

**PROPOSED REFURBISHMENT/REPLACEMENT OF
EXISTING GARAGE TO FORM TWO BEDROOM
RESIDENTIAL ACCOMMODATION AT 12 – 14
DITTON ROAD, SURBITON**

J-14359

FLOOD RISK ASSESSMENT



PROPOSED REFURBISHMENT/REPLACEMENT OF EXISTING GARAGE TO FORM TWO BEDROOM RESIDENTIAL ACCOMMODATION AT 12 – 14 DITTON ROAD, SURBITON

FLOOD RISK ASSESSMENT

Report No.	Issue Detail	Originator	Date	Checked By	Date
01	Client	HG	07/12/2020	AG	07/12/2020

For: McLaren Associates
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Job No: J-14359
Date: May 2021
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1.0 INTRODUCTION

McLaren Associates are representing a client who is looking to replace an existing disused garage to provide a two bedroom residential dwelling at 12 – 14 Ditton Road, Surbiton.

According to the Environment Agency (EA) interactive map, it is apparent that part of the site is within Flood Zone 2, and as such any submission for planning will require a Flood Risk Assessment (FRA). Therefore, it has been deemed necessary to produce an FRA for the site in accordance with the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG).

In order to address this requirement, Nijhuis Industries Ltd. have been commissioned. The objective of this appointment is to prepare a FRA for the development in accordance with the best practice principles of NPPF and PPG regarding flood risk. The study will assess the possible extent to which flooding could occur at the site, and will recommend measures to mitigate against the possible risks that could be posed as a result of the development. This report describes the findings of the study.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The proposed development site is located to the rear of 12 – 14 Ditton Road, Surbiton. The Ordnance Survey Grid Reference for the site is TQ 18634 66475. A plan showing the location of the whole site is shown in **Figure 2.1**. The garage to be redeveloped is at the rear of the plot and has been indicated on the plan below.

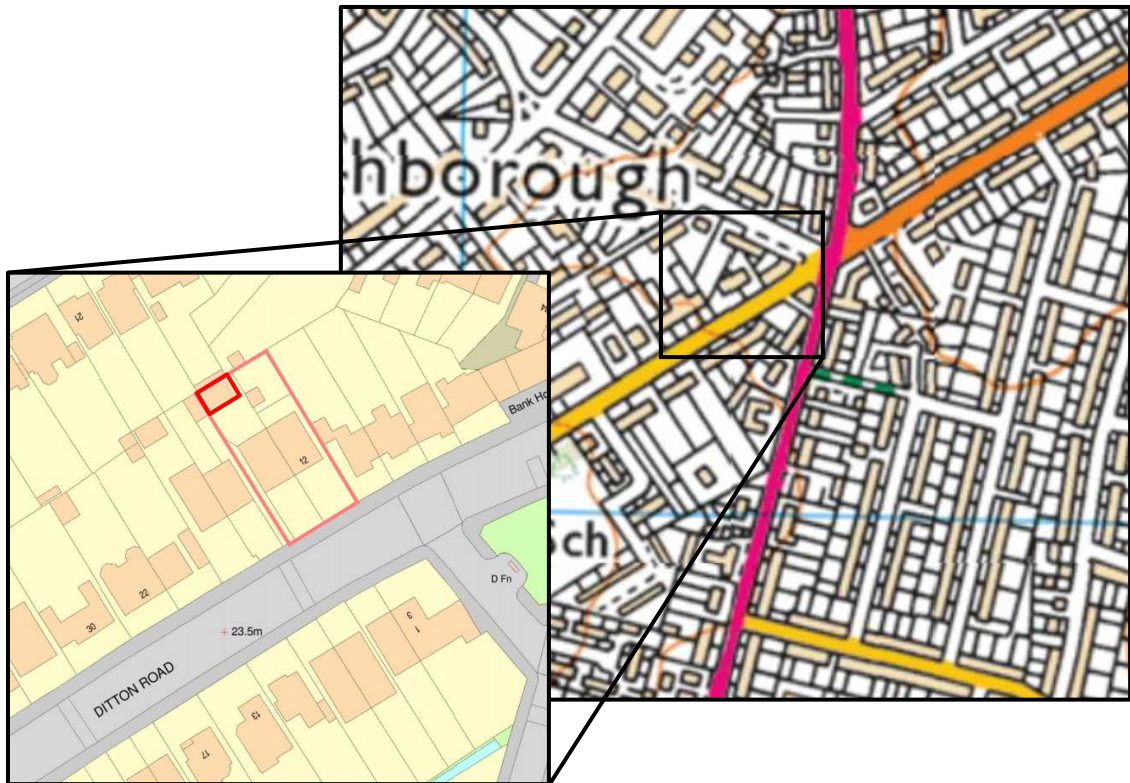


Figure 2.1 Site Location

2.2 Existing Usage

The site is an existing disused garage to the rear of 12 – 14 Ditton Road, Surbiton.

2.3 Proposed Usage

The existing garage is proposed to be replaced with a two bedroom residential unit to provide additional housing in this sought-after area.

3.0 EXISTING HYDROLOGY

Initial inspection of the EA indicative flood plain suggests that the site within Flood Zone 2 (Figure 3.1 below).

The proposed development site is located within close proximity to the Surbiton Stream which appears to be the source of the flood risk to the site.

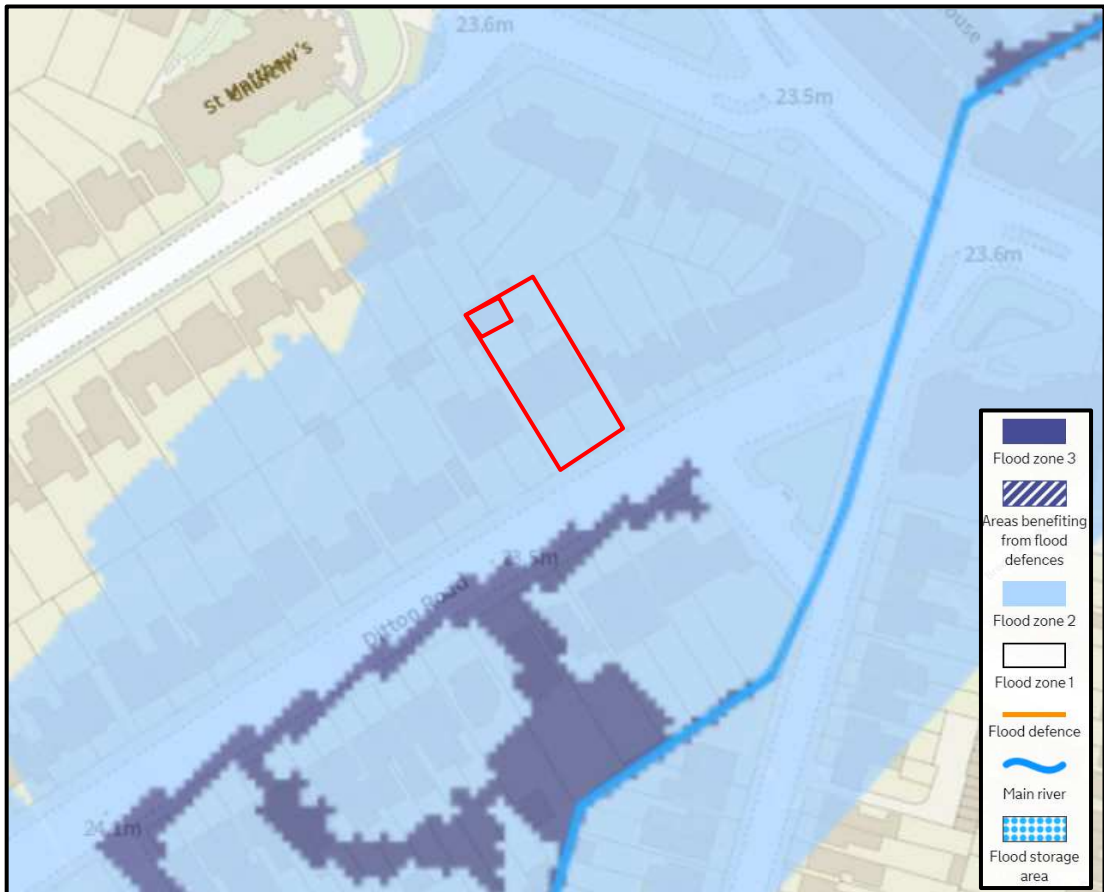


Figure 3.1. Extract from EA Indicative Flood Map

4.0 FLOOD MECHANISMS

A number of possible flooding mechanisms have been considered at the site, and are discussed below.

4.1 Groundwater Flooding

The Strategic Flood Risk Assessment for the site area states that a large proportion of the borough overlies London Clay, therefore the risk of groundwater flooding will typically be very low. It is considered that groundwater flooding does not pose a significant risk to the development site and will not be considered further within this report.

4.2 Overland Sheet Flow

The land surrounding the site is built-up urban environment incorporating predominantly residential units. The EA indicative surface water flood map (**Figure 4.1** below) shows that the site appears to be at medium/high risk of flooding from surface water.

The mapping indicates that in the medium and high risk scenario the flood depths are anticipated to be less than 300mm. It is considered that any mitigation measures against fluvial flooding will also protect the development from surface water flooding.

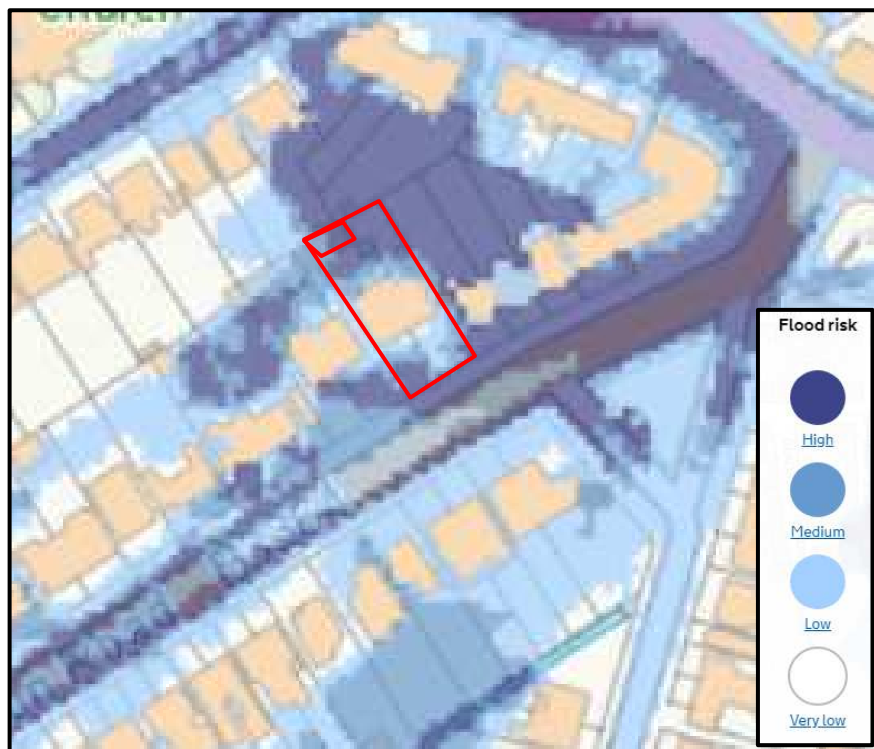


Figure 4.1 Environment Agency Risk of Surface Water Flooding Map Extract

4.3 Tidal Flooding

Due to the location of the site it is not anticipated to be at risk of tidal flooding. As such, this mechanism of flooding will not be discussed further.

4.4 Fluvial (River) Flooding

Fluvial flooding from the Surbiton Stream poses the main risk to the proposed site. An EA information request has provided data which will be used to analyse the flood risk. This will be discussed in more detail in **Section 5** of this report.

4.5 Flooding as a Result of Development

Any development and paving of permeable areas has potential to increase flood risk to properties down slope of the proposed development because of the increase in surface water runoff and as such would need to comply with guidance outlined in the local planning guidance document. The existing site for the redevelopment is entirely hard paved and therefore there will be no change to the impermeable area of the site once the development is completed. As such it is deemed that the proposal will not increase flood risk elsewhere as a result of development.



5.0 FLUVIAL FLOODING

The proposed site is located in close proximity to the Surbiton Stream. The EA provided Product 5 and 6 information for the site.

They provided both 1D and 2D data for watercourse and flood levels. The 1D data has been provided for nodes along the Surbiton Stream for the 100 year event and 1,000 year event. The closest node to the site has been considered. The 2D data has been provided for the 100 year event with 35% allowance for climate change and the 70% allowance for climate change. The 2D data has been provided as a level grid and therefore the potential flood levels at the garage where the new dwelling is to be located can be determined.

Table 5.1: EA 1D flood level data for Node 429

Node	Easting	Northing	1% AEP (m AOD)	0.1% AEP (m AOD)
429	518694.663	166396.299	23.536	23.869

The 2D data provided flood levels for the 100 year event with allowances for climate change. The data is shown below in **Table 5.2**. The flood level mapping is included within **Appendix B**.

Table 5.2: EA 2D flood level data for the garage to be redeveloped

1% AEP +35%CC (m)	1% AEP +70%CC (m)
23.47	23.67

The client has provided some site levels. These levels show that the threshold of the garage is currently set at 24.64m AOD. This puts it above the outlined flood levels for the site. As such the garage is not deemed to be at risk of flooding.

5.1 Flood Risk Summary

The proposed site is deemed to be at risk of flooding from the nearby Surbiton Stream. The maximum flood level for the location of the garage for redevelopment is considered to be 23.869m AOD for the 1 in 1,000 year flood event. Due to the inclusion of a lower ground floor mitigation measures are proposed to ensure the property is safe from flooding. Flood mitigation measures are recommended in **Section 6** below.



6.0 FLOOD RISK MITIGATION MEASURES

The proposed garage for re-development is deemed to be above the outlined flood levels, however the inclusion of a lower ground floor means that the FFL of the lower ground floor may be lower than the outlined flood levels and therefore the following mitigation measures are recommended. It is noted that this is a conservative approach and it is unlikely that based on the outlined flood levels that any floodwater would reach the property.

- There should be no access or entry points to the lower ground floor below 23.87m AOD. This includes and service entries or vents. If they are required lower than 23.87m AOD they should be floodproof. This is to ensure that if an extreme flood event were to occur floodwater would not be able to enter the property.
- Flood resilient materials should be used on the lower ground floor up to a level of 23.87m AOD where appropriate.
- The construction of the lower floor level should avoid the inclusion of any sleeping accommodation as this would be classed as “highly vulnerable”. The proposed plans indicate that there will be no sleeping accommodation on the lower ground floor.

Further advice on developing flood risk is available from Improving Flood Resilience of New Buildings which is available at:

http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf



7.0 ACCESS AND EGRESS

The main access route onto Ditton Road is deemed to be at risk of flooding as shown on the flood maps. Therefore, it is unlikely that safe and dry access and egress would be possible during an extreme flood event. It is likely that any flooding on the access route would be visible from inside the property. Therefore, if any flood water is visible on the access route occupants should remain within the building on the ground floor level which should have a FFL above the outlined flood levels within this report. This means that the property will provide a safe haven during an extreme flood event.

It is noted that potential flooding on Ditton Road to the south of the site is likely to be less than 200mm, as such if evacuation is required then this should be the access route.

When considering the hazard risk of this route along Ditton Road to the South in relation to DEFRA Hazard risk (FD2320) – ‘Danger to People for Combinations of Depth & Velocity’ and Table 13.1 of this document the risk can be considered to be ‘Very low hazard - Caution’. This is based on the 2D flood information from the EA indicating that the flooding would be up to 200mm with a velocity no greater than 0.3 m/s. The velocity mapping is included in **Appendix B**.

HR	Depth of flooding - d (m)												
	DF = 0.5				DF = 1								
Velocity v (m/s)	0.05	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.80	1.00	1.50	2.00	2.50
0.0	0.03+0.5 = 0.53	0.05+0.5 = 0.55	0.10+0.5 = 0.60	0.13+0.5 = 0.63	0.15+1.0 = 1.15	0.20+1.0 = 1.20	0.25+1.0 = 1.25	0.30+1.0 = 1.30	0.40+1.0 = 1.40	0.50+1.0 = 1.50	0.75+1.0 = 1.75	1.00+1.0 = 2.00	1.25+1.0 = 2.25
0.1	0.03+0.5 = 0.53	0.06+0.5 = 0.56	0.12+0.5 = 0.62	0.15+0.5 = 0.65	0.18+1.0 = 1.18	0.24+1.0 = 1.24	0.30+1.0 = 1.30	0.36+1.0 = 1.36	0.48+1.0 = 1.48	0.60+1.0 = 1.60	0.90+1.0 = 1.90	1.20+1.0 = 2.20	1.50+1.0 = 2.50
0.3	0.04+0.5 = 0.54	0.08+0.5 = 0.58	0.15+0.5 = 0.65	0.19+0.5 = 0.69	0.23+1.0 = 1.23	0.30+1.0 = 1.30	0.38+1.0 = 1.38	0.45+1.0 = 1.45	0.60+1.0 = 1.60	0.75+1.0 = 1.75	1.15+1.0 = 2.15	1.50+1.0 = 2.50	1.75+1.0 = 2.75
0.5	0.05+0.5 = 0.55	0.10+0.5 = 0.60	0.20+0.5 = 0.70	0.25+0.5 = 0.75	0.30+1.0 = 1.30	0.40+1.0 = 1.40	0.50+1.0 = 1.50	0.60+1.0 = 1.60	0.80+1.0 = 1.80	1.00+1.0 = 2.00	1.50+1.0 = 2.50	2.00+1.0 = 3.00	2.50+1.0 = 3.50
1.0	0.08+0.5 = 0.58	0.15+0.5 = 0.65	0.30+0.5 = 0.80	0.38+0.5 = 0.88	0.45+1.0 = 1.45	0.60+1.0 = 1.60	0.75+1.0 = 1.75	0.90+1.0 = 1.90	1.20+1.0 = 2.20	1.50+1.0 = 2.50	2.25+1.0 = 3.25	3.00+1.0 = 4.00	3.75+1.0 = 4.75
1.5	0.10+0.5 = 0.60	0.20+0.5 = 0.70	0.40+0.5 = 0.90	0.50+0.5 = 1.00	0.60+1.0 = 1.60	0.80+1.0 = 1.80	1.00+1.0 = 2.00	1.20+1.0 = 2.20	1.60+1.0 = 2.60	2.00+1.0 = 3.00	3.00+1.0 = 4.00	4.00+1.0 = 5.00	5.00+1.0 = 6.00
2.0	0.13+0.5 = 0.63	0.25+0.5 = 0.75	0.50+0.5 = 1.00	0.63+0.5 = 1.13	0.75+1.0 = 1.75	1.00+1.0 = 2.00	1.25+1.0 = 2.25	1.50+1.0 = 2.50	2.00+1.0 = 3.00	3.00+1.0 = 4.00	4.50+1.0 = 5.50	6.00+1.0 = 7.00	7.25+1.0 = 8.25
2.5	0.15+0.5 = 0.65	0.30+0.5 = 0.80	0.60+0.5 = 1.10	0.75+0.5 = 1.25	0.90+1.0 = 1.90	1.20+1.0 = 2.20	1.50+1.0 = 2.50	1.80+1.0 = 2.80	3.40+1.0 = 4.40	4.00+1.0 = 5.00	5.50+1.0 = 6.50	7.00+1.0 = 8.00	8.50+1.0 = 9.50
3.0	0.18+0.5 = 0.68	0.35+0.5 = 0.85	0.70+0.5 = 1.20	0.88+0.5 = 1.38	1.05+1.0 = 2.05	1.40+1.0 = 2.40	1.75+1.0 = 2.75	2.10+1.0 = 3.10	3.00+1.0 = 4.00	4.00+1.0 = 5.00	5.25+1.0 = 6.25	6.50+1.0 = 7.50	7.75+1.0 = 8.75
3.5	0.20+0.5 = 0.70	0.40+0.5 = 0.90	0.80+0.5 = 1.30	1.00+0.5 = 1.50	1.20+1.0 = 2.20	1.60+1.0 = 2.60	2.00+1.0 = 3.00	2.40+1.0 = 3.40	3.60+1.0 = 4.60	4.50+1.0 = 5.50	6.00+1.0 = 7.00	7.50+1.0 = 8.50	9.00+1.0 = 10.00
4.0	0.23+0.5 = 0.73	0.45+0.5 = 0.95	0.90+0.5 = 1.40	1.13+0.5 = 1.63	1.35+1.0 = 2.35	1.80+1.0 = 2.80	2.25+1.0 = 3.25	2.70+1.0 = 3.70	4.00+1.0 = 5.00	5.00+1.0 = 6.00	6.50+1.0 = 7.50	8.00+1.0 = 9.00	10.00+1.0 = 11.00
4.5	0.25+0.5 = 0.75	0.50+0.5 = 1.00	1.00+0.5 = 1.50	1.25+0.5 = 1.75	1.50+1.0 = 2.50	2.00+1.0 = 3.00	2.50+1.0 = 3.50	3.00+1.0 = 4.00	4.50+1.0 = 5.50	6.00+1.0 = 7.00	7.50+1.0 = 8.50	9.00+1.0 = 10.00	11.00+1.0 = 12.00
5.0	0.28+0.5 = 0.78	0.60+0.5 = 1.10	1.10+0.5 = 1.60	1.38+0.5 = 1.88	1.65+1.0 = 2.65	2.20+1.0 = 3.20	2.75+1.0 = 3.75	3.30+1.0 = 4.30	4.80+1.0 = 5.80	6.50+1.0 = 7.50	8.25+1.0 = 9.25	10.00+1.0 = 11.00	11.75+1.0 = 12.75
Flood Hazard Rating (HR)	Colour Code		Hazard to People Classification										
Less than 0.75			Very low hazard - Caution										
0.75 to 1.25			Danger for some – includes children, the elderly and the infirm										
1.25 to 2.0			Danger for most – includes the general public										
More than 2.0			Danger for all – includes the emergency services										

Figure 7.1. Table from DEFRA FD2320 – ‘Danger to People for Combinations of Depth & Velocity’

8.0 POLICY

The garage for proposed re-development has been shown to be located above all outlined flood levels and therefore can be considered to be located within Flood Zone 1. In accordance with PPG Table 2, a development of this type “*Buildings used for dwellings*” is classified as ‘More Vulnerable’. Referring to Table 3 of PPG a ‘More Vulnerable’ development within Flood Zone 1 is deemed appropriate.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	x	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	x	x	x	✓*

Key:
 ✓ Development is appropriate
 x Development should not be permitted.

Figure 8.1 PPG Table 3



9.0 CONCLUSIONS AND RECOMMENDATIONS

On the basis of this report it has been shown that the proposed garage for re-development is currently set above the outlined flood levels and as such should be free from flooding.

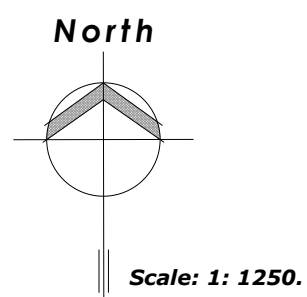
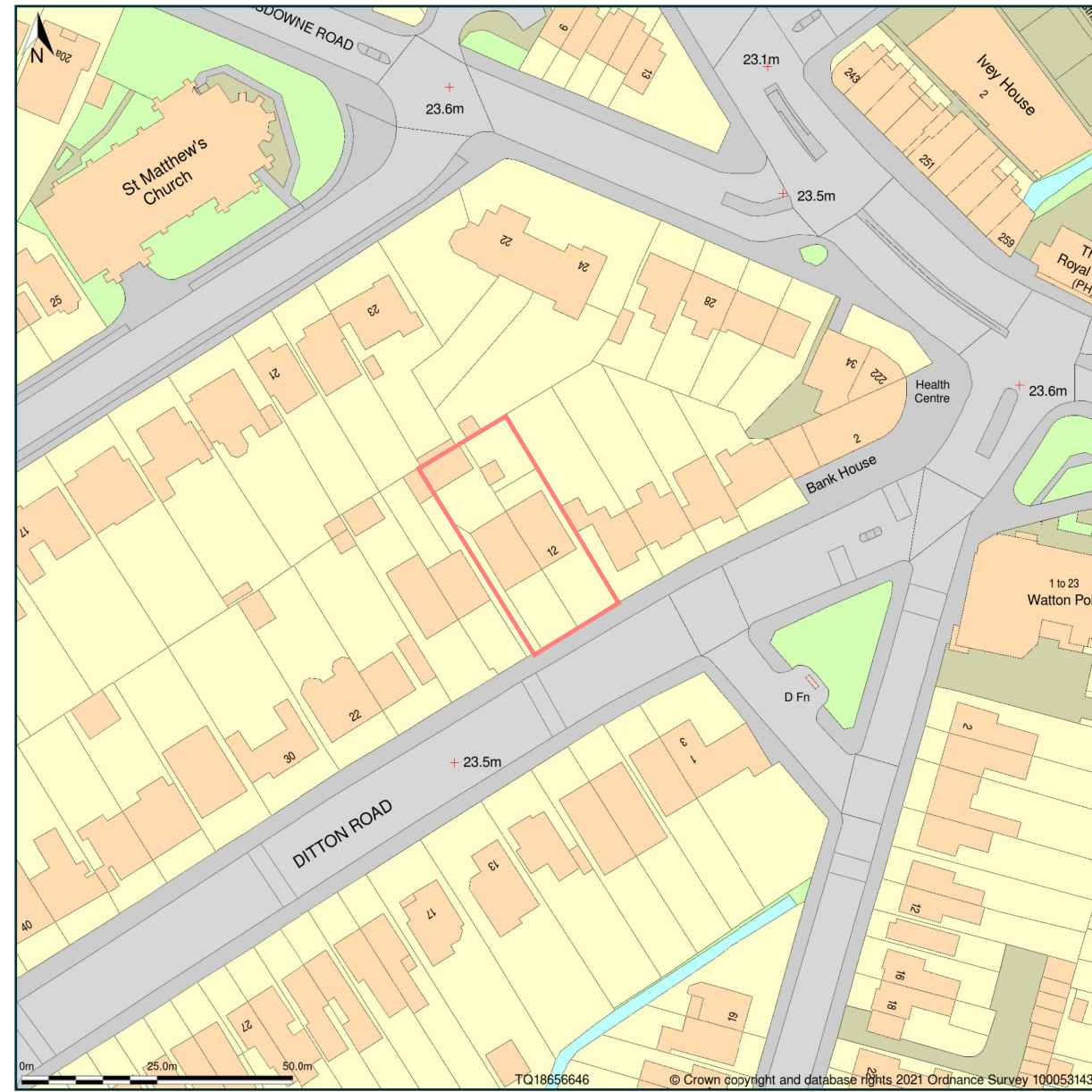
As a conservative approach, due to the inclusion of a lower ground floor, flood mitigation construction methods have been recommended in **Section 6.0**.

The access and egress from the site is anticipated to be at risk from fluvial flooding. The risk on most of the access route is considered to be low. The dwelling will be set above the flood level and therefore would act as a safe haven during an extreme flood event.

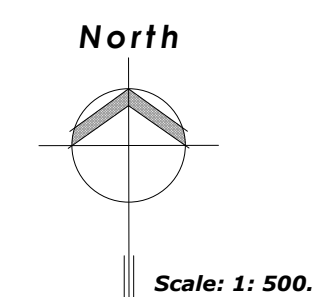
The proposed development building is considered to be within Flood Zone 1 and therefore is appropriate in terms of flood risk planning policy.

In summary, it is concluded that there is potential for the redevelopment of the existing garage to be carried out in a way to minimise the risk of flooding to the building and occupants.

APPENDIX A SITE LOCATION



SITE LOCATION PLAN. SCALE 1: 1250.



BLOCK PLAN. SCALE 1: 500.

NOTE:
 ALL EXISTING AND PROPOSED DIMENSIONS AND LEVELS MUST BE VERIFIED ON-SITE BEFORE COMMENCING WORK AND ANY DISCREPANCIES OR OMISSIONS NOTIFIED TO MCLAREN ASSOCIATES. ALL BOUNDARIES SUBJECT TO SITE SURVEY. THIS DRAWING MUST NOT BE SCALED.

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PROPOSED DEVELOPMENT AT:
 12-14 DITTON ROAD
 SURBITON
 KT6 6QZ

SITE LOCATION
 BLOCK PLAN

SCALE:
 1:200 [A1]

AUTHOR :
 DCP

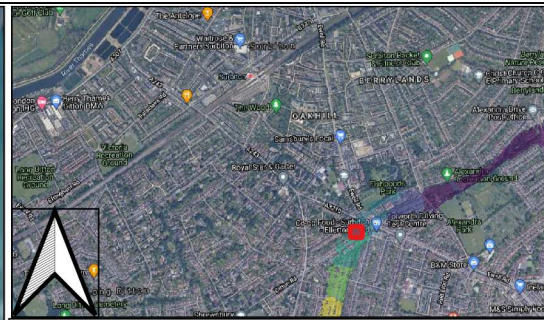
DATE:
 JANUARY 2021

PROJECT:
 1032

DRAWING:
 21

REVISION:
 .

APPENDIX B EA INFORMATION



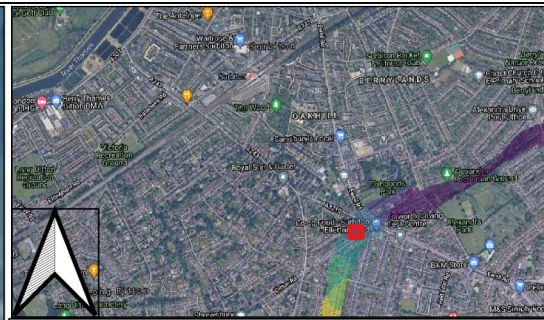
Legend

SStream_005_E100plus35pc_h_Max

- <= 21.83
- 21.83 - 22.67
- 22.67 - 23.50
- 23.50 - 24.33
- 24.33 - 25.17
- > 25.17
- Site Boundary

REV	BY	CHECK	QA	DESCRIPTION	DATE	SHEET
1	HG	-	Y	FIRST ISSUE	19/05/21	1
CLIENT				MCLAREN ASSOCIATES		
PROJECT				12 - 14 DITTON ROAD		
TITLE				EA FLOOD LEVEL 1 IN 100 YR + 35% CC		
DOCUMENT				J-14258-NUK-XX-XX-X-3002-XX		



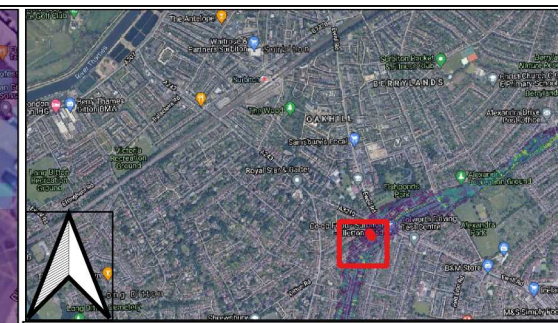
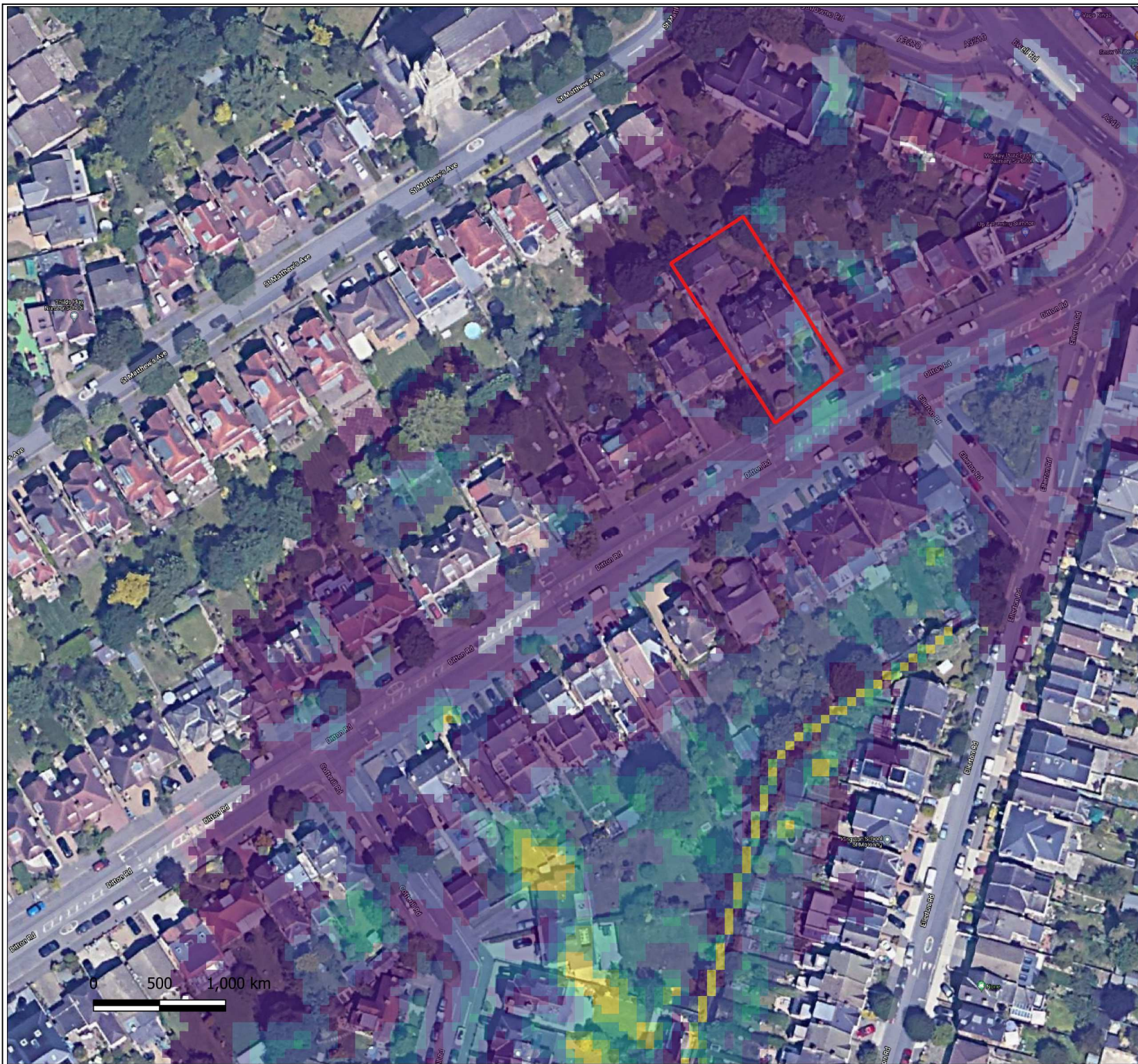


Legend

- SStream_005_E100plus70pc_h_Max
- <= 22.57
 - 22.57 - 23.14
 - 23.14 - 23.71
 - 23.71 - 24.29
 - 24.29 - 24.86
 - 24.86 - 25.43
 - > 25.43
 - Site Boundary

REV	BY	CHECK	QA	DESCRIPTION	DATE	SHEET
1	HG	-	Y	FIRST ISSUE	19/05/21	1
CLIENT				MCLAREN ASSOCIATES		
PROJECT				12 - 14 DITTON ROAD		
TITLE				EA FLOOD LEVEL 1 IN 100 YR + 70% CC		
DOCUMENT				J-14258-NUK-XX-XX-X-3002-XX		





Legend

Site Boundary

SStream_005_E100plus70pc_v_Max

- <= 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 0.7
- 0.7 - 0.8
- > 0.8

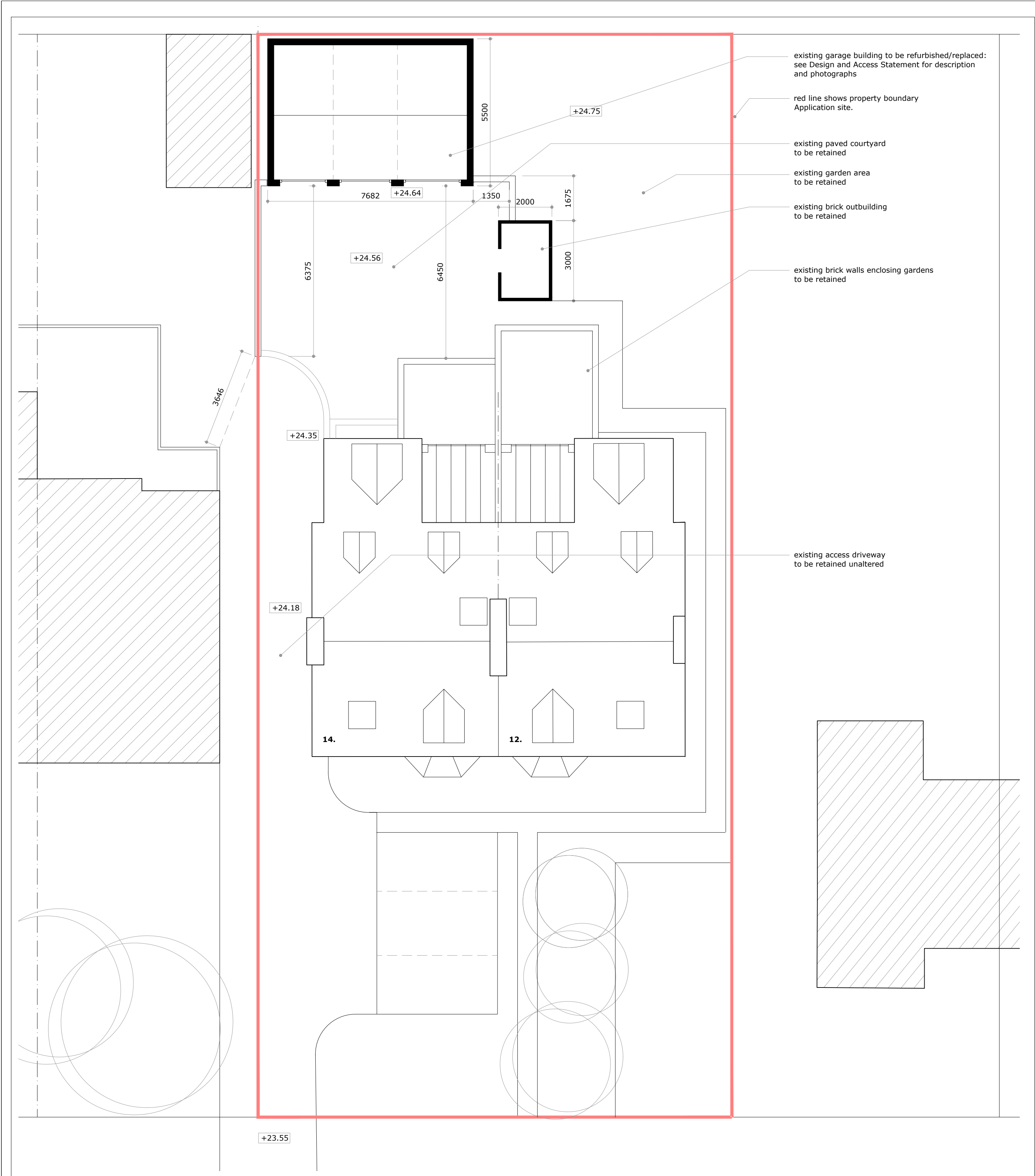
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1	HG	-	Y	FIRST ISSUE	11/05/21	1
CLIENT				MCLAREN ASSOCIATES		
PROJECT				12 - 14 DITTON ROAD		
TITLE				EA FLOOD VELOCITY 1 IN 100 YR + 70% CC		
DOCUMENT				J-14258-NUK-XX-XX-X-3003-XX		



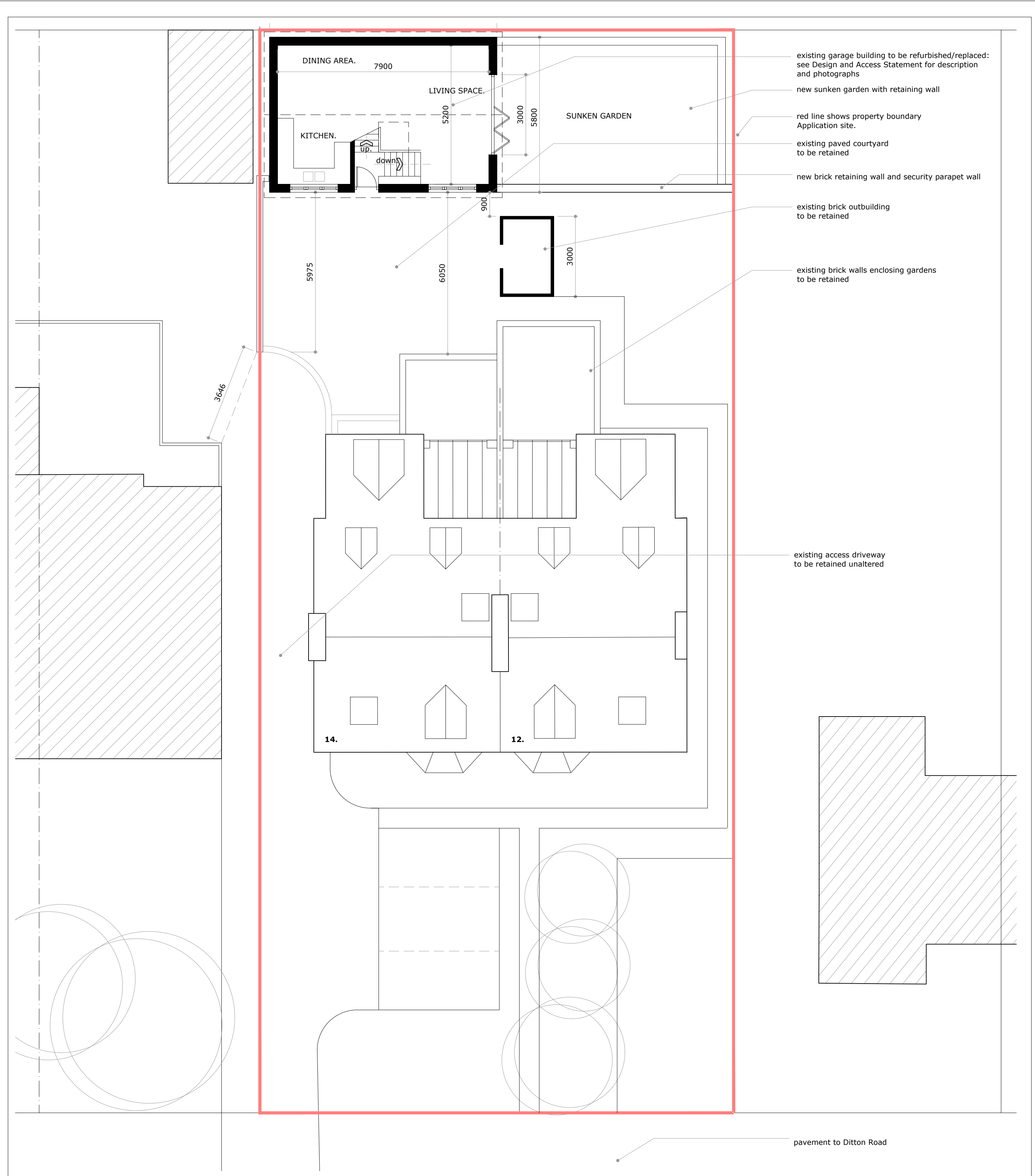




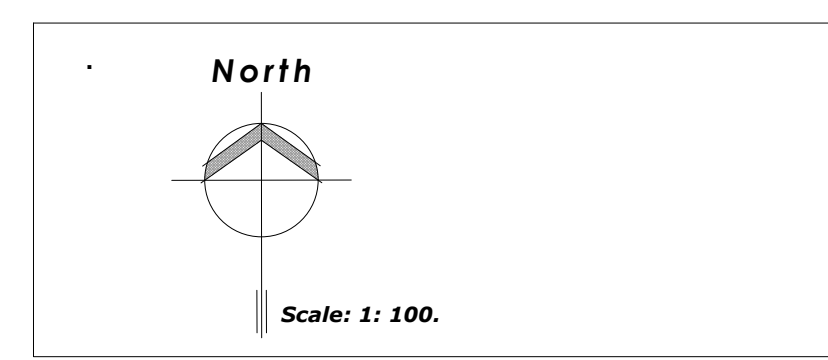
APPENDIX C SITE PLANS



SITE ARRANGEMENT AS EXISTING. SCALE : 1:100



SITE ARRANGEMENT AS PROPOSED. SCALE : 1:100



NOTE:
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PROPOSED DEVELOPMENT AT:
 12-14 DITTON ROAD
 SURBITON
 KT6 6QZ

SITE ARRANGEMENT
 AS EXISTING
 AS PROPOSED

SCALE: 1:100 [A1]	AUTHOR : DCP	DATE: MAY 2021
PROJECT: 1032	DRAWING: 22	REVISION: B



Flood Risk | Water | Wastewater | Civil | Structural | M&E | Highways | CDM | H&S

Truro Office | Nanjerrick Court, Allet | Truro, Cornwall | TR4 9DJ |
Bristol Office | Unit 4, Blenheim Court | Beaufort Office Park, Bristol | BS32 4NE |
Wokingham Office | 15 Metro Centre | Toutley Road | Wokingham, Berkshire | RG41 1QW UK |
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