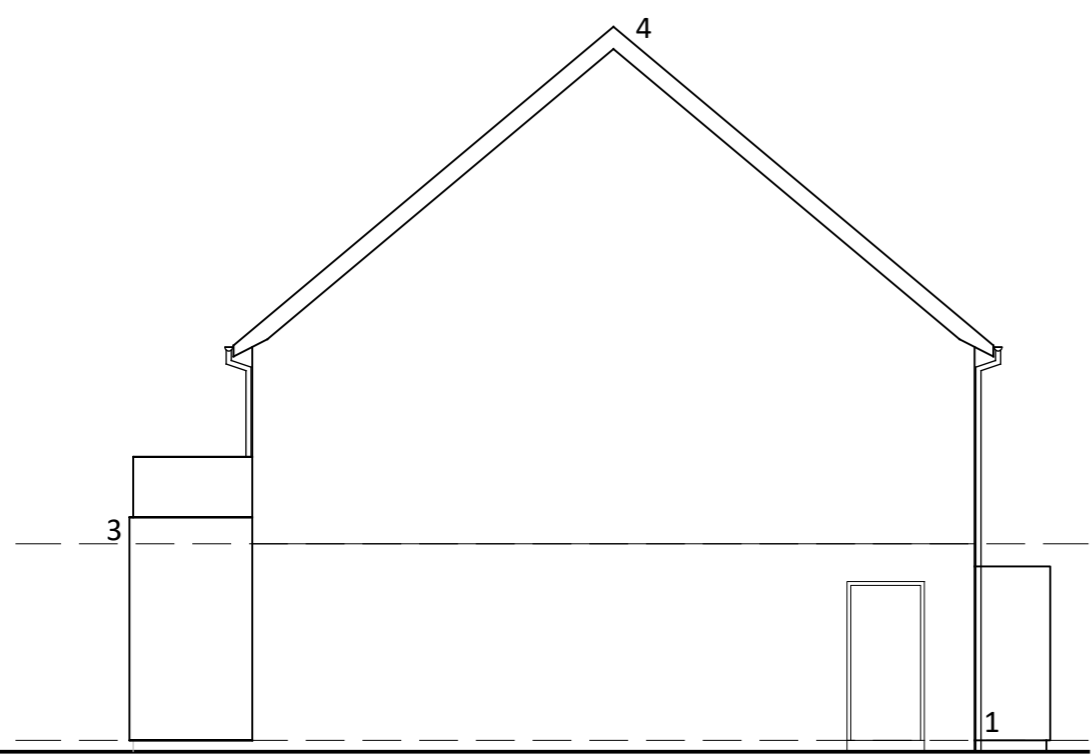
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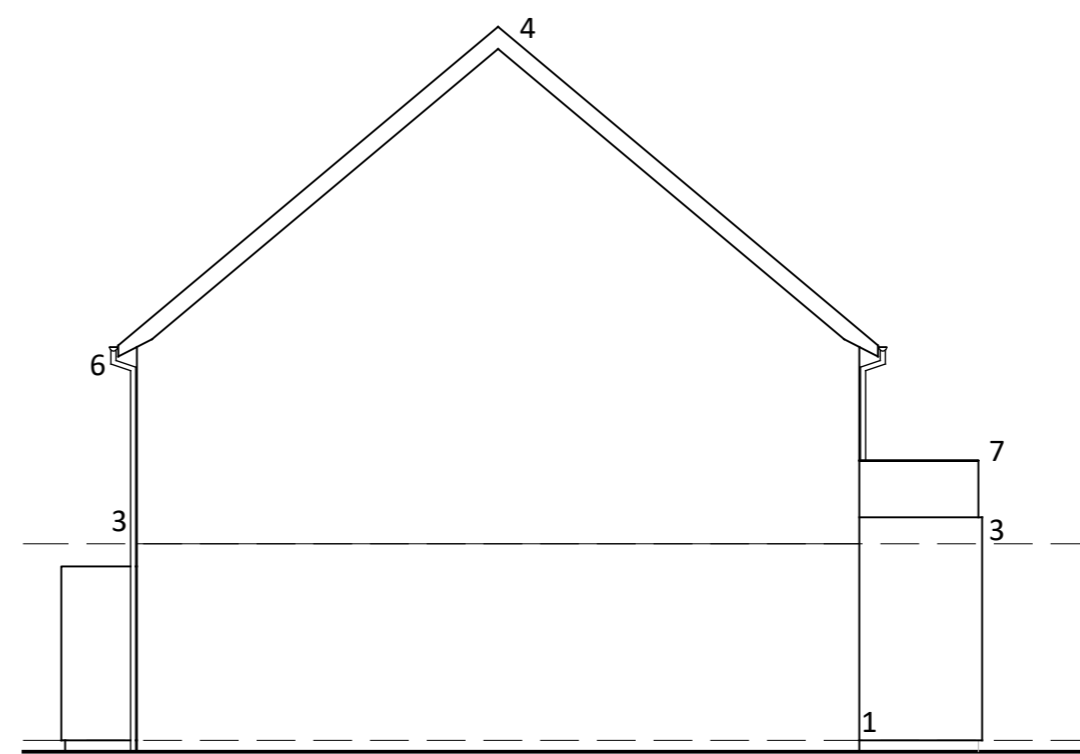
PROPOSED SOUTH ELEVATION



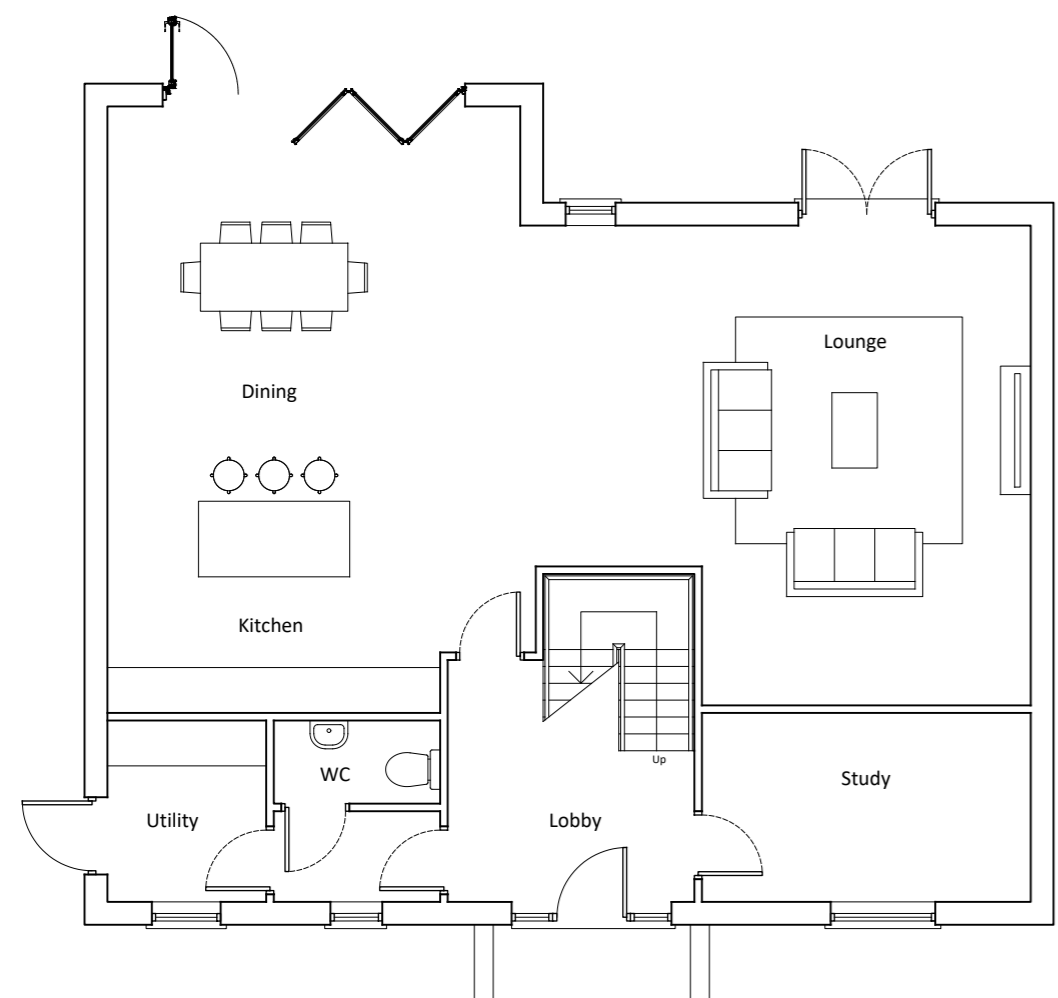
PROPOSED NORTH ELEVATION



PROPOSED EAST ELEVATION



PROPOSED WEST ELEVATION



PROPOSED GROUND FLOOR PLAN



PROPOSED FIRST FLOOR PLAN

Material Schedule

1. Red facing brickwork
2. Through colour render system
3. Vertical hit and miss cedar cladding
4. Clay pantile roof
5. Aluminium PPC doors and windows
6. Aluminium gutters and down pipes
7. Toughened glass balustrades

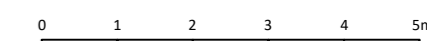
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**Client**  
GJK & KF Swindells

**Project**  
The Mermaid Inn  
Surfleet

**Drawing**  
Plot 6 - Proposed Floor Plans and Elevations

**Scale @ A2**  
1: 100

**Date**  
30/07/21

**Drawn By**  
PSS

**Checked By**  
PSS

**Job Number**  
1447-1

**Status**  
PL

**Purpose of Issue**  
Planning

**Drawing No.**  
1447-1\_PL\_PL03

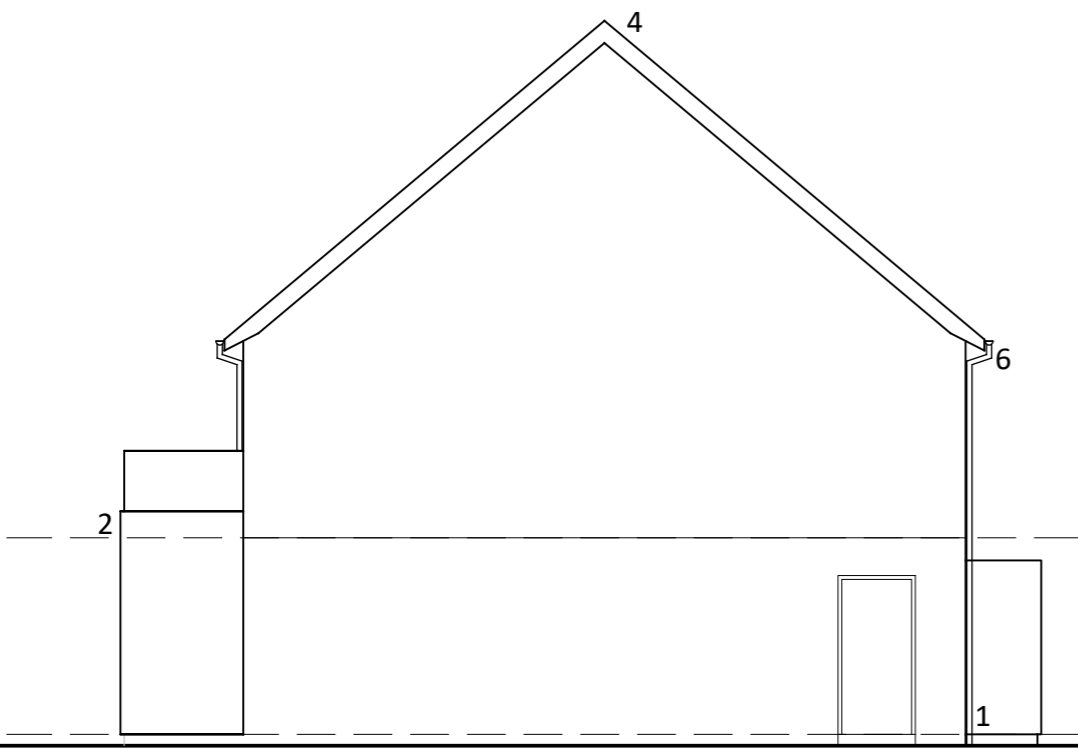
**Rev**  
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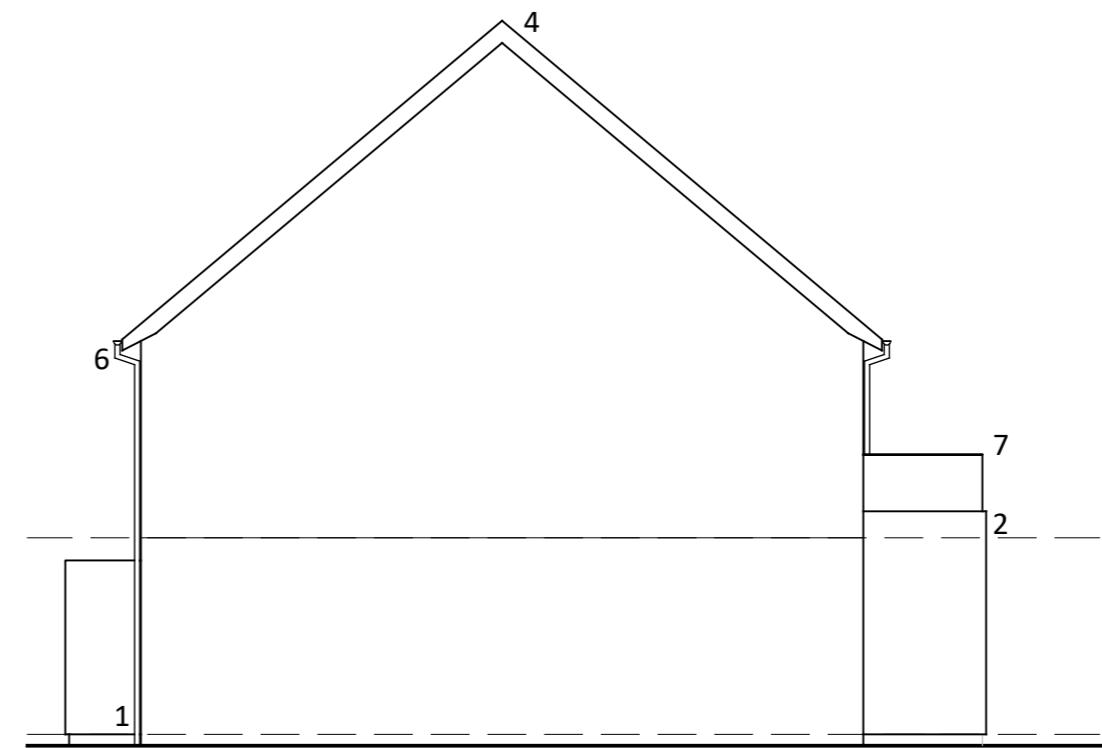
PROPOSED SOUTH ELEVATION



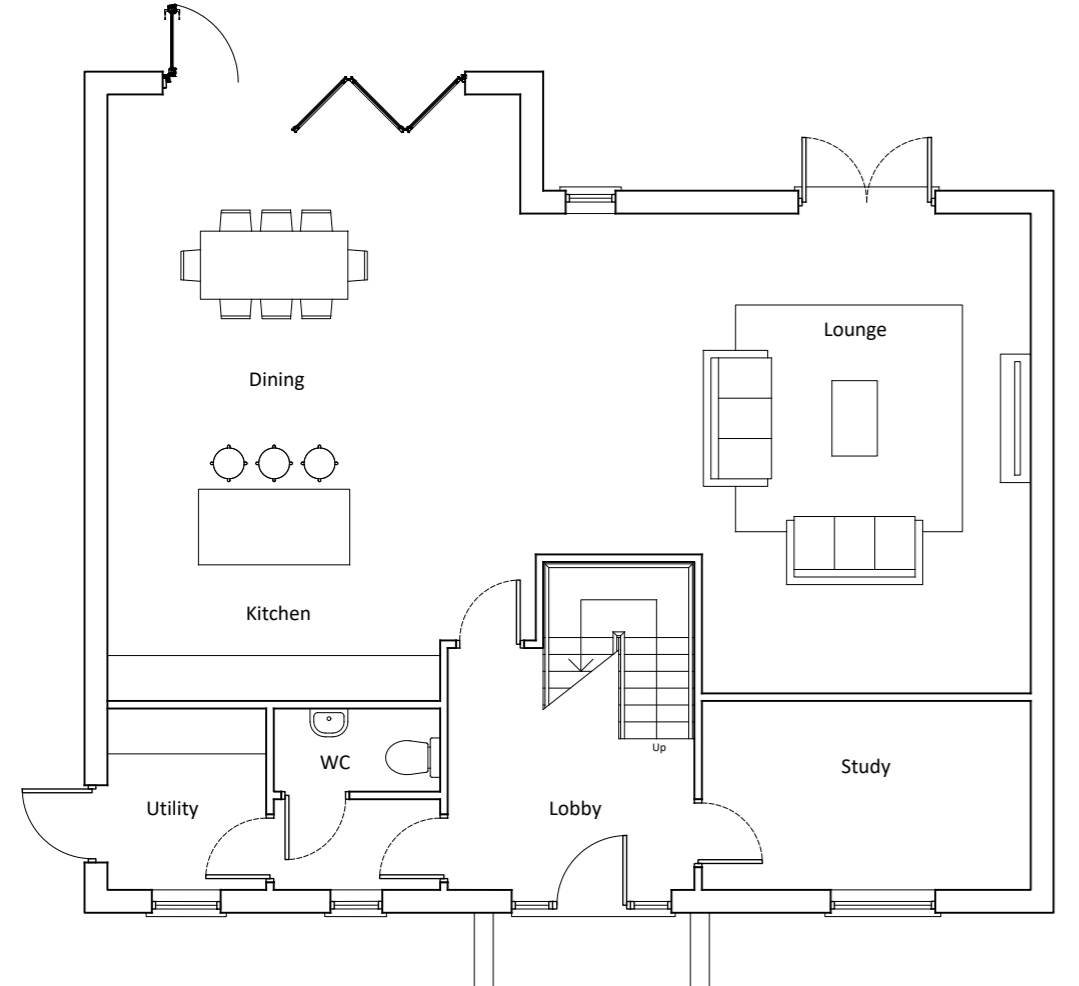
PROPOSED NORTH ELEVATION



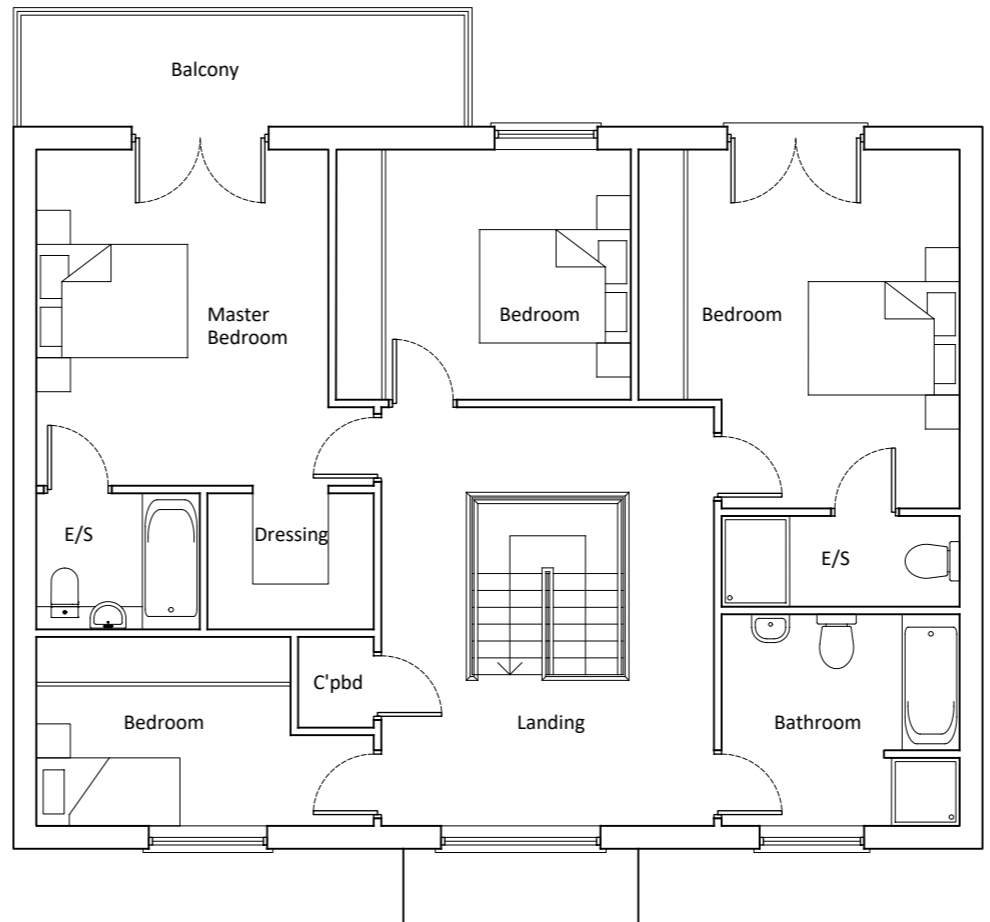
PROPOSED EAST ELEVATION



PROPOSED WEST ELEVATION



PROPOSED GROUND FLOOR PLAN

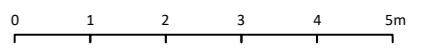


PROPOSED FIRST FLOOR PLAN

Material Schedule

1. Red facing brickwork
2. Through colour render system
3. Vertical hit and miss cedar cladding
4. Fibre cement slates
5. Aluminium PPC doors and windows
6. Aluminium gutters and down pipes
7. Toughened glass balustrades

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**Client**  
 GJK & KF Swindells

**Project**  
 The Mermaid Inn  
 Surfleet

**Drawing**  
 Plot 7 - Proposed Floor Plans and Elevations

**Scale @ A2**  
 1: 100

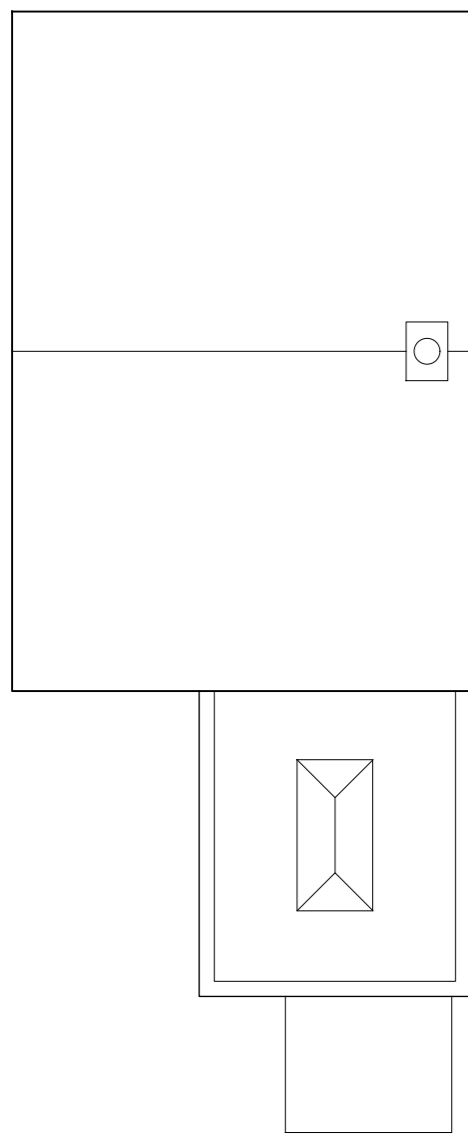
**Date**  
 30/07/21

**Drawn By**  
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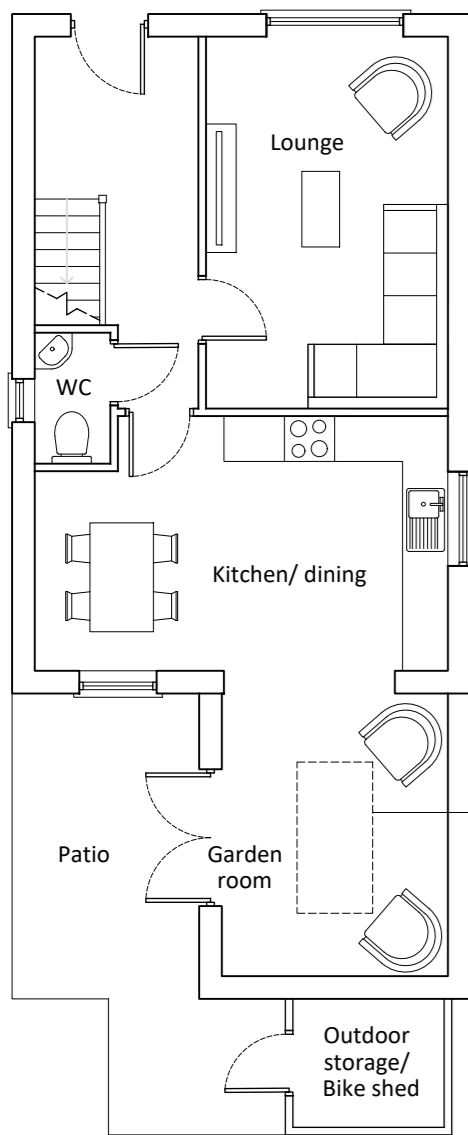
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Job Number	Status	Purpose of Issue
1447-1	PL	Planning

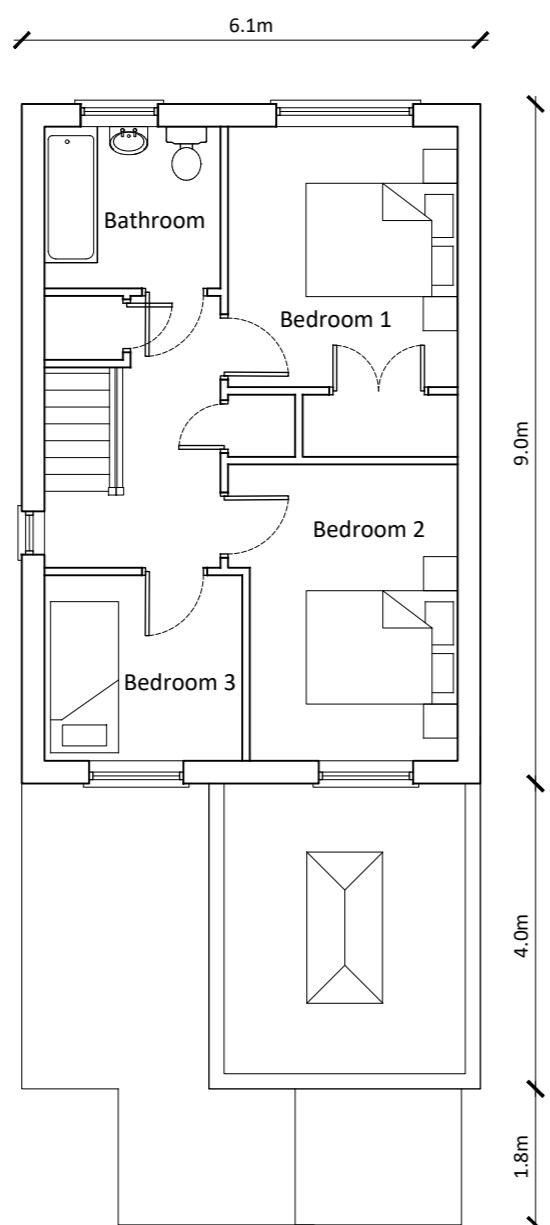
Drawing No.	Rev
1447-1_PL_PL04	-



ROOF PLAN



GROUND FLOOR PLAN



FIRST FLOOR PLAN



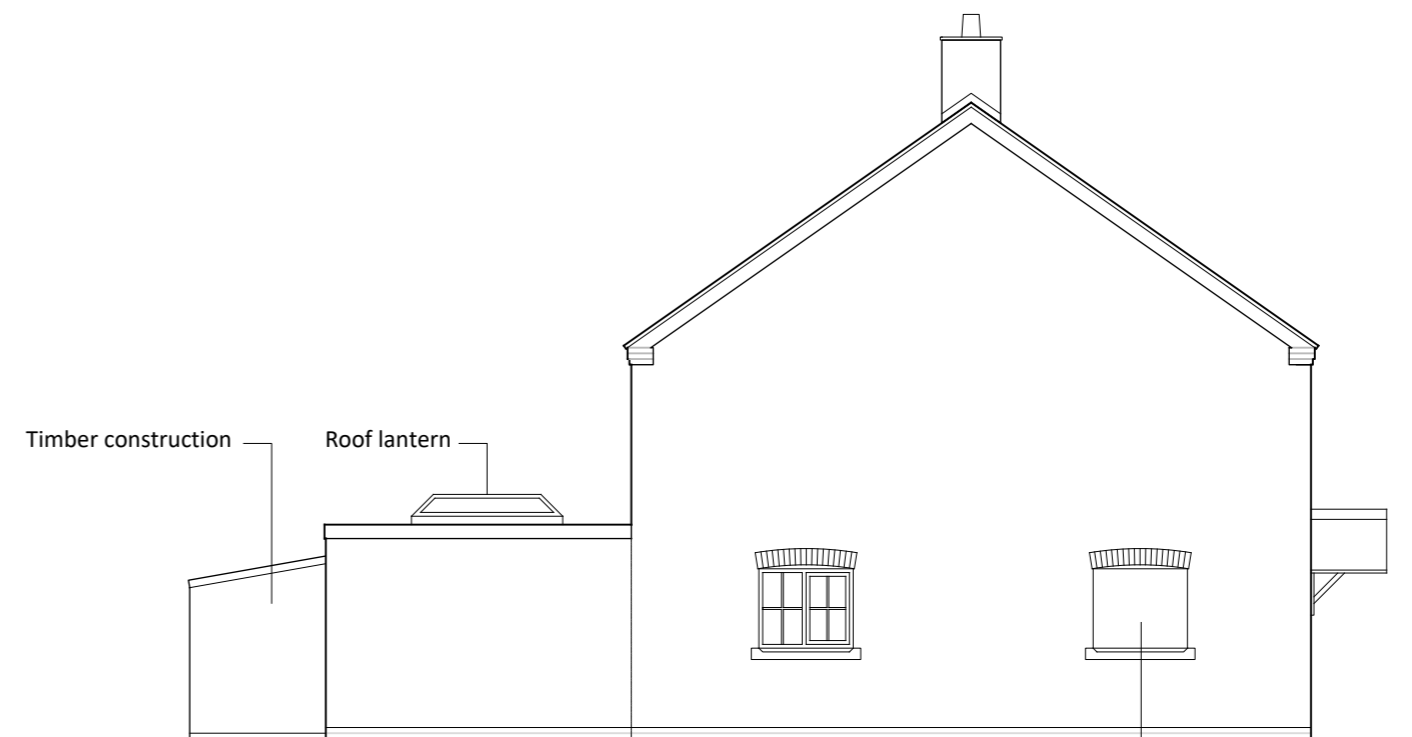
FRONT ELEVATION



SIDE ELEVATION



REAR ELEVATION



SIDE ELEVATION

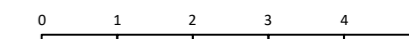
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**Project**  
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Surfleet

**Drawing**  
Frontage plot (plot 8) - Plans & Elevations

**Scale @ A2**  
1: 100

**Date**  
17/08/21

**Drawn By**  
WW

**Checked By**  
PSS

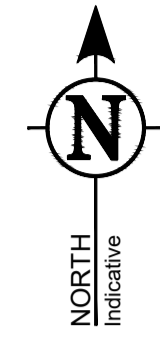
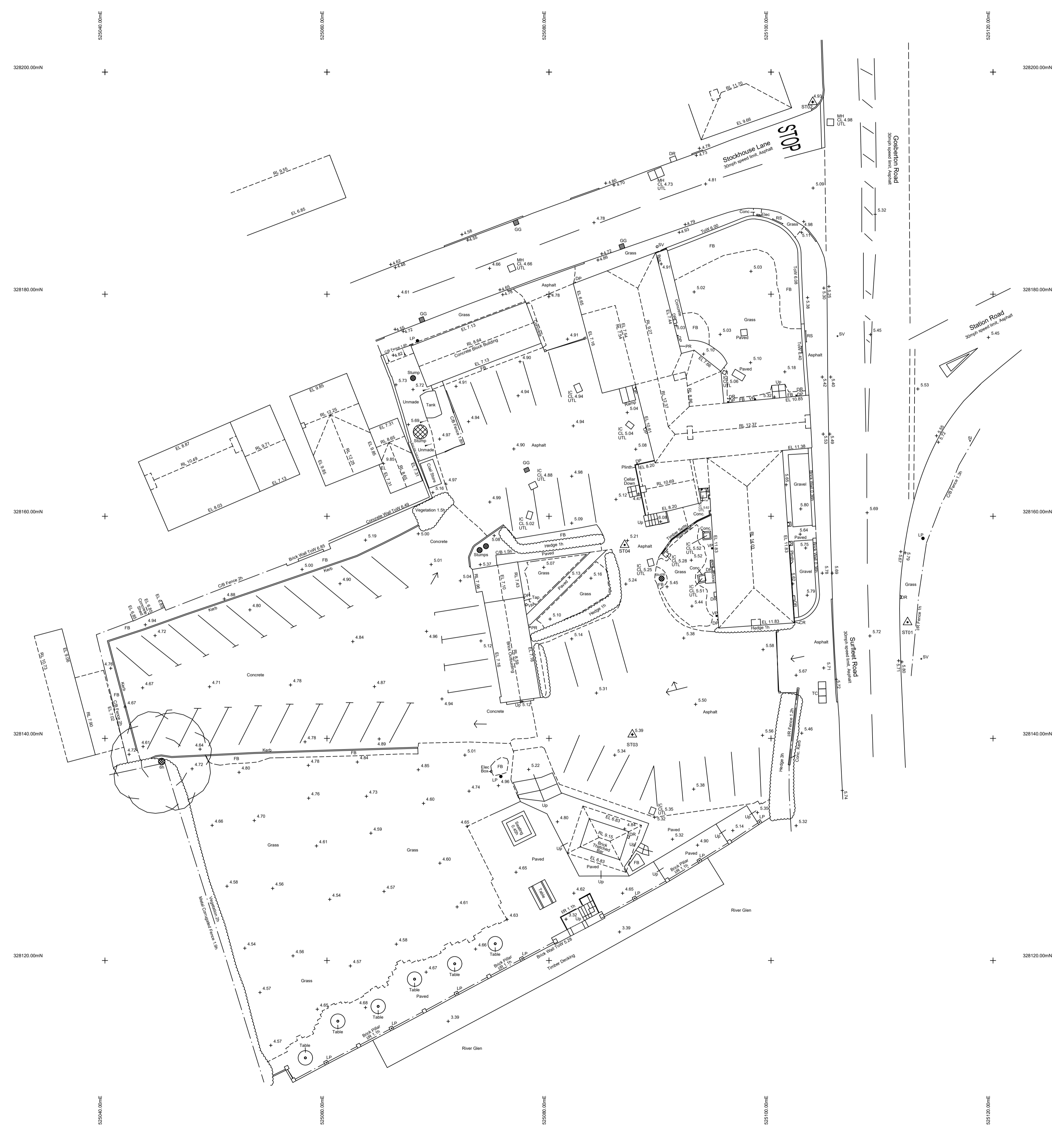
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1447-1

**Status**  
PL

**Purpose of Issue**  
Planning

**Drawing No.**  
1447-1\_PL\_GA01

**Rev**  
-



**DRAWING NOTE**

**Topographical Surveys**

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including: sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

**Measured Building Surveys**

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

**General**

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to 3DSS.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

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Do not scale from this drawing.

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using VRS Now, then orientated to grid north with a scale factor of 1.000

The level datum established for this survey is related to Ordnance Survey (OS) using VRS Now.

To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.

SURVEY CONTROL CO-ORDINATES				
STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
ST01	525112.302	328150.461	5.860	PK Nail
ST02	525103.758	328197.305	4.930	PK Nail
ST03	525087.528	328140.353	5.397	PK Nail
ST04	525086.617	328157.426	5.214	PK Nail

REV	DESCRIPTION	DRAWN	APPR	DATE

**TOPOGRAPHICAL & MEASURED BUILDING SURVEYS**

**ABBREVIATIONS & SYMBOLS**

AH Arch Head Height	FH Fire Hydrant	RSJ Rolled Steel Joist
AR Assumed Route	FBD Floor Board Direction	SI Sign Post
AV Air Valve	FL Fire Hydrant	SP Arch Spring Point Height
BB Bellaha Beacon	FL Floor Level	SV Stop Valve
BH Bore Hole	FP Flag Pole	SW Surface Water
BL Bed Level	FW Foul Water	SV Stair
BO Bollard	GG Gully Grate	Tac Tactile Paving
BP Brace Post	GV Gas Valve	TC Telecom Cover
BS Bus Stop	HW Head Height	TH Trail Pit
BU Bush	IC Inspection Cover	THL Threshold Level
BW Barbed Wire Fence	IL Invert Level	TL Traffic Light
BX Box (Utility)	IR Iron Railings	TSW Top of Wall
CB Close Board Fence	KO Kerb Outlet	TP Telegraph Pole
CH Cill Height	LP Lamp Post	TV Cable TV Cover
CL Cover Level	MH Manhole	UB Universal Beam
CL Chain Link Fence	MP Marker Post	UC Unknown Cover
C-Lev Ceiling Level	NB Name Board	UK Unknown Tree
Col Column	OHL Overhead Line (approx)	USB Under Side Beam
CIP Cheamul Paving Fence	PF Panel Fence	UTL Unable To Lift
CR Cable Rear	PB Post Box	VP Vent Pipe
DC Drainage Channel	PM Parking Meter	WB Waste Bin
DH Door Head Height	PD Post	WH Weep Hole
DP Down Pipe	PFR Post & Rail Fence	WL Water Level
DR Drain	PW Post & Wire Fence	WM Water Meter
EL Eaves Level	PWail Partition Wall	WO Wash Out
EP Electric Pole	RE Racking Eye	⊙ Floor to Ceiling Height
ER Earth Road	RL Ridge Level	⊙ Floor to False Ceiling Ht
ET EP-Transformer	RP Reflector Post	⊙ Survey Control Station
FB Flower Bed	RS Road Sign	⊙ Roter Shutter Door
FBD Floor Board Direction	RSD Roter Shutter Door	

REV: AMENDMENTS:	DRN:	CHK:	DA:
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PROJECT:

**THE MERMAID INN  
PE11 4AB**

DRAWING TITLE:

**EXISTING TOPOGRAPHICAL  
SURVEY**

CLIENT:

**RDC**

DRAWING NUMBER:

**3DSS-PG-MI-21-03**

REVISION:	SHEET SIZE:	DATE:
	<b>A1</b>	<b>23/07/21</b>
DRAWN BY:	CHECKED BY:	SCALE:
<b>PG</b>	<b>RS</b>	<b>1:200@A1</b>

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