



**MICHAEL EVANS
& ASSOCIATES LTD**

Civil and Structural Engineers
& Design Consultants

FLOOD RISK ASSESSMENT

**For Proposed Residential Development of land at:
6 Castle Way
Willington
Derbyshire**

**Job No: 21-631
Prepared by: Michael Evans & Associates Ltd
Date: 13th December 2021
Rev: -**

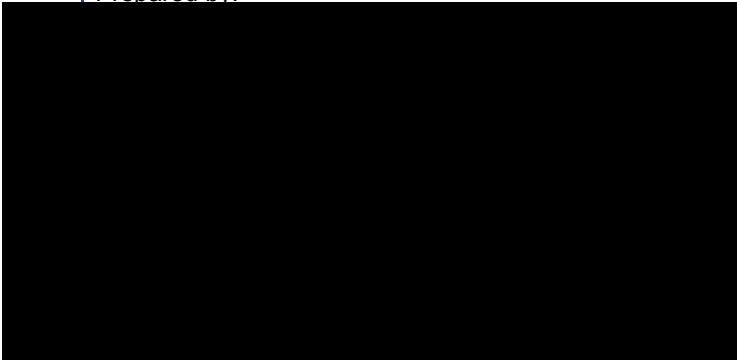
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CLIENT DETAILS

Mr Richard Giles-Grant
A & I Designs Ltd, 3 Thompson Close, Mickleover, Derby. DE3 0AU.

CONTRACT

This report describes work commissioned by A & I Designs Ltd following written (e-mail) instruction on 19th November 2021 from My Richard Grant-Giles. Mrs Nicola Dibble of Michael Evans & Associates Ltd carried out the work.

Date: 13 th December 2021	
Prepared by:	Nicola Dibble
	Senior Engineer
	Shane Litchfield
...	Managing Director

REVISIONS

Revision / Dated Issued	Amendment

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1 INTRODUCTION

1.1 General

1.1.1 Michael Evans & Associates Ltd have been commissioned to undertake a Flood Risk Assessment (FRA), on behalf of A & I Designs Ltd relating to the proposed development of a single detached dwelling in the rear garden of 6 Castle Way, Willington, Derbyshire.

1.1.2 The site has previously been granted outline planning permission for a single residential dwelling under planning application reference: 9/2017/0866. This outline planning application was supported by an FRA and sequential testing, which were accepted by the Local Planning Authority.

1.1.3 This report sets out the findings of the FRA required by the Local Planning Authority in support of the planning application for the development. The assessment has been carried out in accordance with the guidance set out in the National Planning Policy Framework (NPPF).

1.2 Background Information

1.2.1 The Department for Communities and Local Government (DCLG) published the NPPF and the Technical Guidance to the National Planning Policy Framework (Technical Guidance) in March 2012, with the most recent updates being published in August 2018. The NPPF and the accompanying Technical Guidance explain how flood risk should be taken into consideration during the planning process. The guidance specifies a sequential test which local planning authorities should apply to all future proposed development sites. The following Table 1: Flood Zones, extracted from Table 1 of the Technical Guidance, defines the levels of flood risk within England.

Table 1: Flood Zones		
Flood Zone	Flood zone Classification	Description
Flood Zone 1	Low Probability	This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any one year (<0.1%).
Flood Zone 2	Medium Probability	This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.

Flood Zone 3a	High Probability	This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Flood Zone 3b	Functional Floodplain	The zone comprises land where water has to flow or be stored in times of flood.

- 1.2.2** As part of its general obligations under the Water Resources Act 1991, the Environment Agency has carried out surveys of its existing flood defences and has published a series of nationwide 'Indicative Floodplain Maps' based upon information from historic flood events and basic hydraulic modelling. In general terms, these maps give a good indication of the areas likely to be affected by flooding. More recently the Environment Agency have published the 'Flood Map' on their website which is based on improved hydraulic modelling and detailed local data. The Flood Map indicates areas which may be affected by a 1 in 100 year fluvial flood or a 1 in 200 year tidal/coastal flood (ie Zone 3 as defined in the NPPF). It also indicates which areas may be affected by an extreme flood (ie Zone 2 as defined in the NPPF).
- 1.2.3** The Flood Map for the site area of Willington shows that the proposed development is located within Flood Zone 2. The extent of the indicative floodplain is shown on Appendix 1 – 'Environment Agency Information'.
- 1.2.4** The NPPF stipulates that all proposed development sites which are located outside of Flood Zone 1 and/or are greater than 1ha in area must be accompanied by a Flood Risk Assessment as part of the planning process. For site located within Flood Zone 1 which are less than 1ha in area, the main flood risk consideration is the management of surface water runoff from the site.

2 STRUCTURE OF THE REPORT

- 2.1** The report has been structured to follow the general principles set out in the Site Specific Flood Risk Assessment Checklist, included as Section 26 of the PPG.
- 2.2** The methodology for this FRA has comprised a desktop study including liaison with the Environment Agency (East Midlands) carried out as part of the previous FRA.
- 2.3** Reference has also been made to relevant plans, including plans showing the South Derbyshire Strategic Flood Risk Assessment (2008)¹ in the compilation of this report.
- 2.4** The FRA is based on the existing hydraulic modelling information made available by others. No new hydraulic modelling has been undertaken as part of the study.

¹ Scott Wilson (2008) South Derbyshire Strategic Flood Risk Assessment. [available online at:] http://www.south-derbys.gov.uk/planning_and_building_control/planning_policy/local_plan/evidence_base/flood_risk_assessment/default.asp

3 SITE SETTING

3.1 Site Description and Location

3.1.1 A summary of the site and its characteristics is provided in Table 2: 'Site Location Summary', below.

Table 2: Site Location Summary	
Site Name	6 Castle Way
Site Address	6 Castle Way, Willington, Derbyshire. DE65 6BT
Site Area	990m ²
National Grid Reference	429299 E, 328544 N
Existing Land Use	Residential and gardens
Proposed Land Use	Residential and gardens
Local Planning Authority	South Derbyshire District Council
Environment Agency Area	East Midlands
Lead Local Flood Authority	Derbyshire County Council
Sewer Undertaker	Severn Trent Water
Other Authorities (e.g. British Waterways)	Canals and Rivers Trust

3.1.2 A site location plan can be found in the drawings section at the end of this report, drawing number 2114-004 A - 'Existing OS, Site and Block Plans'.

3.1.3 The proposed development site is located at 6 Castle Way, Willington, Derbyshire. The site is located at approximate National Grid Reference (NGR) 429299E, 328544N, and the nearest postcode is DE65 6BT. The site is bounded by Castle Way to the south, and existing residential properties to the north, east and west. The site is within the existing developed area of Willington.

3.1.4 The development site has an area of approximately 990m² comprising of the existing property, 6 Castle Way and associated detached single garage and gardens. The existing impermeable area on the site is approximately 81m².

3.1.5 The nearest named watercourse is the Willington Sands Brook, which is located approximately 60m east of the site. The Eggington Brook is located approximately 530m south of the site, and the River Trent is located approximately 640m south-east of the site. In addition, the Trent and Mersey Canal is located approximately 45m

north of the site. Other local water features include the lakes associated with Willington Gravel Pits which are located approximately 400m south-west of the site at their nearest point.

- 3.1.6** There is no topographical survey for the site. The site is generally flat, with a small rise from the south (front) of the site to the north (rear) of the site.

3.2 Existing Drainage

- 3.2.1** There is no formal drainage network on the northern portion of the site, as this is currently gardens. The connection details for the surface water from the existing property on the site have not currently been confirmed, however it is understood that surface water will either be discharged to a soakaway or connected to the public sewer network within Castle Way. Ground conditions suggest that a sewer connection is the most likely option.

- 3.2.2** Existing surface water runoff rates for the site have been calculated using the 'Greenfield Runoff estimate for sites' calculator available on the UK SUDS website, which uses the IH124 method for calculating runoff from small sites. The estimated greenfield runoff rate is approximately 0.69l/s of runoff from the site during a 1 in 100 year rainfall event, and 0.27l/s during a QBAR (average annual) rainfall event. Brownfield runoff from the current hardstanding areas of the site have been calculated using the Rationale Method, as described by Wallingford, which estimates that the brownfield runoff from the site is approximately 0.88l/s during a 1 in 100 year event. The total existing runoff from the site is therefore approximately 1.6l/s. The existing runoff calculations are included within this report and can be found in Appendix 2 – 'Existing Drainage Calculations'.

- 3.2.3** Foul water on the site is understood to be connected to the public sewer network within Castle Way.

3.3 Flooding History

- 3.3.1** The site is shown to lie within Flood Zone 2 of the Environment Agency's Indicative Flood Map. A copy of the Environment Agency's Flood Map can be seen in Appendix 1 – 'Environment Agency Information'.

- 3.3.2** The EA have confirmed that they hold no details of historical fluvial flooding affecting the site.

3.3.3 The SFRA indicates a number of incidents of flooding that have affected the Willington area, although none are thought to have impacted on the site itself. Fluvial flooding is noted to have occurred in 1981, November 2000 and January 2008 (a combination of fluvial and surface water flooding). In September 2004 surface water and highway flooding was recorded. Fluvial flooding is thought to relate mainly to the River Trent and the Willington Sands Brook, and surface water flooding is thought to originate from along the B5008 (Repton Road). It is not considered that any of these flood events would have directly impacted on the site.

3.4 Ground Conditions

3.4.1 Geological information made available for the site shows that the site is underlain by loamy soils with naturally high groundwater. The site is therefore likely to be above poorly draining soils, which are largely impermeable.

3.4.2 Table 3, below outlines the groundwater vulnerability at this location. The information has been gathered from the Environment Agency website.

Table 3: Summary of Groundwater Information	
Groundwater Source Protection Zone	None
Superficial Deposits Designation	Secondary A
Bedrock Designation	Secondary B
Groundwater Vulnerability Zone	Medium-High

4 PROPOSED DEVELOPMENT

4.1 Description of Site Proposals

4.1.1 The proposed development will consist of the construction of a new detached dwelling on the site, with a detached garage. The existing dwelling will be retained as existing, however the existing garage will be demolished to make way for the access to the new property.

4.1.2 The proposed impermeable area of the finished development will be approximately 160m². This means that an increased impermeable area of approximately 80m² will be created as a result of the development.

4.1.3 A copy of the proposed site development plan is shown on Drawing 2144-005 C – ‘Proposed OS, Site and Block Plans’.

4.2 Vulnerability Classification

4.2.1 The Environment Agency Indicative Flood Map shows that the site lies within Flood Zone 2, with respect to Table 1 of the Technical Guidance.

4.2.2 The vulnerability class for the proposed development, with respect to Table 2 of the Technical Guidance, is ‘more vulnerable’.

4.2.3 Table 3 of the Technical Guidance, ‘Flood Risk Vulnerability and Flood Zone Compatibility’, shows that more vulnerable development is suitable for siting within Flood Zone 2. The site is therefore suitable for the type of development proposed.

4.3 Sequential and Exception Test

4.3.1 The Sequential Test, as set out in the Technical Guidance, aims to steer development to areas with the lowest risk of flooding (ie to steer developments to Flood Zone 1 where possible). The planning application was previously supported by a sequential test, which confirmed that the site was suitable for the siting of a residential property, as is still proposed under this new application. There have been no significant changes to planning policy or site allocations within the area which would materially alter the conclusions of the sequential test. Moreover, more vulnerable developments are suitable for siting within Flood Zone 2 areas, without the need for the Exception Test to be carried out. It is therefore considered that the site is sequentially acceptable for the type of development proposed.

4.4 Drainage Proposals

- 4.4.1** Ideally, surface water runoff rates from new site should be restricted to the existing QBAR greenfield runoff rates, and attenuation should be provided for all events up to the 1 in 100 year + climate change event.
- 4.4.2** As previously calculated, the QBAR greenfield runoff rates for the whole site is approximate 0.69l/s. In line with current best practise, flows <5l/s should be restricted to 5l/s to prevent blockages within the drainage network. Unrestricted surface water flows from the site would be approximately 1.76l/s from brownfield areas, and 0.69l/s from greenfield areas, giving a total runoff during a 1 in 100 year rainfall event of approximately 2.45l/s, ie below the minimum recommended rate of 5l/s.
- 4.4.3** Surface water flows from new developments should be attenuated onsite for all events up to the 1 in 100 year + climate change event, so as not to increase the flood risk to areas offsite. Since the runoff from the site is <5l/s, the flow will be restricted to the rate of 5l/s, as described above. Surface water calculations have been carried out which confirm that approximately 1m³ of surface water attenuation will be required at the site to cater for 1 in 100 year flows, with a 40% allowance for climate change. It is anticipated that these volumes can be accommodate within the piped drainage network serving the site. Calculations can be found in Appendix 3 – ‘Surface Water Attenuation Calculations’.
- 4.4.4** Additional Sustainable Drainage features (SuDS) may be suitable for use at the site, such as rainwater harvesting and rain gardens. These are discussed in later sections of this report and will be investigated further at the detailed design stage.
- 4.4.5** It is proposed that foul flows from the development will be discharged into the public sewer network via the connection serving the existing property at 3 Castle Way. The additional flows created by one small additional property will be minimal and it is not considered that this would create an unacceptable increase in flows into the public sewer network. Drainage within the site will remain private and will be constructed in accordance with Building Regulations.

5 FLOOD RISK

5.1 Flood Risk – To the Development

5.1.1 The main sources of flooding are from rivers, tidal waters, high land/ overland runoff, high water tables, sewers/drains, and from artificial sources such as canals or reservoirs.

5.1.2 The presence of a potential flooding source within the vicinity of the site does not necessarily translate into a high risk of flooding. Table 3 (below) summarises the potential flood sources and the related flood risks poses to the site by the various sources.

Table 3: Sources of Flood Risk			
Flood Source	Presence at site?	Potential risk at site (high/ medium/ low)	Description
Fluvial	✓	Medium	The site is shown to be within Flood Zone 2
Tidal	✗		
Groundwater	✗		
Sewers	✗		
Canals	✗		
Other Artificial Sources	✗		
Pluvial	✗		
Other	✗		

5.1.3 Fluvial Flooding

The source of fluvial flooding which would potentially affect the site is Willington Sands Brook, a copy of this information can be found in Appendix 1 – ‘Environment Agency Information’. The Environment Agency have provided a flood map which shows that the site is within Flood Zone 2. There is no modelled flood information available, and therefore the flood levels are unknown. The Flood Zone 2 extent is to the boundary of the site, but does not extend beyond the site. The flood zone 2 levels are therefore considered to be the approximate level of the site boundary.

The flood zone 3 extent shown on the Environment Agency’s Flood Map does not encroach onto the site. The flood zone 3 extent is approximately 130m south of the

site, to the south of the railway line. The watercourse is culverted for a stretch below the existing road and railway line, and the EA map indicated that the 1 in -100 year flood extent does not back up within the culverted section or affect any areas upstream of the culvert.

The flood risk to the site from fluvial sources is considered to be medium. Mitigation measures are proposed within section 5.2 of this report to ensure that the site can be safely developed for residential use.

5.1.4 Tidal

The site is not near to the coast or within the tidal reaches of any watercourses. OS spot levels indicate that the site is in excess of 40m above sea level. Therefore flooding from tidal sources is not considered to pose a risk to the site.

5.1.5 Groundwater

Groundwater flooding can occur anywhere where groundwater levels rise above the ground level. No evidence of groundwater flooding was found as part of the SFRA for the district. The risk of groundwater flooding at the site is considered to be low.

5.1.6 Sewers

There is no evidence of sewer flooding affecting the site. The SFRA makes passing reference to sewer flooding within the South Derbyshire area, but does not indicate any areas around the site to be at particular risk of flooding from this source. The risk of sewer flooding is therefore considered to be low.

5.1.7 Pluvial/ Overland Flow

On land where there is impermeable surfacing or where the ground infiltration capacity is exceeded, there is the potential for surface water runoff to occur. Evidence within the SFRA indicates that Willington has suffered surface water flooding along the B8006 (Repton Road). Any flooding originating from the B8006 would be routed along this road, which is lower than the site, and is highly unlikely to reach the site itself or encroach as far as the site section of Castle Way. Any surface water flooding originating from Castle Way would be routed along Castle Way, contained within the kerb lines, and would be unlikely to affect the site.

The risk of surface water flooding affecting the site is, therefore, considered to be low.

5.1.8 Artificial Sources

The site is not shown to be at risk of flooding from reservoirs, however the extent of reservoir flooding is shown to be very close to the boundary of the site. The sources of this flooding are Carsington Reservoir, owned and operated by Severn Trent Water, and Willington Reservoir, owned and operated by South Derbyshire District Council.

The site is close to the Trent and Mersey Canal. Canal water levels are maintained by a series of control weirs and overflow weirs. Canals are designed to accommodate flows legally entering the network, and would therefore only normally flood as a result of blockages, vandalism or structural failure causing a breach. The Canals and Rivers Trust (formally British Waterways) are responsible for undertaking regular inspections and maintenance of canals. The canal at this location is below the surrounding ground level, and therefore a breach is highly unlikely to occur or to affect the site.

5.2 Flood Risk – From the Development

5.2.1 Floodplain Storage

There is no development within the 1 in 100 year flood outline (Flood Zone 3), and therefore there is no requirement to provide compensatory floodplain storage.

5.2.2 Flood Flow Routes

There are no 1 in 100 year flood flows across the site. The 1 in 1000 year flood flows, although they affect parts of the site, do not cross the site and therefore there will be no disruption to flood flows as a result of the proposed development, which would otherwise pass across the site. Therefore, there is no requirement to provide mitigation for the impacts of development on flood flows.

5.2.3 Culverts

There are no culverts proposed as part of this development, and the development will not have any impact on any existing culverts. Therefore there is no requirement to provide any mitigation with regards to culverts.

5.3 Climate Change

5.3.1 In assessing the potential flood risk at the site over the lifetime of the development climate change has been taken into account. Climate change allowances have been based on the guidance provided by the Environment Agency (Published in July 2021)

which has been reproduced as Table 4 (below) for the upper end of the River Humber catchment.

Table 4: Recommended national precautionary sensitivity ranges			
Parameter	2015-2039	2040-2069	2070-2115
Peak rainfall intensity	+10%	+20%	+40%
Peak river flow	+13%	+17%	+29%

5.3.2 There are no modelled flood levels available for the site. The site is shown to lie within the 1 in 1000 year flood outline, but not the 1 in 100 year outline. The 1 in 1000 year flood outline is therefore considered to give an indication of the likely 1 in 100 year + climate change flood extent.

5.3.3 In assessing the volume of storage needed to attenuate surface water flows from the site estimated peak rainfall intensities have been increased by 40% to allow for climate change during the lifespan of the development.

5.4 Flood Risk Management Measures

5.4.1 Flows from the site will be restricted to 5l/s, in line with current best practise. The calculation found in Appendix 3 confirm that <1m² of surface water attenuation be required to accommodate flows from the site during a 1 in 100 year event, with a 40% allowance for climate change. It is anticipated that this volume can be accommodated within the piped network serving the proposed development, and no additional attenuation will be required.

5.4.2 The site is not shown to be within the 1 in 100 year flood envelope, and no definitive flood levels are available for the site. The 1 in 1000 year flood extent is approximately to the site boundary and, therefore flood levels are considered to be approximately the boundary levels. Finished Flood Levels for the development will be set approximately 300mm above the site boundary level, to provide protection against high magnitude flood events. The site access and egress is an existing access, which will be retained at its current route and level. The site access is within Flood Zone 2 and wider access and egress from the site can be achieved via flood zone 1 and 2 areas. Flood depths along the site access and egress will be low, and it is considered that access by car/on foot will be possible even during a 1 in 1000 year event.

5.4.3 It is not anticipated that the ground conditions at the site will be favourable for the discharge of surface water to ground via infiltration techniques. Therefore, the Sustainable Drainage Systems (SuDS) techniques would be related to restricting the flows from the site to mimic greenfield conditions. Additional options for the incorporation of SuDS include the use of waterbutts and rain gardens, which may be appropriate for inclusion within some areas of the site. The use of SuDS features will be confirmed as part of the detailed surface water drainage design at a later stage of the planning process. As detailed in the sections above, no additional attenuation will be required at this site due to the low impermeable areas being created, and the recommended minimum flow restriction of 5l/s.

6 RESIDUAL RISKS

- 6.1** There is always a possibility of a flood in excess of that allowed for which might conceivably cause some flooding to the development. However, such an event would have a very low probability and the risk of flooding to development would be extremely small. It is therefore considered that the residual risks associated with flooding are not significant.

7 CONCLUSIONS

- 7.1** This report gives details of the Flood Risk Assessment, which has been carried out in relation to the proposed development site.
- 7.2** The site falls within Flood Zone 2 of Table 1 of the Technical Guidance, and the vulnerability class of the proposed development is 'more vulnerable'. Table 3 of the Technical Guidance indicates that sites classified as Flood Zone 2 are suitable for the vulnerability class of development proposed.
- 7.3** The extent of the 1 in 1000 year flood outline is to the boundary of the site, so the 1 in 1000 year flood level is anticipated to be approximately this level. It is recommended that the finished floor level of the building be set 300mm above the ground level at the site's north western boundary.
- 7.4** The Strategic Flood Risk Assessment for the South Derbyshire area which covers the proposed development site does not indicate any other specific flood risks which would be likely to affect the site.
- 7.5** The existing and proposed surface water runoff rates have been calculated for the site. These calculations confirm that no additional attenuation will be required to accommodate 1 in 100 year, plus 40% climate change, flows to 5l/s.
- 7.6** There are no local site specific risks that would adversely affect this categorisation. Similarly there are considered to be no significant increased offsite flooding risks as a result of the development. The site is therefore considered suitable for the type of development proposed.

APPENDICES

Appendix 1
Environment Agency Information



Nicola Dibble
Michael Evans and Associates Ltd
34 Station Road
Draycott
Derbyshire
DE72 3QB

Our Ref: EMD-54542

Your Ref:

Date: 28/07/2017

Dear Nicola

Enquiry regarding Product 4 – 6 The Castle Way, Willington, South Derbyshire, DE65 6BT

Thank you for your enquiry which was received on 24/07/2017.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

I enclose the available Product 4 data for the above site as per your enquiry.

Please refer to [Open Government Licence](#) which explains the permitted use of this information.

Further details about the Environment Agency information supplied can be found on the GOV.UK website:

<https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments

<https://www.gov.uk/planning-applications-assessing-flood-risk>
<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

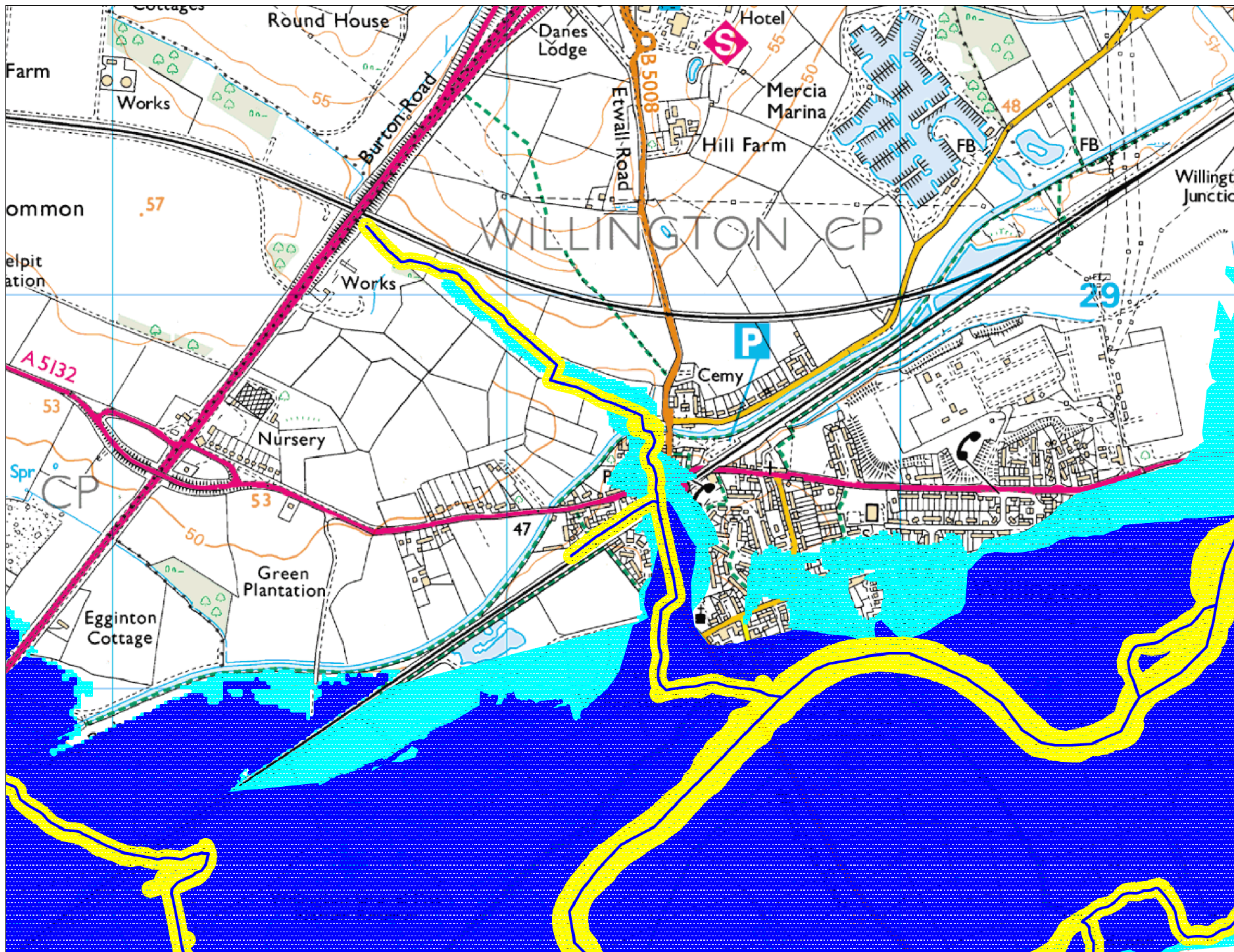
Yours sincerely

June Rolland
Customers & Engagement Officer
East Midlands

For further information please contact the Customers & Engagement Team on 02084 747770

Direct e-mail:- EMDenquiries@environment-agency.gov.uk

Detailed FSA/FRA Map centred on The Castle Way, Willington - created 25 July 2017 Ref: [EMD54542]



Scale 1:10,000



Legend

- 1% (1 in 100 year) floodplain
- 0.1% (1 in 1000 year) floodplain
- Main River
- Bank Top ePlanning Tool
- Areas Benefiting from Defences
- Flood Storage Area

A Strategic Flood Risk Assessment may be available, providing further information for this site. Please contact your Local Planning Authority to access this information as it will need to be considered within any Flood Risk Assessment submission.

Flood Defence Map centred on The Castle Way, Willington - created 25 July 2017 Ref: [EMD54542]



Scale 1:5000



Legend

 Flood Defence Locations

A Strategic Flood Risk Assessment may be available, providing further information for this site. Please contact your Local Planning Authority to access this information as it will need to be considered within any Flood Risk Assessment submission.

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Ref: EMD54542

Modelled Information

No modelled data available

Please note: The flows provided represent **in channel flow only** and do not take into account flow on the floodplain.

On 19th February 2016, the [Flood risk assessments: climate change allowances](http://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances) was published on www.gov.uk website. It has replaced previous guidance [Climate Change Allowances for Planners](http://www.gov.uk/guidance/climate-change-allowances-for-planners).

The climate change guidance can be found at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

If your RFI is to assist with a Flood Risk Assessment (FRA) for a future planning application, please review this guidance to consider which allowances should be used for your site. The climate change allowance provided with this RFI is a 20% increase in the peak river flow for the 1% Annual Exceedance Probability (1 in 100 year) scenario.

EMD54542 Defence Information

Defence ID	Asset Reference	Design Standard	D/S Crest Level (mAOD)	U/S Crest Level (mAOD)	Overall Condition Grade
1	392,493	n/a	43.95	44.05	n/a
2	392,419	n/a	n/a	n/a	n/a
3	173,536	10	42.63	42.82	n/a
4	173,535	10	42.66	42.73	n/a

EMD54542 Historic Information

We have no records of historic fluvial flooding at this location. However, we would advise that this does not mean there has never been historic flooding in this location or that the area is automatically free from a risk of flooding. We do not claim that all flood events have been recorded.

Open Data

The below datasets are now classed as Open Data and as such can be downloaded free of charge under an open data licence from the following address: <https://data.gov.uk/publisher/environment-agency>

- Risk of Flooding from Rivers and Sea (RoFRS) data
- LiDAR Data
- Flood Map for Planning (Rivers and Sea)
- Historic Flooding Data

Appendix 2
Existing Drainage Calculations

Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

Date:

This is an estimation of the greenfield runoff rates that are used 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). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics Default Edited

SOIL type:

HOST class:

SPR/SPRHOST:

Hydrological characteristics Default Edited

SAAR (mm):

Hydrological region:

Growth curve factor 1 year:

Growth curve factor 30 years:

Growth curve factor 100 years:

Growth curve factor 200 years:

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q _{BAR} (l/s):	0.27	0.27
1 in 1 year (l/s):	0.22	0.22
1 in 30 years (l/s):	0.53	0.53
1 in 100 year (l/s):	0.69	0.69
1 in 200 years (l/s):	0.81	0.81

This report was produced using the greenfield runoff 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 www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. 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 this data in the design or operational characteristics of any drainage scheme.

Appendix 3
Surface Water Attenuation Calculations

Attenuation Estimates



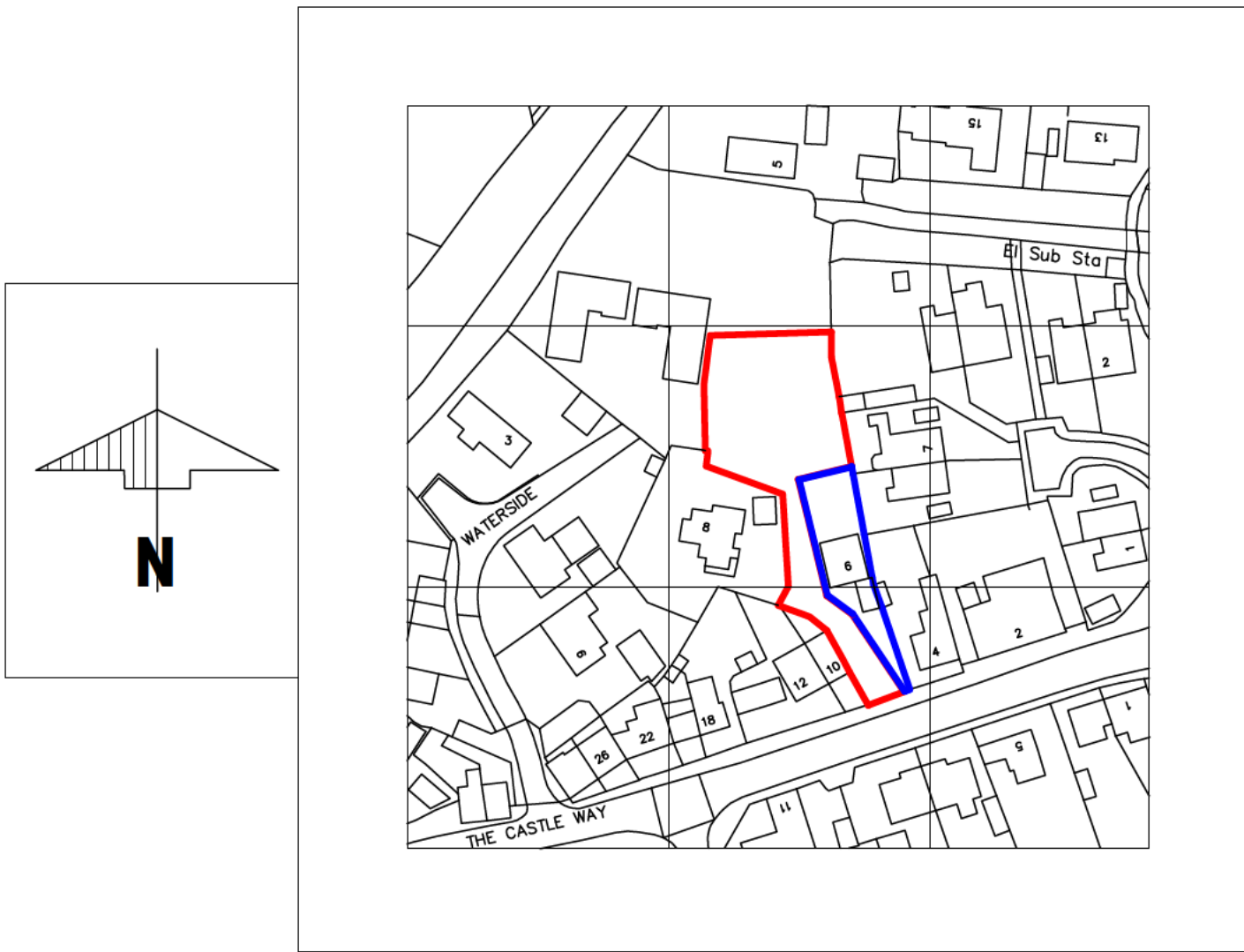
Minimum Storage Required: **1 m³** incl cc allowance

FACTOR	VALUE	SOURCE
Return Period (yrs):	100	Environment Agency, Water Authority, etc.
Limiting Discharge (l/s):	5	Environment Agency, Water Authority, etc.
Contributing Area (ha):	0.016	Site plans
Impervious, PIMP (%):	100	Site plans
M5-60min (mm):	20	Volume 3 maps and site location
SAAR (mm/yr):	662	Volume 3 maps and site location
Ratio, r:	0.4	Volume 3 maps and site location
Soil Type:	4	Volume 3 maps and site location
SOIL:	0.45	Soil Type and Volume 1, Section 7.4
UCWI:	62	SAAR and Volume 1, Figure 9.7
Calculated PR	78.30	
Percentage Runoff =	78.30	

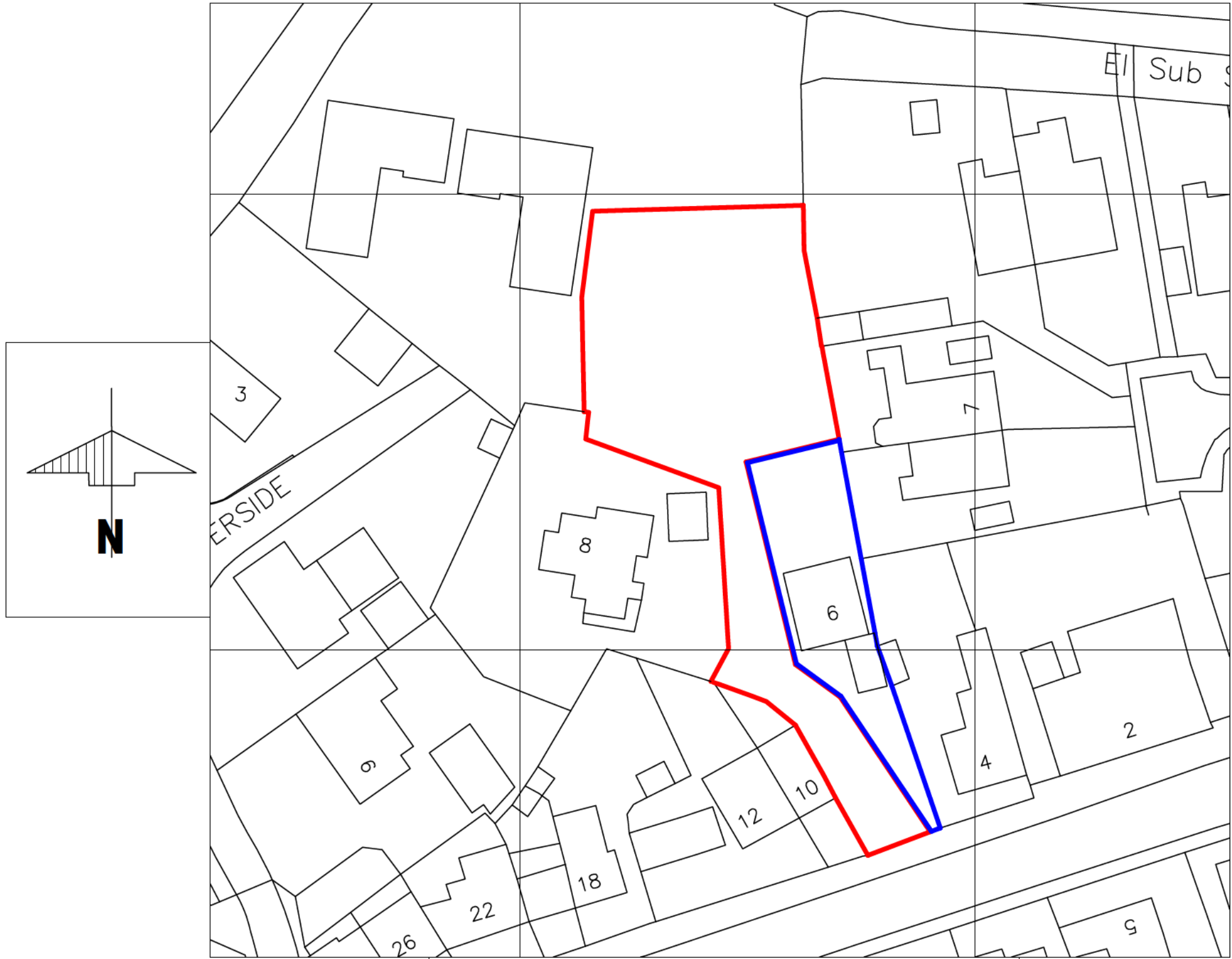
FACTOR	VALUE
Additional Inflow (l/s):	0
Calculate/Specify PR:	Calculate
Specify PR:	100
Climate Change Allowance	40

Duration, D (min)	M5-60 (mm)	Z1 for r=0.40	M5-D (mm)	Z2 for M100	M100-D (mm)	incl climate change	Area C (ha)	PR (%)	Runoff (m3)	Add. Runoff (m3)	Total Runoff (m3)	Limiting Discharge (m3/min)	Limiting Runoff (m3)	Storage Required (m3)
5	20	0.38	7.6	1.86	14.2	19.8	0.02	78	2.5	0.0	2.5	0.30	1.5	1.0
10	20	0.54	10.8	1.93	20.8	29.1	0.02	78	3.6	0.0	3.6	0.30	3.0	0.6
15	20	0.63	12.6	1.96	24.7	34.5	0.02	78	4.3	0.0	4.3	0.30	4.5	-0.2
30	20	0.80	16.0	2.00	32.0	44.8	0.02	78	5.6	0.0	5.6	0.30	9.0	-3.4
60	20	1.00	20.0	2.03	40.6	56.8	0.02	78	7.1	0.0	7.1	0.30	18.0	-10.9
120	20	1.20	24.0	2.01	48.3	67.7	0.02	78	8.5	0.0	8.5	0.30	36.0	-27.5
240	20	1.46	29.2	1.98	57.8	80.9	0.02	78	10.1	0.0	10.1	0.30	72.0	-61.9
360	20	1.60	32.0	1.95	62.5	87.5	0.02	78	11.0	0.0	11.0	0.30	108.0	-97.0
480	20	1.70	34.0	1.94	65.9	92.2	0.02	78	11.6	0.0	11.6	0.30	144.0	-132.4
600	20	1.83	36.6	1.91	70.1	98.1	0.02	78	12.3	0.0	12.3	0.30	180.0	-167.7
720	20	1.85	37.0	1.91	70.8	99.1	0.02	78	12.4	0.0	12.4	0.30	216.0	-203.6
840	20	1.90	38.0	1.91	72.4	101.4	0.02	78	12.7	0.0	12.7	0.30	252.0	-239.3
1440	20	2.28	45.6	1.84	84.0	117.6	0.02	78	14.7	0.0	14.7	0.30	432.0	-417.3
2880	20	2.70	54.0	1.78	96.3	134.8	0.02	78	16.9	0.0	16.9	0.30	864.0	-847.1

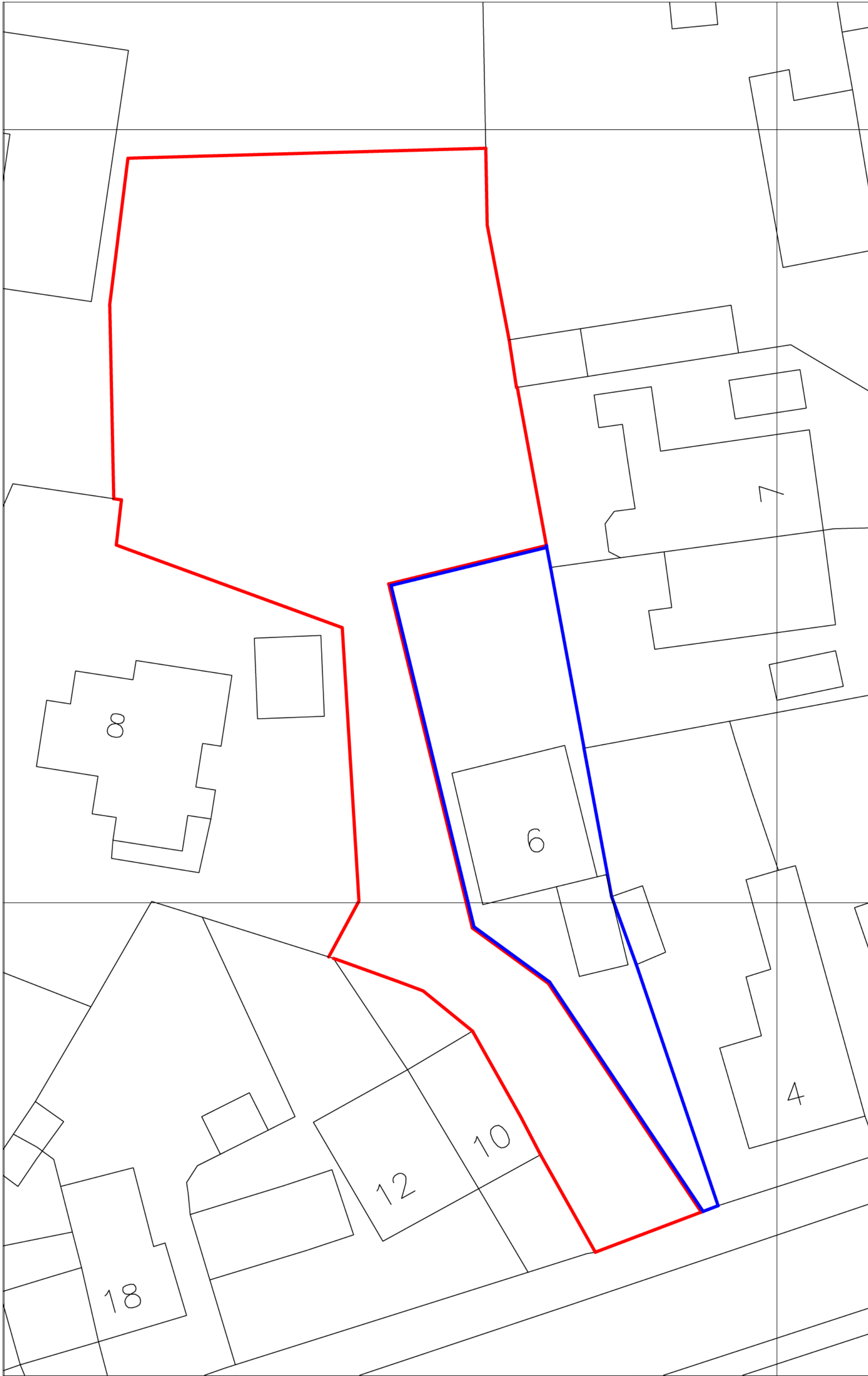
DRAWINGS



EXISTING OS PLAN (1:1250)

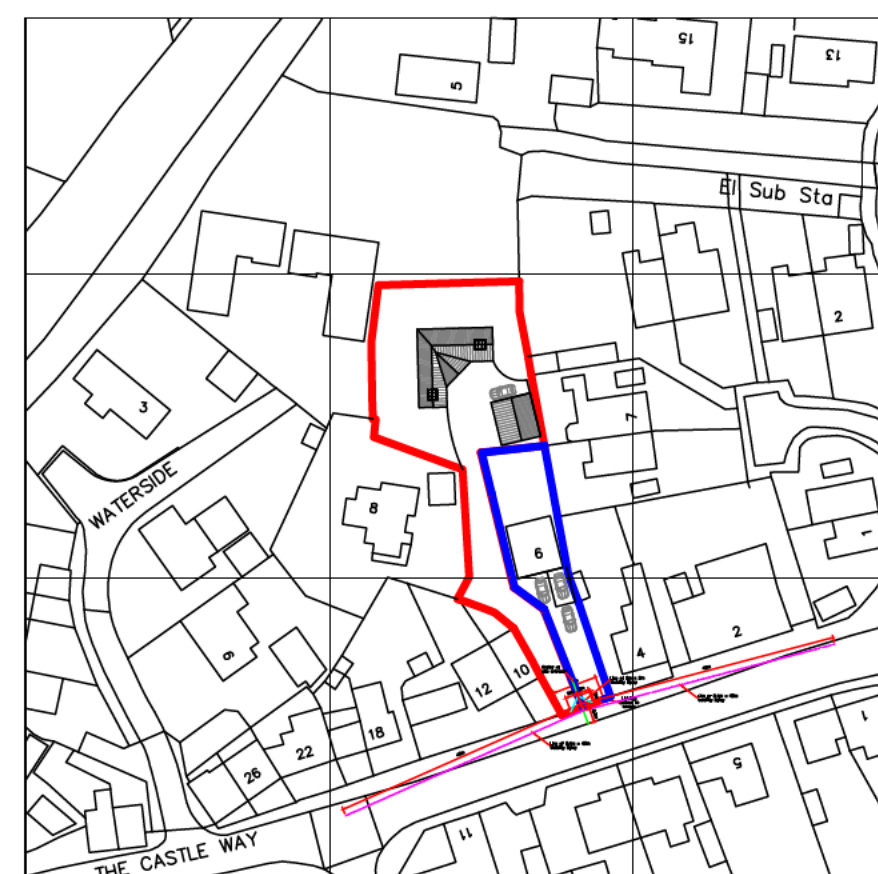


EXISTING BLOCK PLAN (1:500)

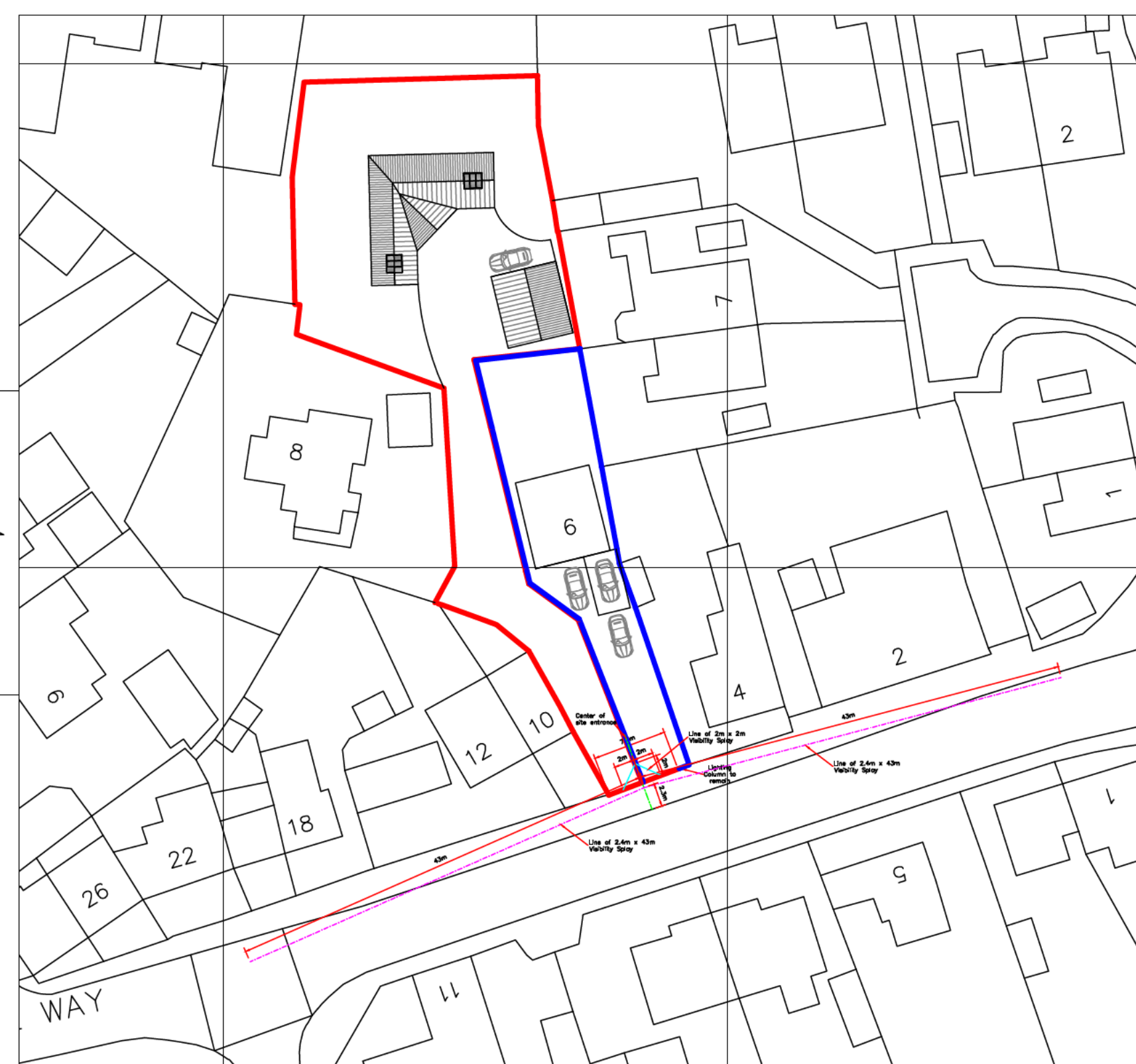


EXISTING SITE PLAN (1:200)

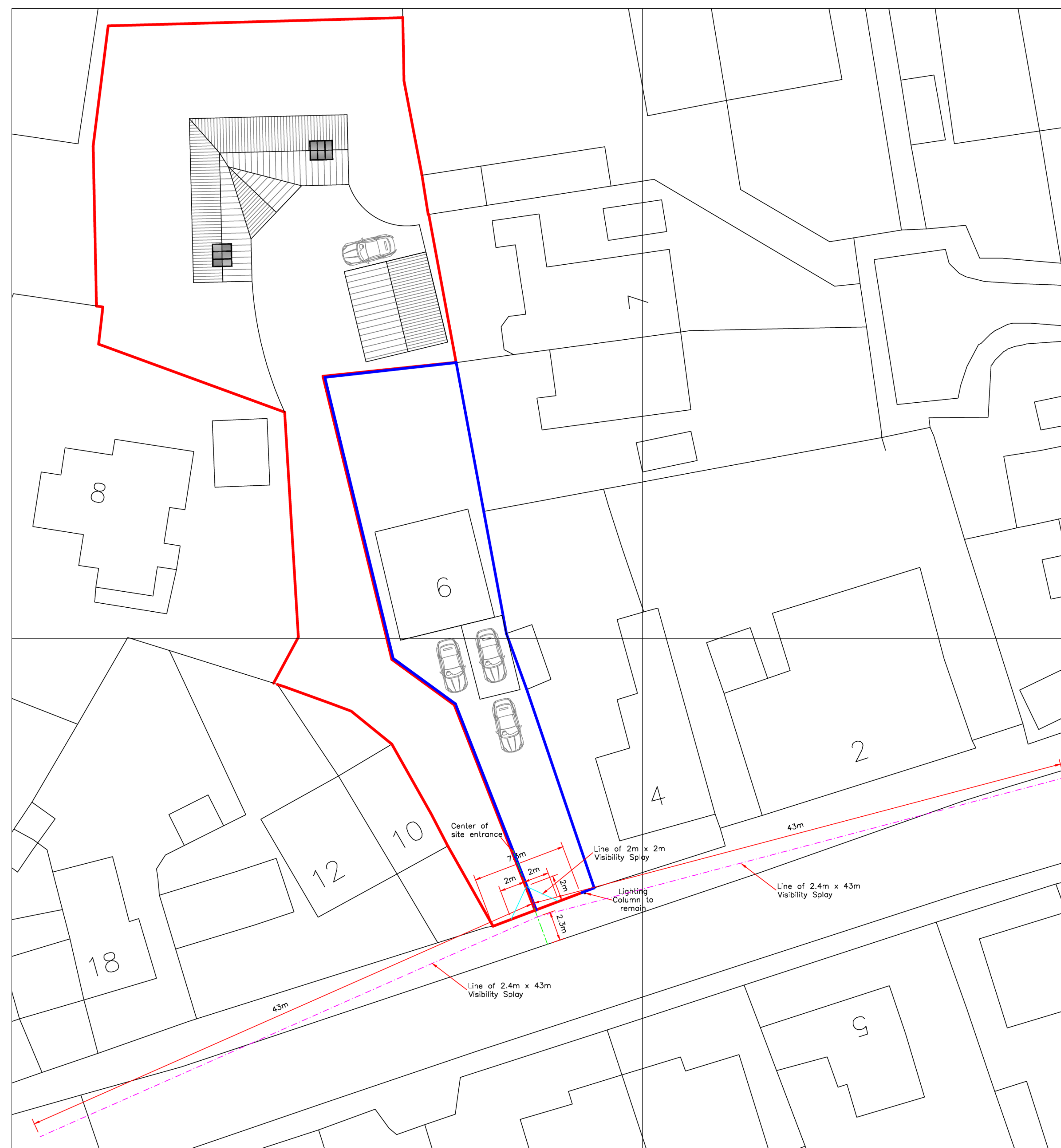
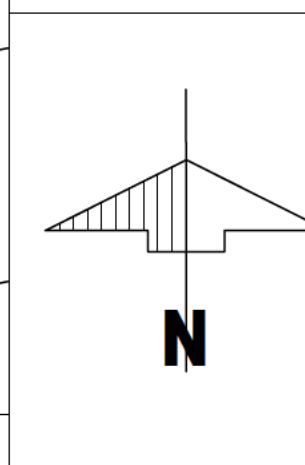
A	Drawing updated to planners comments				RGG	30 Jun 21		
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STATUS:								
FOR PLANNING								
DRAWN BY:		CHECKED BY:		APPROVED BY:		SCALE:		
RGG						Varies		
DATE:		DATE:		DATE:				
23/11/2020								
ORIGINAL DRAWING SIZE D1 + 100 A1								
								
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CLIENT:								
Mr R Hodson								
PROJECT:								
New Dwelling 6a Castleway, Willington Derby, DE65 6BT								
DRAWING TITLE:								
Existing OS, Site & Block Plans								
DRAWING NUMBER:								
2144-004 A								



PROPOSED OS PLAN (1:1250)



PROPOSED BLOCK PLAN (1:500)



PROPOSED SITE PLAN (1:200)

C	Drawing updated to clients comments	RGG			28 Sep 2
B	Drawing updated to planners comments	RGG			30 Jun 2
A	Drawing updated to planners comments	RGG			10 Mar 2
REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:

REV.	
STATUS	

FOR PLANNING

DRAWN BY: RGG	CHECKED BY:	APPROVED BY:	SCALE: 1:50
DATE: 23/11/2020	DATE:	DATE:	

ORIGINAL DRAWING SIZE (H1 x B1) A1



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DRAWING TITLE: Proposed OS,
Site &
Block Plans

DRAWING NUMBER: 2144-005 C