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Nutbank Lane FRA & Drainage Strategy Version 1

01/06/21





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Introduction

1.0 Introduction

1.1 Brief

Struktura Engineering Services Ltd has been commissioned to carry out a flood risk assessment and drainage strategy for Nutbank Lane

1.2 Planning Policy Context

Government policy with respect to development in flood risk areas is contained within the Department of Communities and Local Government National Planning Policy Framework (DCLG, 2012) and accompanying Technical Guidance of March 2012 (DCLG 2012) which supersedes Planning Policy Statement 25 (PPS25) 'Development and Flood Risk' which was issued in December 2006 and revised in April 2010. However, guidance for the NPPF is brief and the principles and requirements of PPS25 remain largely unchanged. PPS25 practice guides on flood risk and coastal change remain in place until Government chooses to replace them.



2.0 Existing Study Area

2.1 Study Area

The study area lies to the North West of the A664 and North of M60. The Site Postcode is M24 1JR and is located at National Grid Reference (Easting) 386399 (Northings) 404436 and is approximately 1.345 Hectare in area.

2.2 Study Area Description and Surroundings

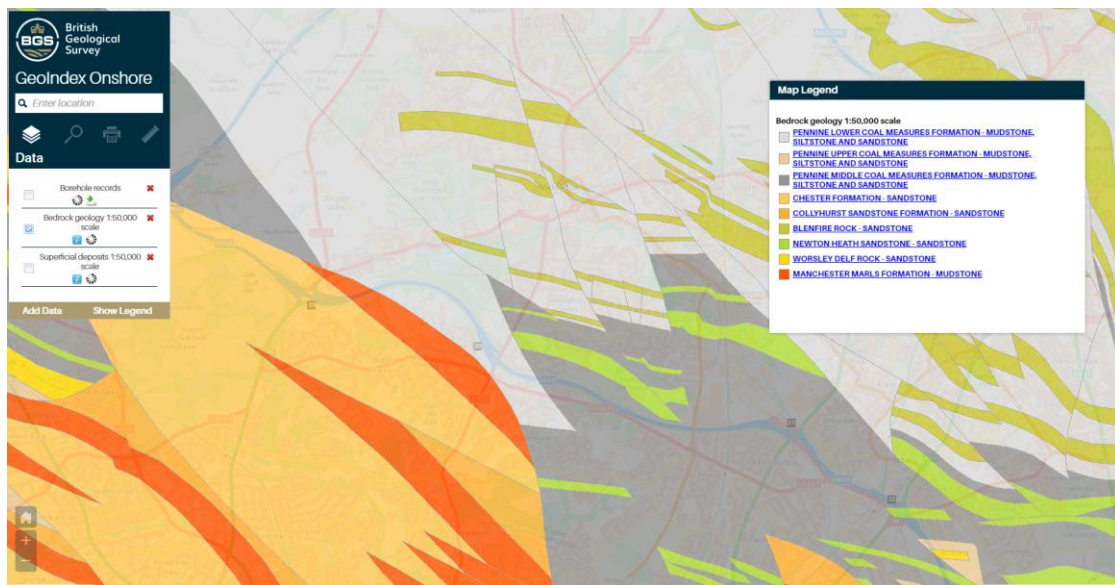
A walkover visit has not been undertaken but from Google Earth the site is undeveloped

2.3 Topography

A Topographical survey is included in Appendix A and shows the site falls from the West to the East

2.4 Ground Conditions

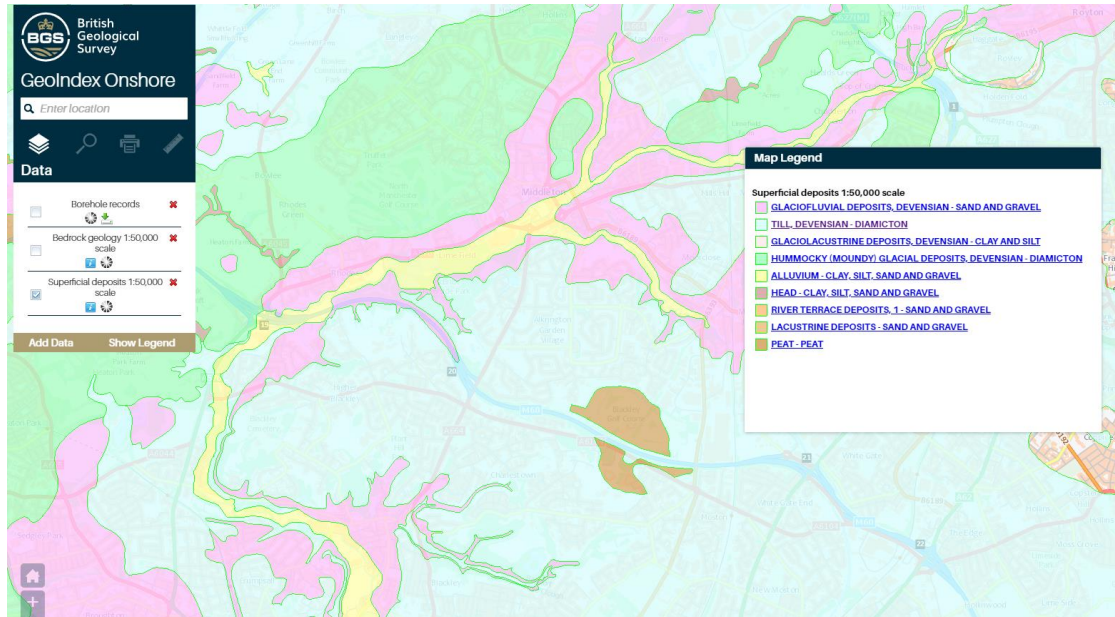
The geological map for the location (see screenshot) shows the study area has bedrock as detailed description below



PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE



Drift Deposits



TILL, DEVENSIAN - DIAMICTON

1:50 000 scale bedrock geology description: Pennine mill mudstones

1:50 000 scale superficial deposits description: Till, Devensian - Diamicton. Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by ice age conditions



2.5 Water and Drainage Environment

2.5.1 Public Sewerage

According to sewerage records, there is a combined drainage network serving the residential area to the North and North East of the Study area. An 375 Dia Sewer crosses to the North





2.5.2 Private Drainage

There is a private drain which connects into the combined drain in Nutbank Lane which isn't shown on UU plans for the area

2.5.3 Watercourses

There is a watercourse to the eastern Boundary

2.5.4 Groundwater

The SFRA makes reference to no flooding from Groundwater events in the area.

3. Information Gathered

This section contains the responses received to enquiries submitted to obtain information relevant to preparing this Flood Risk Assessment. These responses are summarised below.

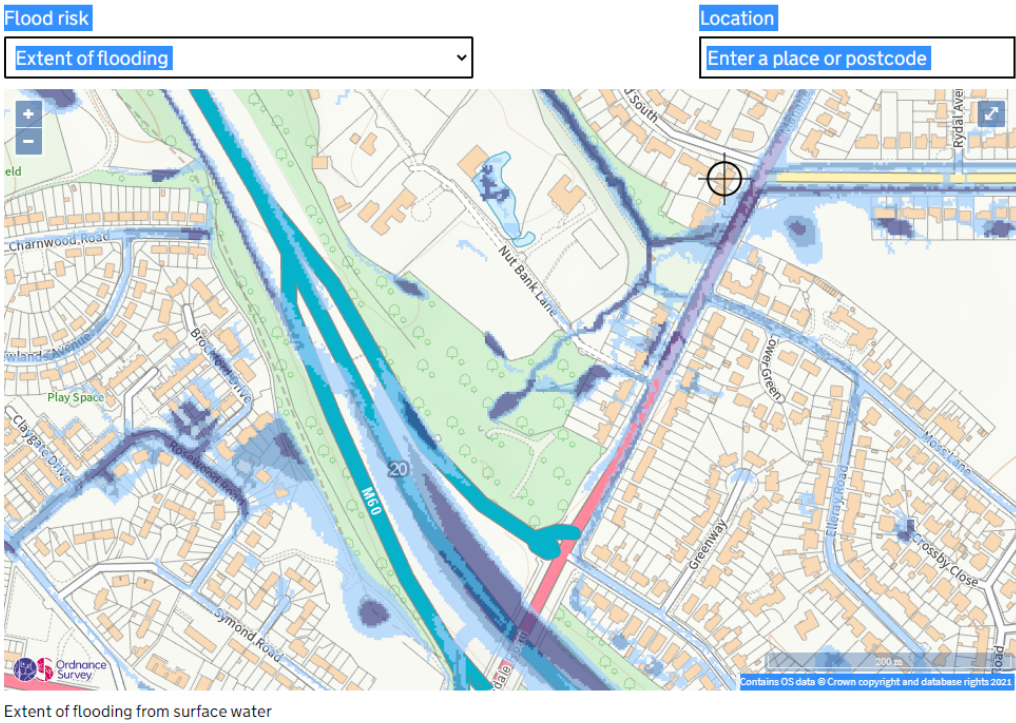
3.1 Environment Agency

The responses received from the Environment Agency are summarised below:

The study area is located within Flood Zone 1 very low risk which means that each year this area has a chance of flooding of less than 0.1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.



Flooding from Sewers



Flood from Rivers

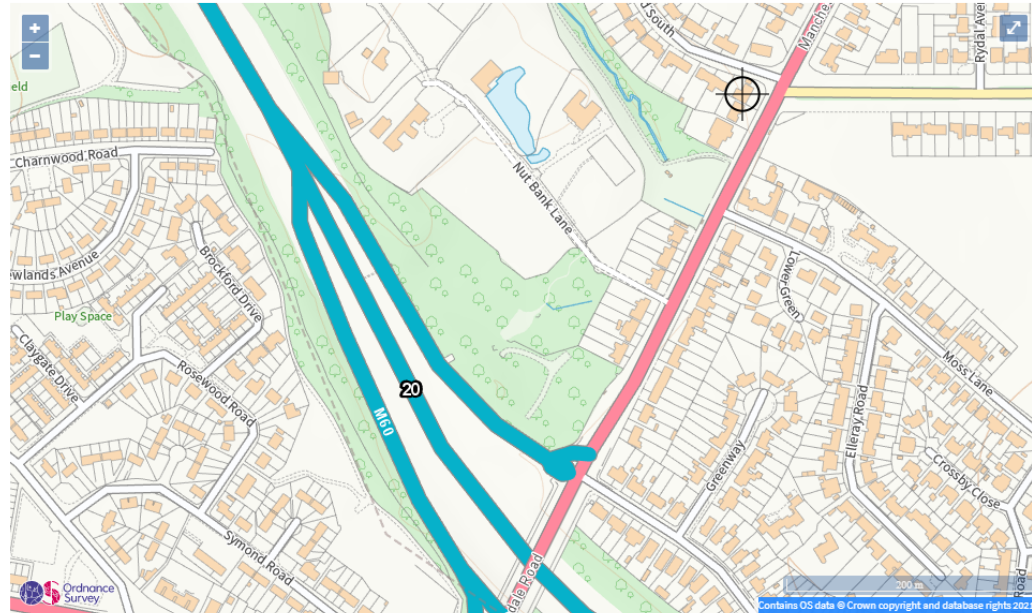


Flood risk

Extent of flooding

Location

Enter a place or postcode



Extent of flooding from rivers or the sea

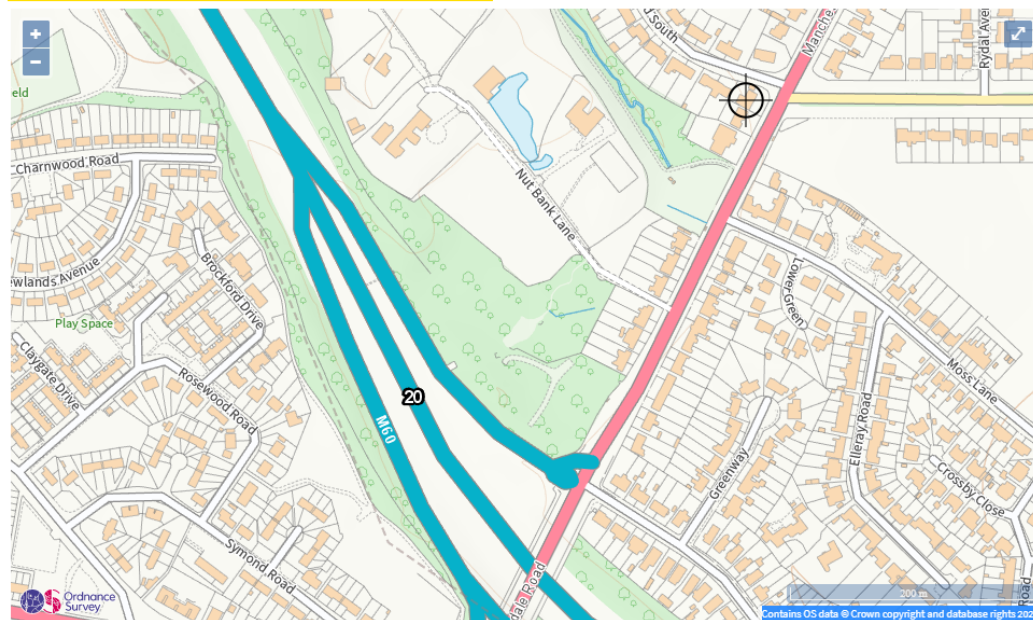
Flooding from Reservoirs

Flood risk

Extent of flooding

Location

Enter a place or postcode



Extent of flooding from reservoirs

3.2 United Utilities

Within the SFRA there is no record of any Sewage incident and the site is low on the UU DG5 database of flooding events.

3.3 Strategic Flood Risk Assessment

The Strategic Flood Risk Assessment for Rochdale Metropolitan Borough Council was prepared to help identify those areas in the area most at risk of flooding and to provide the basis from which to apply NPPF to planning applications. The SFRA indicates that the study area is not within a postcode area that has suffered from flooding from any source up to 2008.



4. Development Proposals

On the study area it is proposed to construct a new residential property

4.1 Sequential Test

The NPPF3 requires that the Sequential Test be applied to development proposals in Flood Zones 2 and 3 to determine if there are any 'reasonably available' and suitable alternative sites at lower flood risk. Since the study area is located in Flood Zone 1, a sequential test should not be required.

4.2 Exception Test

Although an exception test is not required for planning, the issues of safety and reduction in flood risk to others required by an Exception Test are addressed in this document.



5. Assessment of Flood Risk

5.1 Sources of flooding

The risk of flooding from the following flood sources has been considered:

Fluvial – The Environment Agency has confirmed the study area is within Flood Zone 1. Therefore the flood risk associated with this source is considered negligible.

The nearest watercourse is 20m to the West

Tidal – The study area is remote from the sea and tidally influenced water bodies; therefore, the flood risk associated with this source is considered negligible.

Pluvial (Rainfall) – There is no impermeable area at a level generally above that of the study area and all adjacent areas are served by a positive drainage system by means of Highway drainage.

Groundwater – The E.A confirmed the site sits on Pennine Coal Measure which is not considered an aquifer and therefore doesn't hold any groundwater. In addition, the superficial deposits are glacial till, which are also not considered aquifers,

Sewers – Drainage records for the development have not been received but anecdotal evidence is that no flooding has occurred on the site.

Artificial sources – There are no artificial sources close to the development which could flood the site



6. Flood Mitigation Measures

6.1 Safe Access

Safe and dry access is available onto the study area (located on Flood Zone 1) from Nut bank Lane. In this situation, a formal emergency evacuation plan will not be necessary, and no mitigation is proposed.

6.2 Flood Resistance and Resilience

The development proposed may be subject to flooding at more extreme events than those considered. However the risk appears to be sufficiently low that flood resilience measures need not be included in ground floor construction of the development.

6.3 Groundwater Flooding

Groundwater flooding is not considered a risk to the development

6.4 Residual Risks

It is impossible to completely guard against flooding since extreme events greater than the 1:1000 year event are possible. However, the study area's location in Flood Zone 1 and the elevated position of the development will safeguard it from localised fluvial flooding during extreme rainfall events and fluvial flooding events outside the scope of this assessment. Ground floor levels of the properties should be set above proposed surrounding levels across the development in order to provide a nominal freeboard to allow overland flow away from the properties under exceptional conditions.



7. OUTLINE DRAINAGE STRATEGY

7.1 Existing Drainage

There is a existing drainage close to the site

7.2 Proposed Foul Drainage

Foul drainage will be provided to the residential unit and will discharge into the combined sewer.

7.3 Proposed Surface Water Drainage

7.3.1 Requirements for surface water drainage at the study area.

PPS25 recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface run-off from development sites through the use of Sustainable Drainage Systems (SuDS), this being complementary to the control of development within the floodplain.

SuDS will not alleviate flooding in an area prone to flooding; however, properly designed SuDS have the potential to prevent the surface water runoff from new development worsening the flood risk.

PPS25 Annex F paragraph F5 states that 'The effective disposal of surface water from development is a material planning consideration in determining proposals for the development and use of land.'

PPS25 Annex F paragraph F6 states that 'Surface water arising from a developed area should, as far as practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account. This should be demonstrated as part of the flood risk assessment.'

The Building Regulations Requirement H3 stipulates that rainwater from roofs and paved areas is carried away from the surface to discharge to one of the following, listed in order of priority:

- an adequate soak away or other adequate infiltration system,
- a watercourse or, where that is not practicable,
- a sewer.

7.3.2 SuDS selection

To comply with current best practice, the drainage system should:

- (i) manage runoff at or close to its source;
- (ii) manage runoff at the surface;

- (iii) be integrated with public open space areas and contribute towards meeting the objectives of the urban plan;
- (iv) be cost-effective to operate and maintain.

The drainage system should endeavour to ensure that, for any particular site:

- (i) natural hydrological processes are protected through maintaining Interception of an initial depth of rainfall and prioritising infiltration, where appropriate;
- (ii) flood risk is managed through the control of runoff peak flow rates and volumes discharged from the site;
- (iii) stormwater runoff is treated to prevent detrimental impacts to the receiving water body as a result of urban contaminants.

In addition, it is desirable to maximise the amenity and ecological benefits associated with the drainage system where there are appropriate opportunities. SuDS are green infrastructure components and can provide health benefits, and reduce the vulnerability of developments to the impacts of climate change.

RUNOFF DESTINATION

INTRODUCTION

Infiltration should be prioritised as the method of controlling surface water runoff from the development site, unless it can be demonstrated that the use of infiltration would have a detrimental environmental impact.

GROUNDWATER (VIA INFILTRATION)

Infiltration may not be appropriate for managing runoff from this site subject to site investigation.

(1) Runoff from this site is unlikely to be hazardous (ie potentially contain high levels of pollution). Therefore infiltration could be used for runoff disposal.

(2) This could be either partly or entirely a contaminated site. Infiltration will not be suitable where there is a risk of mobilising the contaminants and causing pollution. If the contaminated zones can be satisfactorily remediated, or isolated and sealed from the infiltration pathways, then infiltration can be used.

(3) The maximum groundwater level beneath the site is within 2 m of the ground surface. This means that there is unlikely to be in excess of the required 1m depth of unsaturated zone between the infiltration surface and the water table.

The groundwater beneath the site is designated as Principal Aquifer, and this designation will define the treatment requirement for any infiltrated water (See Water Quality Design Criteria).

SURFACE WATER BODY

It has been determined that surface water runoff from the site (that cannot be discharged to groundwater via infiltration) can practicably be discharged to a surface water body.

SURFACE WATER SEWER /LOCAL HIGHWAY DRAIN

It has been determined that surface water runoff from the site cannot practicably be discharged to a surface water sewer.

(1) The distance from the point of discharge from the site to the surface water sewer is significantly greater than to the combined sewer, and this constraint outweighs any negative impacts resulting from discharging to the combined sewer.

COMBINED SEWER

All surface water runoff that cannot be discharged to groundwater will be managed on site and discharged to the combined sewer.

The combined sewer reference is: Long Lane and the asset owner is: United Utilities.

HYDRAULIC DESIGN CRITERIA

INTRODUCTION

Best practice criteria for hydraulic control require Interception, runoff and volume control.

INTERCEPTION

To fulfill the requirements for Interception, there should normally be no runoff from the site for an initial depth of rainfall - usually 5mm. This is achieved through the use of infiltration, evapotranspiration, or rainwater harvesting.

FLOW AND VOLUME CONTROL

The site has been previously developed. It is likely that there will be a requirement for the runoff to be constrained to levels as close to the equivalent greenfield rates and volumes as possible. Discharges that exceed equivalent pre-development rates and volumes will not, generally, be acceptable.

Rainwater harvesting, or the use of Long Term Storage provide the means to achieve runoff volume control. Where volume control is not practicable, flows discharged from the site will need to be constrained to 6.2 l/s/ha.

WATER QUALITY DESIGN CRITERIA

INTRODUCTION

Current best practice takes a risk-based approach to managing discharges of surface runoff to the receiving environment. The following text provides guidance on the extent of water quality management likely to be appropriate for the site.

Provided that appropriate measures are included to manage the risk of discharging oil and sediments, no further water quality treatment components are required for discharges to the combined sewer.

TREATMENT REQUIREMENTS FOR DISPOSAL TO SURFACE WATER SYSTEMS

Roof runoff will not require treatment prior to discharge.

Car parking areas will discharge via trapped gullies.

SITE-SPECIFIC DRAINAGE DESIGN CONSIDERATIONS

Where SuDS are being designed on a contaminated site, unless infiltration has been demonstrated to be acceptable via an approved risk assessment, liners or other protective measures should be used to prevent exfiltration from drainage components.

The design of SuDS with access to temporary or permanent water should consider public health and safety as well as issues associated with construction and operational management of the structures. Health and safety issues and risk mitigation features are presented in the CIRIA SuDS Manual.

Individual SuDS components should not be treated in isolation, but should be seen together as providing a suite of drainage features which are appropriate in different combinations for varying scales. It is always desirable to have a mix of SuDS components across the site as different components have different capacities for treatment of individual pollutants.

SuDS CONSTRUCTION

SuDS are a combination of civil engineering structures and landscaping practice. Due to the limited experience of building SuDS in the water industry, there are a number of key issues which need to be particularly considered as their construction requires a change in approach to some standard construction practices.

- SuDS components should be constructed in line with either the manufacturer's guidelines or best practice methods.
- The construction of SuDS usually only requires the use of fairly standard civil engineering construction and landscaping operations, such as excavation, filling, grading, top-soiling, seeding, planting etc. These operations are specified in various standard construction documents, such as the Civil Engineering Specification for the Water Industry (CESWI).
- Construction of soakaways is regulated by the Buildings Regulations part H (Drainage and waste disposal) which sets out the requirements for drainage of rainwater from the roofs of buildings.
- During construction, any surfaces which are intended to enable infiltration must be protected from compaction. This includes protecting from heavy traffic or storage of materials.
- Water contaminated with silt must not be allowed to enter a watercourse or drain as it can cause pollution. All parts of the drainage system must be protected from construction runoff to prevent silt clogging the system and causing pollution downstream. Measures to prevent this include soil stabilisation, early construction of sediment management basins, channelling run-off away from watercourses and surface water drains, and erosion prevention measures.
- After the end of the construction period and prior to handover to the site owner/operator:
 - Subsoil that has been compacted during construction activities should be broken up prior to the

re-application of topsoil to garden areas and other areas of public open space to reinstate the natural infiltration performance of the ground;

- Any areas of the SuDs that have been compacted during construction but are intended to permit infiltration must be completely refurbished;
- Checks must be made for blockages or partial blockages of orifices or pipe systems;
- Any silt deposited during the construction must be completely removed;
- Soils must be stabilised and protected from erosion whilst planting becomes established.

Detailed guidance on the construction related issues for SuDS is available in the SuDS Manual and the associated Construction Site handbook (CIRIA, 2007).

SuDS COMPONENTS PERFORMANCE

	Interception	Peak flow control: Low	Peak flow control: High	Volume reduction	Volume control	Gross sediments	Fine sediments	Hydrocarbons/ PAHs	Metals	Nutrients
Rainwater Harvesting	Y	Y	S	Y	N	N	N	N	N	N
Pervious Pavement	Y	Y	Y	Y	Y	Y	Y	Y	Y	Var
Filter Strips	Y	N	N	N	N	Y	N	Y	Y	Var
Swales	Y	Y	S	Y(*)	N	Y	Y(+)	Y	Y	Y(-)
Trenches	Y	Y	S	Y(*)	N	N	N	Y	Y	Y(-)
Detention Basins	Y	Y	Y	N	Y	Y	Y(+)	Y	Y	Var
Ponds	N	Y	Y	N	Y	N(-)	Y	Limited	Y	Var
Wetlands	N	Y	S	N	Y	N(-)	Y	Limited	Y	Y
Green Roofs	Y	Y	N	N	N	N	N	Y	N	N
Bioretention Systems	Y	Y	S	Y(*)	N	N(-)	Y	Y	Y	Y
Proprietary Treatment Systems	N	N	N	N	N	Y	Y	Y(!)	Y(!)	Y(!)
Subsurface Storage	N	Y	Y	N	Y	N(-)	N	N	N	N
Subsurface Conveyance Pipes	N	N	N	N	Y	N(-)	N	N	N	N

•

Notes:

S: Not normally with standard designs, but possible where space is available and designs mitigate impact of high flow rates.

Y(*): Where infiltration is facilitated by the design.

N(-): Gross sediment retention is possible, but not recommended due to negative maintenance and performance implications.

Y(+): Where designs minimise the risk of fine sediment mobilisation during larger events.



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Y(!): Where designs specifically promote the trapping and breakdown of oils and PAH based constituents.

Y("): Where subsurface soil structure facilitates the trapping and breakdown of oils and PAH based constituents.

Var: The nutrient removal performance is variable, and can be negative in some situations.

Y(-): Good nutrient removal performance where subsurface biofiltration systems with a permanently saturated zone included within the design.

GUIDANCE ON POTENTIAL INDIVIDUAL COMPONENTS RAINWATER HARVESTING

- Roofs

Rainwater harvesting systems can be used to effectively drain roofs and provide both water supply and stormwater management benefits. However detailed analysis would be required to determine if there is sufficient greywater demand at the property to justify the capital expenditure in installing a rainwater harvesting tank

PERVIOUS PAVEMENT

- Roofs

Roof water can be drained into pervious pavement areas using diffusers to dissipate the point inflows. Detailed design of the pavement will need to take account of the additional impermeable roof area subject to Site investigation.

- Car parks/other impermeable surfaces

Pervious pavements provide effective drainage, storage and treatment of car park surfacing subject to site investigation.

- Groundwater < 2m below surface

The design of the drainage system will need to fully mitigate the risks posed by: a) the groundwater surface potentially rising above the base of the drainage system; and b) the reduction in unsaturated zone depth which may compromise any treatment function provided by the subsurface soils.

- Contaminated land

The pervious pavement system may require an effective liner or other protective mechanism to minimise the risks of infiltrating water mobilising contaminants in the soil.

FILTER STRIPS (NOT APPLICABLE LIMITED SITE AREA)

- Roads

Filter strips can provide treatment for road runoff, upstream of swales or trench components. They can reduce the need for kerbing and runoff collection systems.

- Car parks/other impermeable surfaces



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Filter strips can provide treatment for runoff from impermeable surfaces, upstream of swales or trench components. They can reduce the need for kerbing and runoff collection systems.

- Groundwater < 2m below surface

The design of the drainage system will need to fully mitigate the risks posed by: a) the groundwater surface potentially rising above the base of the drainage system; and b) the reduction in unsaturated zone depth which may compromise any treatment function provided by the subsurface soils.

- Contaminated land

The filter strip may require a liner to prevent infiltrating water from mobilising contaminants in the soil.

SWALES (NOT APPLICABLE LIMITED SITE AREA)

- Roofs

Swales can be used to convey roof water to other parts of the site.

- Roads

Swales provide treatment and conveyance of road runoff. There are a range of swale types - standard grass channels, underdrained swales, and wetland swales - depending on drainage requirements.

- Car parks/other impermeable surfaces

Swales provide treatment and conveyance of runoff from impermeable areas. There are a range of swale types - standard grass channels, underdrained swales, and wetland swales - depending on drainage requirements.

- Groundwater < 2m below surface

The design of the drainage system will need to fully mitigate the risks posed by: a) the groundwater surface potentially rising above the base of the drainage system; and b) the reduction in unsaturated zone depth which may compromise any treatment function provided by the subsurface soils.

- Contaminated land

The swale may require a liner to prevent infiltrating water from mobilising contaminants in the soil.

TRENCHES (NOT APPLICABLE LIMITED SITE AREA)

- Roofs

Trenches can be used to convey roof water to other parts of the site.

- Roads

Trenches can provide treatment and conveyance of road runoff. They require effective pre-treatment to minimise the risk of blockage.



- Car parks/other impermeable surfaces

Trenches can provide treatment and conveyance of runoff for impermeable areas.

- Groundwater < 2m below surface

The design of the drainage system will need to fully mitigate the risks posed by: a) the groundwater surface potentially rising above the base of the drainage system; and b) the reduction in unsaturated zone depth which may compromise any treatment function provided by the subsurface soils.

- Contaminated land

The trench may require a liner to prevent infiltrating water from mobilising contaminants in the soil.

DETENTION BASINS (NOT APPLICABLE LIMITED SITE AREA)

- Roofs

Detention basins can be used to attenuate and treat runoff.

- Roads

Detention basins can be used to attenuate and treat runoff.

- Car parks/other impermeable surfaces

Detention basins can be used to attenuate and treat runoff.

- Contaminated land

The trench may require a liner to prevent infiltrating water from mobilising contaminants in the soil.

PONDS (NOT APPLICABLE LIMITED SITE AREA)

- Roofs

Ponds can be used to attenuate and treat roof runoff.

- Roads

Ponds can be used to attenuate and treat runoff. However, they are best implemented at the lower end of the treatment train as a 'polishing' component. They should not be used as sediment management devices, as sediment and wet vegetation is relatively costly to extract and dispose of. If poor quality water remains in ponds for extended periods, nutrient concentrations can rise - particularly in the summer months, and the pond can become unattractive with poor amenity and biodiversity potential.

- Car parks/other impermeable surfaces

Ponds can be used to attenuate and treat runoff. However, they are best implemented at the lower end of the treatment train as a 'polishing' component. They should not be used as sediment management devices, as sediment and wet vegetation is relatively costly to extract and dispose of. If poor quality water remains in ponds for extended periods, nutrient concentrations can rise - particularly in the summer months, and the pond can become



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unattractive with poor amenity and biodiversity potential.

- Other

Ponds built in permeable soils will require lining to maintain the water level of the permanent pool. The lining may be finished 100 or 200 mm lower than the outlet invert to encourage some infiltration to take place to contribute to interception.

WETLANDS (NOT APPLICABLE LIMITED SITE AREA)

- Roofs

Wetlands can be used to attenuate and treat roof runoff.

- Roads

Wetlands can be used to attenuate and treat runoff. However, they are best implemented at the lower end of the treatment train as a 'polishing' component. They should not be used as sediment management devices, as sediment and wet vegetation is relatively costly to extract and dispose of. If poor quality water remains in wetlands for extended periods, nutrient concentrations can rise - particularly in the summer months, and the wetland can become unattractive with poor amenity and biodiversity potential.

- Car parks/other impermeable surfaces

Wetlands can be used to attenuate and treat runoff. However, they are best implemented at the lower end of the treatment train as a 'polishing' component. They should not be used as sediment management devices, as sediment and wet vegetation is relatively costly to extract and dispose of. If poor quality water remains in wetlands for extended periods, nutrient concentrations can rise - particularly in the summer months, and the wetland can become unattractive with poor amenity and biodiversity potential.

- Groundwater < 2m below surface

Wetlands can perform satisfactorily where the groundwater level supports baseflows in the system. However, if there is a risk of higher levels then the loss in wetland capacity should be evaluated in the design. Consideration should also be given to any potential lowering of levels which may cause exfiltration from the system, and the system to dry out.

- Contaminated land

The wetland may require an effective liner to prevent infiltrating water from mobilising contaminants in the soil.

GREEN ROOFS (ROOF NOT SUITABLE FOR THIS TYPE OF ROOF)

- Roofs

Green roofs can be designed to provide interception, management and treatment of rainfall up to specified rainfall depths.

BIORETENTION SYSTEMS (DEPENDANT ON SITE INVESTIGATION)



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- Roofs

Bioretention systems can be used to attenuate and treat roof runoff.

- Roads

Linear bioretention systems (i.e. biofiltration swales) can be used to attenuate and treat road runoff.

- Car parks/other impermeable surfaces

Bioretention systems can be used for car park drainage.

- Groundwater < 2m below surface

Infiltration systems should not be designed where maximum predicted groundwater levels are less than 1m below base of the proposed infiltration unit.

- Contaminated land

Runoff should not be infiltrated into contaminated land as it may cause contaminants to mobilise into the environment.

PROPRIETARY TREATMENT SYSTEMS (DEPENDANT ON SITE INVESTIGATION)

- Roads

Proprietary treatment systems can be used where surface vegetated systems are impracticable. However, regular monitoring needs to be ensured so that they are maintained so that they continue to function effectively.

- Car parks/other impermeable surfaces

Proprietary treatment systems could be used where surface vegetated systems are impracticable. However, regular monitoring needs to be ensured so that they are maintained so that they continue to function effectively.

SUBSURFACE STORAGE (MOST SUITABLE OPTION IF SOAKAWAYS CANNOT BE USED)

- Roofs/Roads/Car parking

Subsurface storage can be used to attenuate roof runoff in the form of either Geocells or Storage tanks before controlled discharge to the nearest acceptable sewer. Storage of 48m³ Will be required for a 1: 100 Year storm with 30% climate Change (See Appendix B)



8. Conclusions and recommendations

- The study area is shown on published mapping to be located within the Environment Agency's Flood Zone 1 - low risk of flooding. As such, the development is considered appropriate in terms of the sequential test.
- There are no records of flooding on site.
- Pedestrian and vehicular safe access to and from the development will be achievable under all. A formal evacuation plan is not required.
- Ground floor levels for the properties should be set above proposed surrounding levels across the development to provide a nominal freeboard to allow overland flow under exceptional conditions.
- SuDS is considered appropriate for the development subject to Site Investigation to determine ground permeability.

Appendix A Calculations

Appendix B Drawings

Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

Date:

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site characteristics

Total site area (ha):	0.2
Significant public open space (ha):	0
Area positively drained (ha):	0.2
Impermeable area (ha):	0.1
Percentage of drained area that is impermeable (%):	50
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	100
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.2
Net impermeable area for storage volume design (ha):	0.11
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Design criteria

Climate change allowance factor:

Urban creep allowance factor:

Volume control approach:

Interception rainfall depth (mm):

Minimum flow rate (l/s):

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	60
Rainfall 100 yrs 12 hrs:	--	81.76
FEH / FSR conversion factor:	1.12	1.12
SAAR (mm):	995	995
M5-60 Rainfall Depth (mm):	17	17
'r' Ratio M5-60/M5-2 day:	0.3	0.3
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 10 year:	1.38	1.38
Growth curve factor 30 year:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Q_{BAR} for total site area (l/s):	1.46	1.46
Q_{BAR} for net site area (l/s):	1.46	1.46

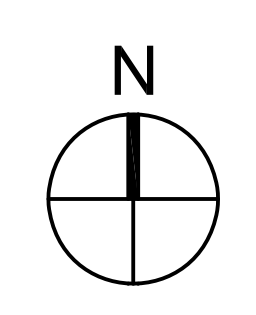
Site discharge rates

	Default	Edited
1 in 1 year (l/s):	2	2
1 in 30 years (l/s):	2.5	2.5
1 in 100 year (l/s):	3	3

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m^3):	48	48
Long term storage 1/100 years (m^3):	0	0
Total storage 1/100 years (m^3):	48	48

This report was produced using the storage estimation tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at <http://uksuds.com/terms-and-conditions.htm>. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.



C

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Status

FOR PLANNING

NOTES:

KEY

- Proposed Site Boundary
- Land Owned by Applicant
- Existing Trees
- Existing Hedgerow
- Existing Boundary Fencing
- Existing Foul Drainage & Manhole Cover

/	12/05/21	For Information		BP
no.	date	revision details		by

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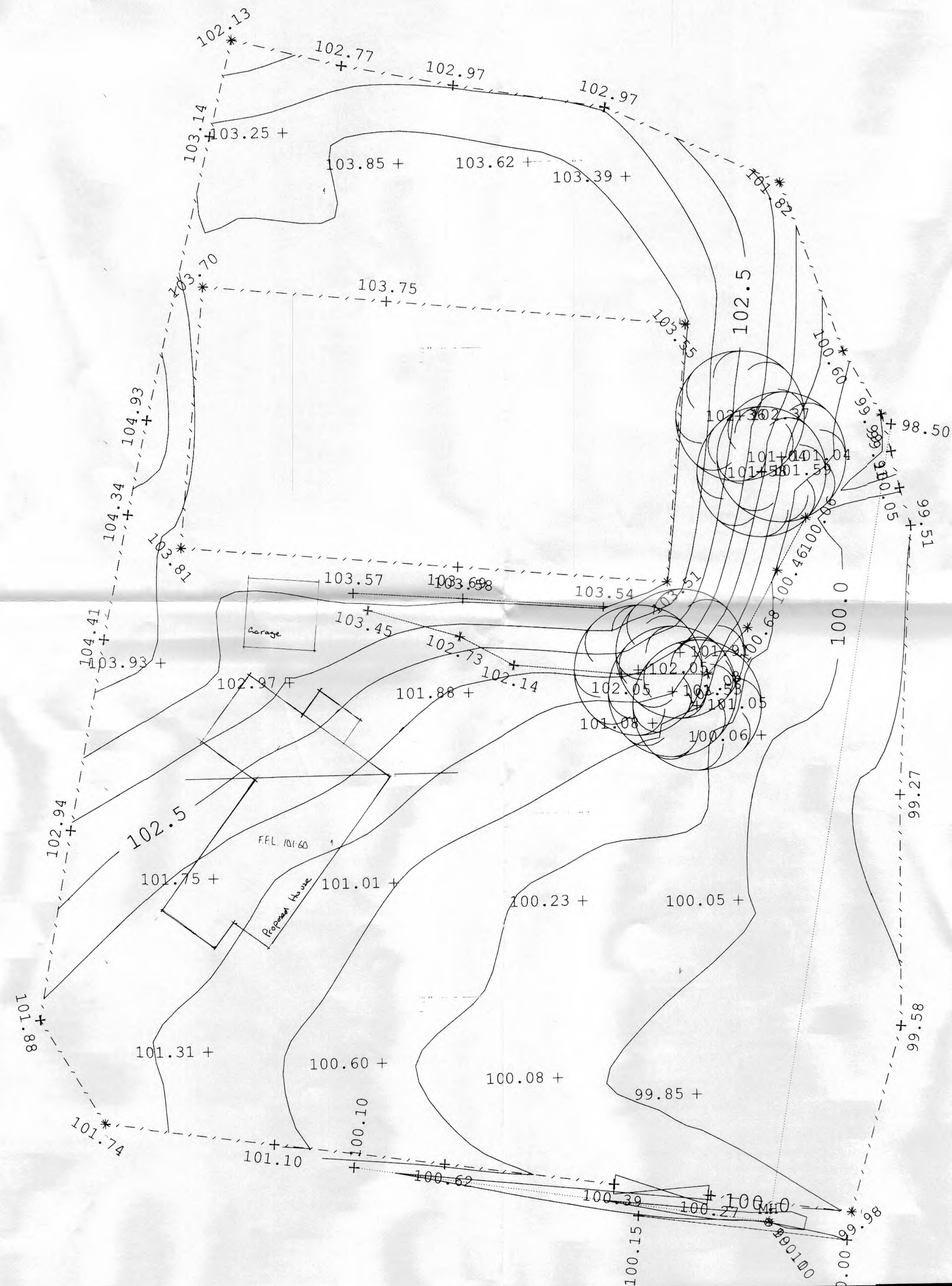
clientMr. KEVIN McNALLY

job titleSOUTH VIEW HOUSE, NUT BANK LANE,
MANCHESTER

drawing titleEXISTING SITE PLAN

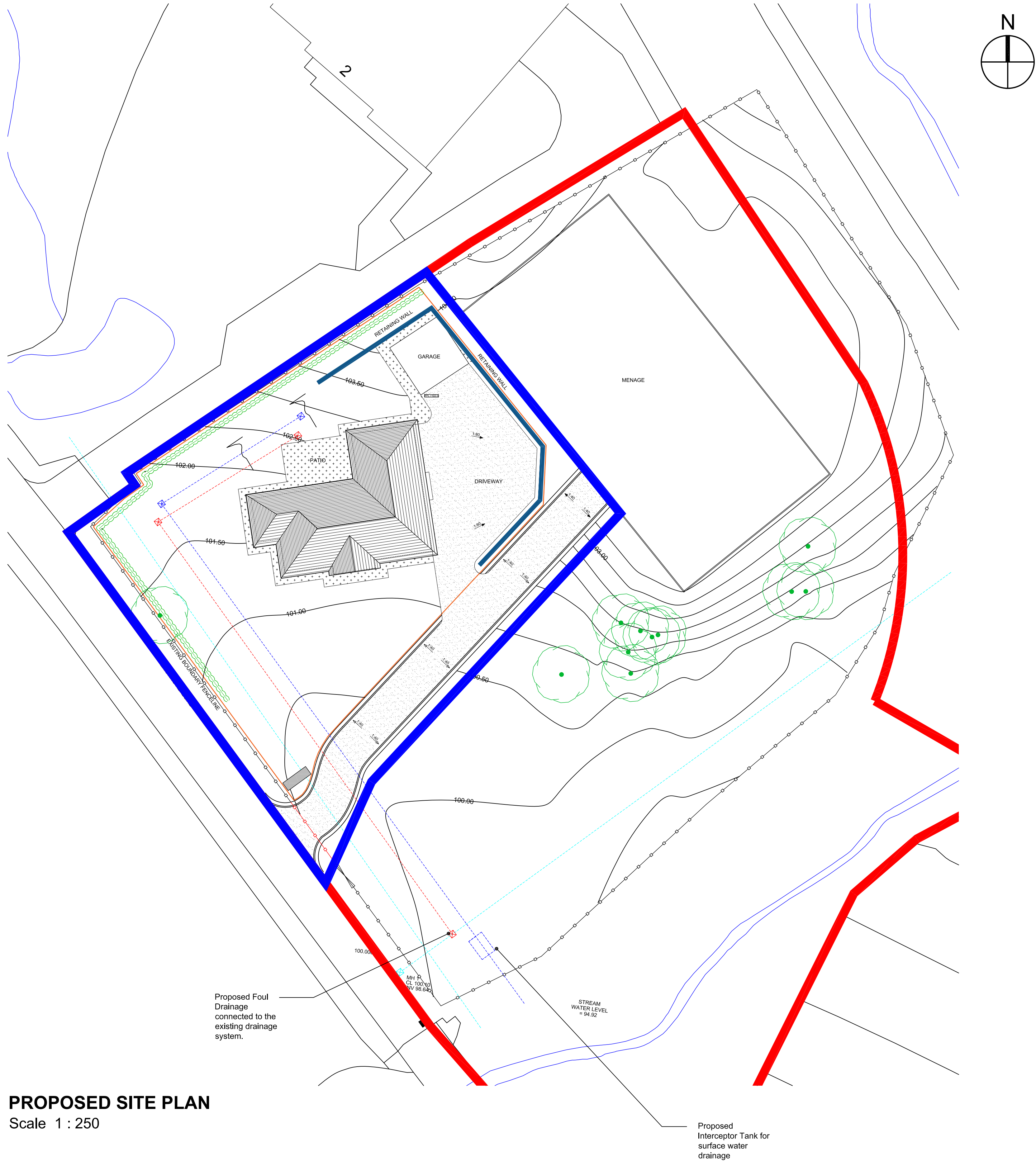
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job no. 2945	drawing no. 001	revision no. /

job no.	drawing no.	revision no.
2945	001	/



PLANNING AND
BUILDING CONTROL
31 OCT 2017

PROJECT
PROPOSED FOUR BEDROOM
DETACHED DWELLING HOUSE
WITH DOUBLE GARAGE.
DRAWING TITLE
SITE PLAN AND TOPOGRAPHICAL.
CLIENT
MR. KEVIN McNALLY.
ADDRESS
LAND ADJACENT,
NUT BANK LANE,
MANCHESTER.
SCALE 1:200 DATE FEB 2017.
DRAWING No
ADL 02175149/3



PROPOSED SITE PLAN
Scale 1 : 250

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STATUS
FOR PLANNING

- NOTES:
- KEY**
- Proposed Site Boundary
 - Land Owned by Applicant
 - Existing Foul Drainage & Manhole Cover
 - Proposed Foul Drainage & Manhole Cover
 - Proposed Surface Water Drainage & Manhole Covers

/	12/05/21	For Information	BP
no.	date	revision details	by

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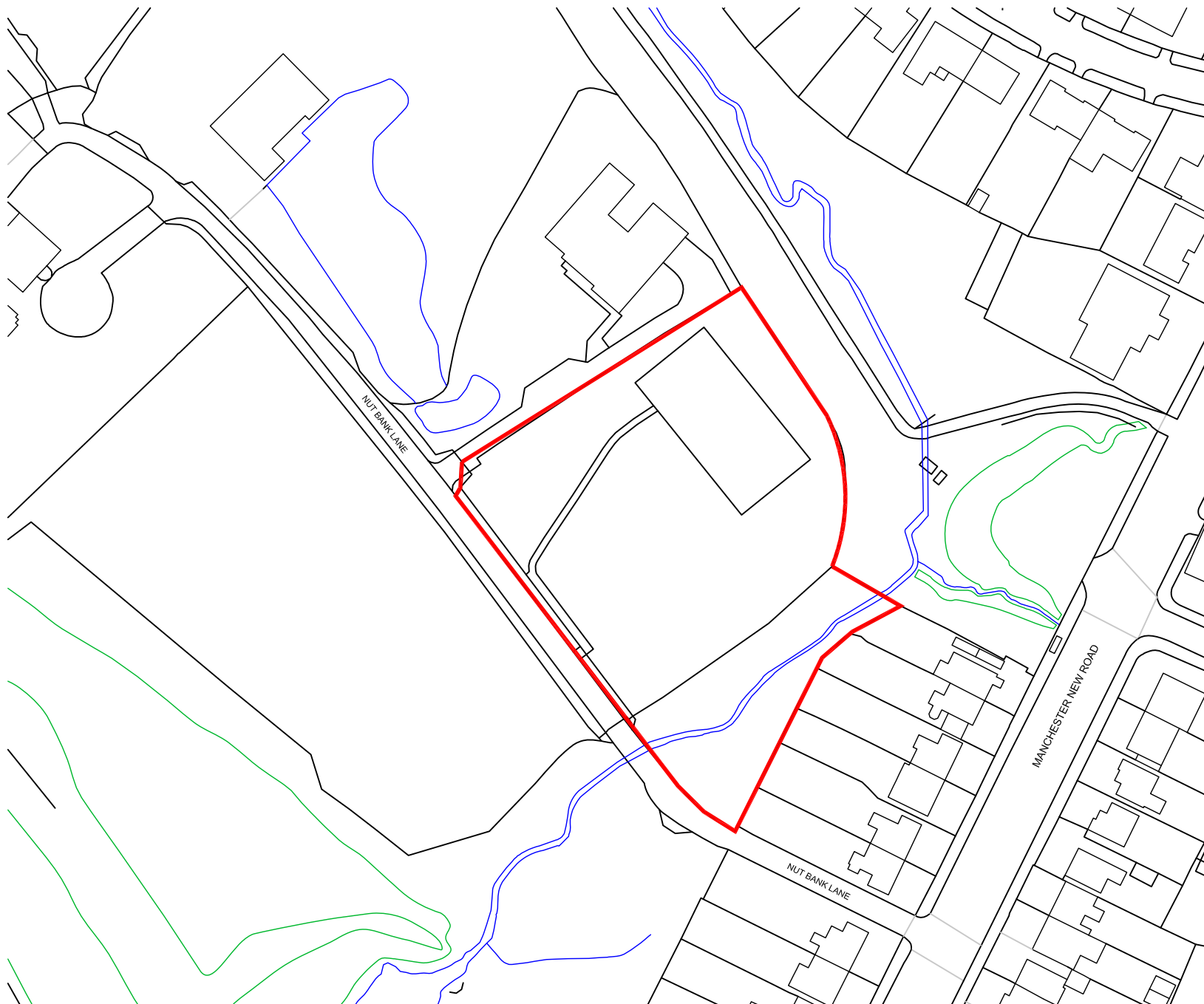
Mr. KEVIN McNALLY

job title
**SOUTH VIEW HOUSE, NUT BANK LANE,
MANCHESTER**

drawing title
PROPOSED SITE PLAN

scale	drawn by	date
1:150 @ A1	BP	12/05/21

job no.	drawing no.	revision no.
2945	101	/



LOCATION PLAN
Scale 1 : 1250

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STATUS

FOR PLANNING

NOTES:

KEY

Application Area

/	06/05/21	BP	FOR INFORMATION	BP	RS
no.	date	by	Revision Details	Ckd	App

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Mr. KEVIN McNALLY

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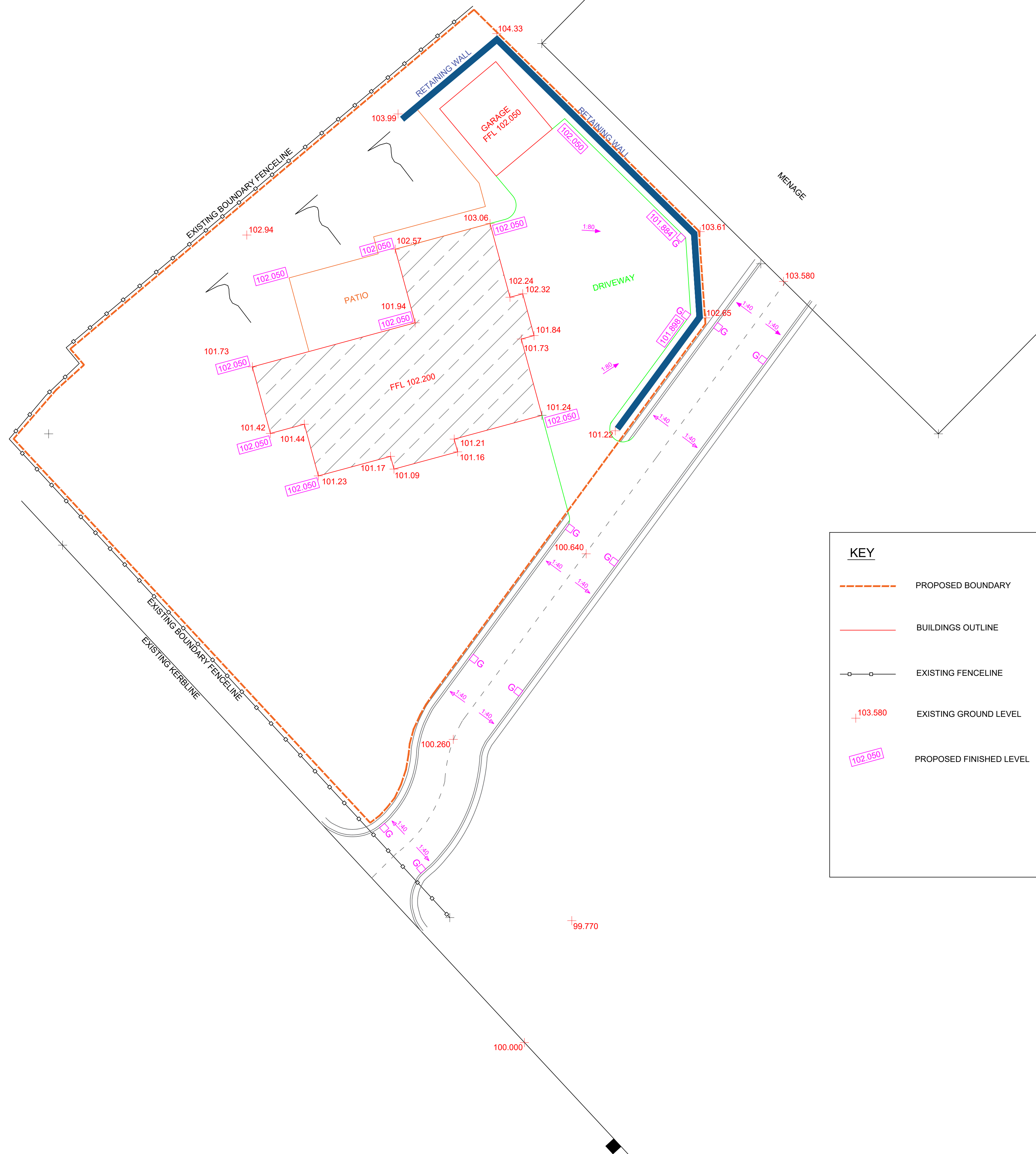
SOUTH VIEW HOUSE, NUT BANK LANE,
MANCHESTER

drawing title

LOCATION PLAN

scale	1:1250 @ A4	drawn by	BP	date	06/05/21
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job no.	drawing no.	revision no.
2945	LP-01	/



PROJECT
PROPOSED FIVE BEDROOM
DETACHED DWELLING

DRAWING TITLE
PROPOSED PLOT 1

SUB TITLE
BOUNDARIES, LEVELS AND
ROAD OPTION 2

CLIENT
MR K McNALLY

ADDRESS
SOUTH VIEW,
NUT BANK LANE,
MANCHESTER.

SCALE
1:150 @ A1

DATE
JUNE 2020

DRAWING NO.
MESD - 02578/2