



FLOOD RISK & DRAINAGE ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT PLATTING LANE ROCHDALE OL11 2JT

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Revision	Date	Reason
0	July 2024	Original to support planning application.
1	Jan 2025	Updated site plan H, LLFA comments, site investigations & detailed drainage design.
2	Feb 2025	Updated site plan J, LLFA comments, site investigations & detailed drainage design.

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Contents.

1	Introduction.....	3
1.1	Purpose of Flood Risk Assessment.....	3
1.2	LLFA Consultation.....	3
1.3	LPA Planning.....	3
2	Site Proposals.....	4
2.1	Location Plan.....	4
2.2	Site Plan.....	4
2.3	Derivation of Data, Surveys and Models.....	4
2.3.1	Existing and proposed topography.....	4
2.3.2	Geology.....	4
2.3.3	Drainage Surveys.....	4
2.3.4	Sewer Undertaker Records.....	4
2.3.5	BGS Borehole Records.....	5
2.3.6	Site Investigations.....	5
2.3.7	Landmark Records.....	5
3	Drainage Strategy.....	6
3.1	Drainage.....	6
3.2	Existing Site rainfall & drainage systems.....	6
	Design rainfall 1yr (The Wallingford Procedure).....	6
	Design rainfall 30yr (The Wallingford Procedure).....	7
	Design rainfall 100yr (The Wallingford Procedure).....	7
3.3	Rainfall Climate Change Impacts.....	7
3.4	Proposed Surface Water Drainage.....	8
3.4.1	Infiltration.....	8
3.4.2	Watercourse.....	8
3.4.3	SW Sewer.....	8
3.4.4	Combined Sewer.....	8
3.5	Proposed Foul Water Drainage.....	8
3.6	Adoption.....	8
3.7	Maintenance.....	8
4	Flood Risk Assessment.....	8
4.1	Reference.....	8
4.2	Existing Fluvial & Surface Water System.....	9
4.3	Proposed Fluvial & Surface Water System.....	9
4.4	River Catchment Climate Change Impacts.....	9
4.5	Fluvial Morphological Impacts.....	9
4.6	Potential Sources of Flooding.....	9
4.7	Design.....	10
4.8	Emergency Evacuation Plan.....	10
4.8.1	Emergency Plan.....	10
4.8.2	Section 5. Flood Warnings and Associated Actions.....	10
4.8.3	Section 6. Safe Access and Escape.....	12
4.8.4	Section 7. Temporary Refuge.....	13
4.8.5	Section 8. After the Flood.....	13
4.8.6	Section 9. List of Roles.....	13
4.8.7	Section 10. Plan Upkeep and Awareness.....	13
5	Conclusion & Residual risks.....	13
5.1	Drainage.....	13
5.2	Compliance with Drainage & Flood Officer Summary.....	13
6	Appendix.....	16
6.1	Location Plan.....	16
6.2	Existing Plans/Topographic Survey.....	17
6.3	Proposed Site Plan.....	18
6.4	Proposed Drainage Plan.....	19
6.5	Infiltration Test & Proposed Drainage/Soakaway Calculations.....	20
6.6	Environment Agency Fluvial Flood Risk Maps.....	36
6.7	United Utilities Sewer Plans.....	39
6.8	NPPF Planning Practice Guidance Table 1.....	40
6.9	NPPF Planning Practice Guidance Table 2.....	40
6.10	NPPF Planning Practice Guidance Table 3.....	41
6.11	Environment Agency Climate Change Allowances.....	42

1 Introduction.

1.1 Purpose of Flood Risk Assessment.

The purpose of the assessment is to inform & accompany a planning application for a residential development of 2No. residential dwellings, associated driveways/patios & gardens.

The primary purpose of this report is to identify flood risk to/from the proposed development, and also to assess drainage proposals.

An application has been submitted under app No: 24/00772/FUL.

1.2 LLFA Consultation.

In December 2024, a consultation was received from Rochdale LLFA. The consultation summary is as follows:

DRAINAGE & FLOOD OFFICER COMMENTS

1. Although the applicant has submitted a Flood Risk Assessment and Drainage Strategy (FRA&DS), additional details are required. The proposals should incorporate a layout drawing indicating the proposed drainage layout, cover and invert levels, pipe sizes etc and supported by infiltration testing.
2. There appears to be public sewers crossing through the site which are not shown on the layouts or discussed in the report.
3. The aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable: The ordered drainage techniques to be assessed with the aim to reduce or omit lower techniques:
 - Control at Source (Infiltration / Recycling)
 - On Site Treatment (Basins, Swales, Rain gardens, Tree pits)
 - Local Treatment (Adoptable Ponds, Basins, Swales etc)
 - Regional Treatment (ditto usually to a larger scale)
 - Discharge to Watercourses / Bodies
 - Discharge to SW Sewers
 - Discharge to Combined Sewers
4. The FRA&DS references a borehole located approx. 175m from the site, indicating sand and gravel conditions. However, the British Geological Survey (BGS) records identify glacial till and clay deposits which does not appear to be consistent with the borehole data. It is considered that the desk top appraisal is not sufficient to reliably draw conclusions about the site's ground conditions, detailed and further site-based investigations are required.
5. The applicant's justification for not using soakaways is insufficient. The arguments about insufficient space are not acceptable. There appears to be a reasonable amount of space around the site and the north end is a footpath and then a carpark. Therefore, it may be feasible to encroach within 5m of the boundary. Or perhaps a redesign to reduce the build footprint should be considered.
6. The riverbank does not appear to be a steep embankment and presumably the rain falling on the site currently find its way to the river. The proposals should seek to mimic the existing regimes as much as possible.
7. If traditional soakaway design is found not be feasible then shallow diffuse options &/or hybrid options should be considered.
8. The applicant's design feasibility is based on a 1-in-100-year storm event with a 45% allowance for climate change, which is appropriate for peak rainfall. Additionally, the applicant's use of a 35% allowance for peak river flow is appropriate.
9. The proposed finished floor levels should be minimum 300mm above the highest river flood level. This does not appear to have been provided for.
10. Sudden Brook is classified as a 'main river' by the Environment Agency, the applicant must obtain an environmental permit before connecting any drainage systems to it and agreement /confirmation in principle should be provided.

1.3 LPA Planning.

Subsequent to the revision 0 version of this report, in January 2025 the Proposed Site Plan was updated By the Architects in discussion with the Planners for 3No residential dwellings.

The plan was again updated following a further request from Planning as of February 2025. The proposal was for a reduction to 2No. dwellings.

2 Site Proposals.

2.1 Location Plan.

See Location Plan in Appendix showing the area features.

The Application Site is located to the east of Platting Lane in a mixed residential/commercial area.

It is bound by Sudden Brook to the east side.

2.2 Site Plan.

Refer to Existing & Proposed Plans in the appendix.

The Application Site comprises a former garage site which is now primarily a vacant plot of land. Some existing hardstanding remain from the former use, such as a macadam driveway to a dilapidated garage, and a former garage slab to the site centre.

Existing Site areas are as follows:

Ex hardstandings	65 sqm.
Soft landscaping	465 sqm.
Total area	530 sqm.

The Proposed Plan indicates 3No. terraced residential dwellings.

Each of the properties has a private driveway for a 2 cars, and associated soft landscaping to form garden areas.

Proposed Site areas are as follows:

Roof/dwelling area	140 sqm.
Driveways/patios/paths	125 sqm.
Soft landscaping/lawns	210 sqm.
Ex river bank left undeveloped	55sqm.
Total area	530 sqm.

2.3 Derivation of Data, Surveys and Models.

2.3.1 Existing and proposed topography.

A topographic survey has been undertaken which gives the approximate following levels in maOD:

Southwest site corner:	136.00m
Southeast site corner top of bank:	c135.90m
Southeast site corner bottom of bank/river:	c134.10m
Northwest site corner:	135.58m
Northeast site corner top of bank:	c135.45m
Northeast site corner bottom of bank/river:	c133.90m

Manhole cover levels at road level central to the Site are around 135.55m aOD.

The river bed is approximately 133.80m aOD central to the Site.

2.3.2 Geology.

BGS Maps record the superficial cover to be hummocky (moundy) glacial deposits, Devensian - Diamicton.

HR Wallingford hydraulic records indicate the soil type as being Class 1.

2.3.3 Drainage Surveys.

N/A – not yet undertaken.

2.3.4 Sewer Undertaker Records.

United Utilities drainage records for the local area indicate a 525mm combined sewer & a 225mm surface water sewer flowing north in Platting Lane.

Within the Site is a 225 diameter surface water sewer which discharges to the watercourse bordering the east site boundary.

There is also a 225 diameter combined sewer just within the south site boundary. This has a combined sewer overflow to the surface water outfall connection with the watercourse.

The building development footprints are outside the 3m easements required by United Utilities.

2.3.5 BGS Borehole Records.

The closest boreholes to the Site are approximately 175m south. Geology recorded was as follows:

0-1250 MADE GROUND (sand & gravel).

1250-2900 Med dense silty SAND & GRAVEL.

2900-4950 Med dense silty medium SAND.

4950-6300 Soft silty CLAY.

2.3.6 Site Investigations.

A single investigation has been undertaken to date on the 18th December 2024. The Investigations were undertaken by T J Booth Associates and comprised 3No. trial holes (THs 1-3), excavated with a 1.5t back actor.

In summary the Site is underlain by up to approximately 1m of sand & gravel MADE GROUND, with between 500-700mm virgin SAND beneath, and SAND & GRAVEL recorded below to a max depth of around 2m.

No groundwater was noted in any of the trial holes.

The Trial Hole Logs & Site Investigation Plan are in the Appendix.

Infiltration testing was undertaken in THs 1 & 3. The testing methodology was undertaken in accordance with BRE365, and comprised 3 separate tests (each hole), and an infiltration test rate obtained for each. The worst-case infiltration result obtained of all tests undertaken was used as the basis for soakaway design.

Summary data including the design infiltration coefficient is tabulated below (full calculations in the Appendix):

soakaway test		as per BRE Digest 365	
client	B&L Homes		
project	Platting Lane		
date	18.12.2024		
TH1			
TEST	DATE	INFILTRATION RATE	
		m/s	m/hr
TEST 1	18.12.2024	1.0E-04	3.8E-01
TEST 2	18.12.2024	8.9E-05	3.2E-01
TEST 3	18.12.2024	8.5E-05	3.0E-01
Design infiltration rate		8.5E-05	3.0E-01
TH3			
TEST	DATE	INFILTRATION RATE	
		m/s	m/hr
TEST 1	18.12.2024	9.8E-05	3.5E-01
TEST 2	18.12.2024	1.0E-04	3.7E-01
TEST 3	18.12.2024	8.0E-05	2.9E-01
Design infiltration rate		8.0E-05	2.9E-01
		m/s	m/hr
Overall Design infiltration rate (THs1 & 3)		8.0E-05	2.9E-01

2.3.7 Landmark Records.

Not obtained.

3 Drainage Strategy.

3.1 Drainage.

The Site will be assessed in accordance with the national drainage hierarchy for surface water disposal & exceedance characteristics, also considering the proposed end adopters and their requirements.

Regarding Site assessment, this report will appraise the existing and local drainage infrastructure, assess the suitability of the proposed development, giving recommendations for drainage design & management, specifically for approval of the LLFA/EA/sewerage undertakers, as applicable.

Drainage from new developments is to be designed to follow the national drainage hierarchy for surface water discharge to the following networks in order of preference:

- infiltration.
- Watercourse.
- surface water sewer.
- combined sewer.

Flow rates (existing & proposed) are to be estimated for approval using the following methodology:

- Development should aim to deliver greenfield runoff on greenfield sites up to a 100yr rainfall event, considering climate change.
- Development should aim for a minimum reduction in surface water runoff rates of 50% for Brownfield sites on a 1yr rainfall event.
- Development should be designed so that there is no flooding to the development in a 30yr event, and so that there is no property flooding in a 100yr event considering climate change.

3.2 Existing Site rainfall & drainage systems.

There is no known Site drainage apart from the United Utilities services.

Local rainfall characteristics are as follows:

SAAR (mm) 	1137
M5-60 rainfall depth (mm) 	20 
'r' ratio M5-60 / M5-2day 	0.3 
FEH/FSR conversion factor 	1.12
Hydrological region 	10
Specify SOIL type 	1 
SPR 	0.1

DESIGN RAINFALL 1YR (THE WALLINGFORD PROCEDURE)

Design rainfall in accordance with the Wallingford Procedure

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = 30 min
Return period	Period = 1 yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = 0.300
5-year return period rainfall of 60 minutes duration	M5_60min = 20.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.77
Rainfall for 30min storm with 5 year return period	M5_30min _i = Z1 ' M5_60min = 15.4 mm
Factor Z2 (Wallingford procedure)	Z2 = 0.62

Rainfall for 30min storm with 1 year return period
Design rainfall intensity

$$M1_{30min} = Z2 \cdot M5_{30min_i} = \mathbf{9.6 \text{ mm}}$$

$$I_{max} = M1_{30min} / D = \mathbf{19.1 \text{ mm/hr}}$$

DESIGN RAINFALL 30YR (THE WALLINGFORD PROCEDURE)

Design rainfall in accordance with the Wallingford Procedure

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area

Storm duration

Return period

Ratio 60 min to 2 day rainfall of 5 yr return period

5-year return period rainfall of 60 minutes duration

Increase of rainfall intensity due to global warming

Factor Z1 (Wallingford procedure)

Rainfall for 30min storm with 5 year return period

Factor Z2 (Wallingford procedure)

Rainfall for 30min storm with 30 year return period

Design rainfall intensity

Other

D = **30 min**

Period = **30 yr**

r = **0.300**

M5_60min = **20.0 mm**

p_{climate} = **0 %**

Z1 = **0.77**

M5_30min_i = Z1 · M5_60min = **15.4 mm**

Z2 = **1.53**

M30_30min = Z2 · M5_30min_i = **23.5 mm**

I_{max} = M30_30min / D = **47.1 mm/hr**

DESIGN RAINFALL 100YR (THE WALLINGFORD PROCEDURE)

Design rainfall in accordance with the Wallingford Procedure

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area

Storm duration

Return period

Ratio 60 min to 2 day rainfall of 5 yr return period

5-year return period rainfall of 60 minutes duration

Increase of rainfall intensity due to global warming

Factor Z1 (Wallingford procedure)

Rainfall for 30min storm with 5 year return period

Factor Z2 (Wallingford procedure)

Rainfall for 30min storm with 100 year return period

Design rainfall intensity

Other

D = **30 min**

Period = **100 yr**

r = **0.300**

M5_60min = **20.0 mm**

p_{climate} = **0 %**

Z1 = **0.77**

M5_30min_i = Z1 · M5_60min = **15.4 mm**

Z2 = **1.99**

M100_30min = Z2 · M5_30min_i = **30.7 mm**

I_{max} = M100_30min / D = **61.4 mm/hr**

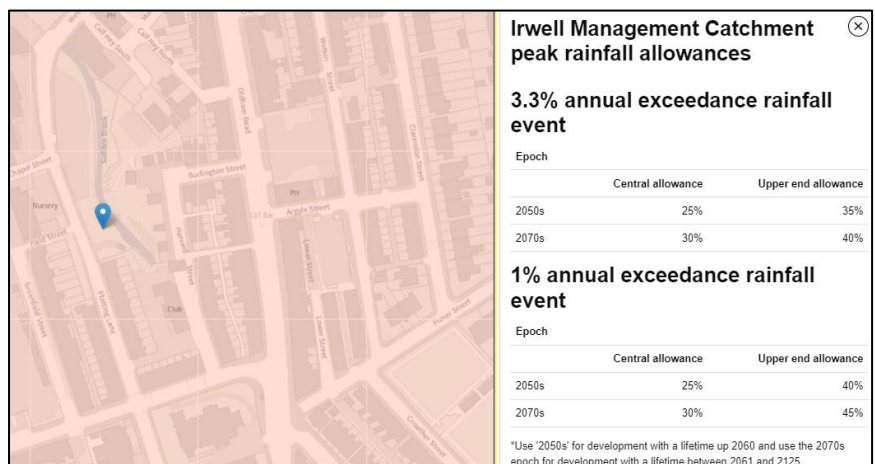
3.3 Rainfall Climate Change Impacts.

Climate change allowances to peak rainfall intensity are given nationally across the whole of England, based upon river management catchment areas. Refer to graphic inset:

Given the proposed residential Site end use, the 2070s epoch is considered suitable for climate change allowance estimation which suggests the following allowance to be used:

30yr rainfalls +40% climate change allowance.

100yr rainfalls +45% climate change allowance.



3.4 Proposed Surface Water Drainage.

3.4.1 Infiltration.

BGS maps suggest the Application Site is underlain by hummocky glacial deposits which usually comprise clay in the local area. However, local borehole records suggested there are sand and gravel/sand deposits locally.

Infiltration testing has been undertaken on the site subsoil, and infiltration rates have been obtained that are suitable for surface water disposal. The redesign of the Site in accordance with the LPA has facilitated this design ensuring enough space from foundations, and associated boundaries required by building control.

Areas such as driveways, pathways and patios, may be of permeable construction with shallow subbase storage to mimic the greenfield runoff of local Soils more naturally.

Soakaways are to be used for the roof areas only, comprising 2No separate 900dia perforated manholes with surrounding coarse stone fill.

All garden areas and soft landscaping will drain via natural infiltration (ie greenfield).

Refer to separate drainage design drawing ref: dwg-tjba-B&L-platting In-drainage plan & details-rev0. Associated infiltration coefficient calculations as well as the proposed microdrainage soakaway calculations can be found in the Appendix.

3.4.2 Watercourse.

Not required.

3.4.3 SW Sewer.

Not required.

3.4.4 Combined Sewer.

Foul water connections only.

3.5 Proposed Foul Water Drainage.

The existing combined sewer within the Site should be used for foul drainage connection.

A simple junction connection will be required to the United Utilities system.

3.6 Adoption.

The drainage systems drainage will remain private.

3.7 Maintenance.

Maintenance of suds will be private.

4 Flood Risk Assessment.

4.1 Reference.

Flood Risk Assessments are required for the following Sites:

- *Sites in areas at risk of flooding*
- *Sites of 1 hectare (Ha) or more.*

The Application Site is approximately 450sqm (0.045Ha), but Sudden Brook forms the east boundary. While flood zone 3 remains within the banks of the river, the Application Site is covered by flood zone 2, and thus triggers the requirement for a Flood Risk Assessment under the Town & Country Planning system.

National Planning Policy Framework and the Planning Practice Guidance (flood risk & coastal change notes).

Flood zone 2 is defined as land assessed as having between a 1:100 & 1:1000 or greater annual probability of river flooding (0.1-1%) in any year (land shown in light blue on the EA flood map). Flood zone 3 is defined as land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) in any year (land shown in dark blue on the EA flood map). Flood zone 1 comprises all areas outside of flood zones 2 & 3.

The Planning Practice Guidance indicates the flood risk vulnerability classification (Table 2) for the Application Site end use to be 'more vulnerable'. The flood risk 'vulnerability' and flood zone 'compatibility' matrix (Table 3) indicates that 'more vulnerable' development is acceptable in flood zone 2.

4.2 Existing Fluvial & Surface Water System.

In the wider area, land elevation falls to the north, ultimately towards the River Roch of which Sudden Brook is a tributary.

Sudden Brook is culverted through much of the local area, but remains as an open watercourse from the south Site boundary to approximately 75m north where it re-enters a culvert beneath Platting Lane.

In exceedance level events, when the river becomes inundated with flood waters, eventually the banks are overtopped and the resulting flood water moves onto the Site and northwards.

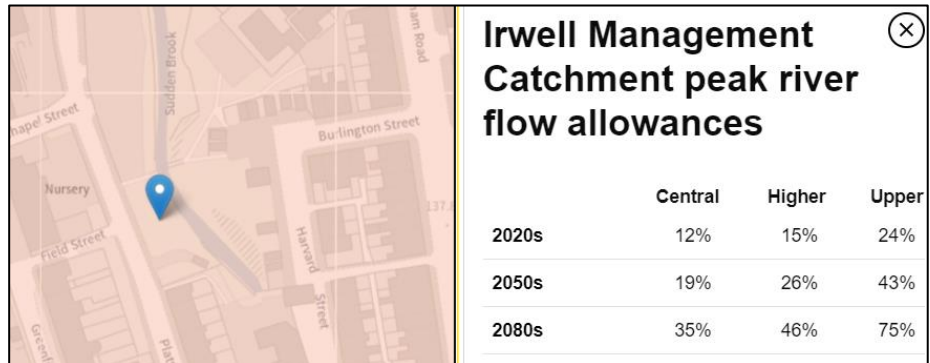
4.3 Proposed Fluvial & Surface Water System.

Site infiltration & SUDS will ensure the proposed construction will not have a negative effect on the fluvial system.

4.4 River Catchment Climate Change Impacts.

As identified in Section 1, the vulnerability of the development is 'more vulnerable'.

The Planning Flood Maps designate the Site as being within flood zone 2. EA guidance specifies climate change allowances by management catchment areas specific to the catchment the Application Site is within. Peak flow river maps have been produced which specify the climate change allowances to be used in a flood risk assessment:



EA guidance indicates the peak flow rates that should be used for the vulnerability classification:

- essential infrastructure – use the higher central allowance.
- highly vulnerable – use central allowance (development should not be permitted in flood zone 3a).
- more vulnerable – use the central allowance.
- less vulnerable – use the central allowance.
- water compatible – use the central allowance.

Given the more vulnerable development risk category, the central allowance climate change multiplier should be used as the basis for assessment.

As the Application Site is to be used for a residential end use, maximum development lifetimes apply, and the '2080s' timeline is appropriate.

Comparing the '2080s' timeline with the central allowance from the peak river flow allowances above, suggests a 35% climate change allowance on the 100yr flood event, which will form the design flood level.

4.5 Fluvial Morphological Impacts.

The proposed development will not impact fluvial morphology.

4.6 Potential Sources of Flooding.

- Fluvial flooding from main rivers.

Environment Agency Product 4 data has been obtained for the local area.

The Site lies in close proximity to Node 7 on the EA flood map with Node 6 approx 75m north of the Site on re-entrance to the culvert beneath Platting Lane. Below are flood levels tabulated for Nodes 6 & 7 for critical flood events:

Sudden Brook Undefended flood model			
Node	100yr level	100yr+35% level	1000yr level
6	134.79m aOD	135.89m aOD	137.34m aOD
7	134.88m aOD	135.88m aOD	137.34m aOD

The flood levels show the 100yr flood event is still within bank, however, the 100yr+35% design flood level is approximately 100mm above existing average ground level.

b. Surface water flood maps.

The Environment Agency surface water flood maps are currently in the process of being replaced.

In some areas, the maps give a similar but less specific account of flooding as the Product 4 river models with a wider band of potential flood depths, which appears to be the case in the local area.

The flood outlines appear to be approximately consistent with the river flood models, with flood depth outlines following local watercourses and subsequent overtopping events.

Given the similarity & reduced accuracy of the surface water flood maps compared to the official Product 4 flood data, it is suggested the surface water maps should not be used.

c. Artificial Watercourse/Canals.

None noted in the local area.

d. Springs and high groundwater levels.

None noted.

e. Surcharging of local drainage & sewerage systems.

No evidence of sewer surcharging in the local area.

f. Reservoirs.

No flood risk from reservoirs in the local area.

4.7 Design.

Environment Agency guidelines indicate a 300mm freeboard will be acceptable on the 100yr+climate change flood level provided there is a high level of certainty around the proposed level. Given the flood levels have been obtained from the Environment Agency Product 4 flood models, the certainty of the flood levels are considered to be high.

Therefore, with a 100yr+35% design flood level of 135.88m aOD having been identified for the Site, the finish floor levels should be set at no less than 136.18m aOD.

4.8 Emergency Evacuation Plan.

4.8.1 Emergency Plan.

The Adept/Environment Agency guidelines indicate the requirements for flood risk emergency plans (EP) for new development. An EP would generally contain the following sub-sections:

- Section 1. Scope, Objectives and Background.
- Section 2. Location and Proposal.
- Section 3. Risk Summary.
- Section 4. Mitigation Measures.
- Section 5. Flood Warnings and Associated Actions.
- Section 6. Safe Access and Escape.
- Section 7. Temporary Refuge.
- Section 8. After the Flood.
- Section 9. List of Roles.
- Section 10. Plan Upkeep and Awareness.

As the FRA has already discussed Sections 1-4, the Emergency Plan will start at Section 5.

4.8.2 Section 5. Flood Warnings and Associated Actions.

The Site is within a flood warning area, and residents will be able to sign up and get advanced warning of potential fluvial flood events, refer to associated Flood Warning Map below:



4.8.2.1 Flood Information Service.

Dwellings or businesses in England can sign up for the Environment Agency free flood alert service by phone, email or text message, if either homes or businesses are at risk of flooding.

The Site is within the Environment Agency Flood Warning Area and it is strongly advised that the Owner must sign up to receive flood warnings via the Environment Agency Flood Information Service.

The current & simple flood alert/warnings guidance used by the Environment Agency, including an easy-to-understand statement of the following:

- PREPARE.
- ACT.
- SURVIVE.

The Flood Information Service can be found on the internet using the following URL: <https://flood-warning-information.service.gov.uk/warnings>.

See inset graphic below for additional general details what is required for each warning stage.

Flood alert - Prepare



- prepare a bag that includes medicines and insurance documents
- check flood warnings

Flood warning - Act



- turn off gas, water and electricity
- move things upstairs or to safety
- move family, pets and car to safety

Severe flood warning - Survive



- call 999 if in immediate danger
- follow advice from emergency services
- keep yourself and your family safe

4.8.2.2 Floodline.

Alternatively, people at risk from flooding and without access to the internet can register for flood alert warnings & get in touch by calling Floodline on telephone: 0345 988 1188 OR Type talk: 0345 602 6340 (for the hard of hearing), which is a 24hr service.

For flood alerts/warnings, people will need to provide the following information:

- the address to be registered.
- a phone number for the person or people requesting the service can be contacted on 24hrs a day.
- an email address for the person or people requesting the service.

4.8.2.3 *Flood Wardens.*

Flood Wardens operate in some areas to provide alerts to the local community when flood warnings are issued. Contact Floodline on 0845 988 1188 to find out if this service is available in the area.

4.8.2.4 *Sirens/Loudhailers.*

Sirens/loudhailers operate in some areas at risk from extreme flooding to alert residents that a flood warning is in force. Contact Floodline on 0845 988 1188 to find out if this service is available in the area.

4.8.2.5 *General Media.*

Media such as the Flood Information Service website details maps and current (up-to-date) area specific advice for all areas of England, including the type of flooding and flood alert/warning level in force for those areas. Other websites such as the Met Office have their own flood alert service. TV & radio news channels give warnings.

4.8.3 *Section 6. Safe Access and Escape.*

In flood risk areas, safe access and egress from new developments should be in accordance with the Adept EP guidance, and that of the referenced background documentation Defra/EA R&D Technical Report FD2320/TR2 and should be in the following order of preference:

- Safe dry route for people and vehicles.
- Safe dry route for people.
- If a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause a risk to people.
- If a dry route for vehicles is not possible, a route for vehicles where the flood hazard (in terms of depth and velocity of flooding) is low to permit access for emergency vehicles. However, the public should not drive vehicles in floodwater.

The Application Site is within flood zone 2, and access to flood zone 1 is accessible by foot nominally 25m south of the Site along Platting Lane.



The Environment Agency guidance is clear: when a flood alert to PREPARE is issued, preparations should be enacted in case a further flood warning to ACT is given, and business owners should be ready for this scenario.

When a flood warning to ACT is issued, people should follow instructions to evacuate as per the above Emergency Evacuation Route Plan - assuming a flood event could be imminent.

DRIVING OR PEDESTRIAN MOVEMENTS SHOULD NOT BE ATTEMPTED THOROUGH FLOOD WATERS.

4.8.4 Section 7. Temporary Refuge.

All finished floor levels are specified above the design flood level, so temporary refuge is not required.

If flood advice is required in an emergency, the Environment Agency has specially trained Flood Support Officers who provide information and advice during and after floods. Call Floodline (24-hour service) on 0345 988 1188 or type-talk (for the hard of hearing) on 0345 602 6340 to find out if they are active in the local area.

4.8.5 Section 8. After the Flood.

Clean-up information & procedures if required following an extreme storm event are as follows:

- Contact your insurance company.
- Cleaning and repairing the property.
- Specialist advice will likely be required and may need to be undertaken in accordance with insurance company requirements.
- Photographs to document damage and record the flood water height.
- Flood water can be hazardous and contain sewage, chemicals, and animal waste. Care should be taken with personal protective equipment.
- Contact the local council about disposing of large flood damaged items.
- Stay healthy – ensure services are running properly and potable water does not have a change in colour, taste or smell. Ensure food touched by flood water is disposed of.
- Get help via Floodline if required.
- Get emotional support if required from family, friends, GP, or charity organisations.
- Apply for financial aid if required. Apply to the local council for eligibility.

4.8.6 Section 9. List of Roles.

It is the owner's responsibility to follow this EP and keep up to date with current flood warning advice.

4.8.7 Section 10. Plan Upkeep and Awareness.

The owner should ensure they are familiar with the Evacuation Plan and procedures, and keep up to date with latest Environment Agency Guidance.

5 Conclusion & Residual risks.

5.1 Drainage.

The Application Site & buildings are safe from fluvial flooding up to and including a 100+35% design flood event.

Access & egress routes are available to proposed Site users.

A minimum floor level of 136.18m aOD should apply to all Site buildings which is 300mm above the 100yr+35% flood level.

As long as this guidance is followed, no other residual risks remain.

Initial assessment of drainage proposals has been put forward for preliminary approval, and detailed design can be sought by Planning by way of condition if required.

5.2 Compliance with Drainage & Flood Officer Summary:

LLFA Consultation queries in red, TJBA FRA responses to consultation in black for ease.

- 1. Although the applicant has submitted a Flood Risk Assessment and Drainage Strategy (FRA&DS), additional details are required. The proposals should incorporate a layout drawing indicating the proposed drainage layout, cover and invert levels, pipe sizes etc and supported by infiltration testing.*

Drainage layout provided, ref: dwg-tjba-B&L-platting In-drainage plan & details-rev1. Excerpt in sect 6.4.

Associated infiltration coefficient calculations as well as the proposed Microdrainage soakaway calculations can be found in the Appendix, sect 6.5.

- 2. There appears to be public sewers crossing through the site which are not shown on the layouts or discussed in the report.*

These were commented on and the UU plans included in both the original & updated reports, sects 2.3.4 & 6.7.

The building development footprints are outside the 3m easements required by United Utilities.

3. *The aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable: The ordered drainage techniques to be assessed with the aim to reduce or omit lower techniques:*

- *Control at Source (Infiltration / Recycling).*
- *On Site Treatment (Basins, Swales, Rain gardens, Tree pits).*
- *Local Treatment (Adoptable Ponds, Basins, Swales etc).*
- *Regional Treatment (ditto usually to a larger scale).*
- *Discharge to Watercourses / Bodies.*
- *Discharge to SW Sewers.*
- *Discharge to Combined Sewers.*

Detailed design has been undertaken as requested which includes all surface water being infiltrated at source.

4. *The FRA&DS references a borehole located approx. 175m from the site, indicating sand and gravel conditions. However, the British Geological Survey (BGS) records identify glacial till and clay deposits which does not appear to be consistent with the borehole data. It is considered that the desk top appraisal is not sufficient to reliably draw conclusions about the site's ground conditions, detailed and further site-based investigations are required.*

Site investigation undertaken confirming similar ground conditions to the local borehole. The site has suitable permeable subsoil as indicated in the revision 0 report, see Site Investigation sect 2.3.6.

5. *The applicant's justification for not using soakaways is insufficient. The arguments about insufficient space are not acceptable. There appears to be a reasonable amount of space around the site and the north end is a footpath and then a carpark. Therefore, it may be feasible to encroach within 5m of the boundary. Or perhaps a redesign to reduce the build footprint should be considered.*

N/A – No longer relevant due to layout changes & subsequent detailed design/infiltration at source.

6. *The riverbank does not appear to be a steep embankment and presumably the rain falling on the site currently find its way to the river. The proposals should seek to mimic the existing regimes as much as possible.*

N/A – No longer relevant due to detailed design/infiltration at source.

7. *If traditional soakaway design is found not be feasible then shallow diffuse options &/or hybrid options should be considered.*

N/A – No longer relevant due to detailed design/infiltration at source.

8. *The applicant's design feasibility is based on a 1-in-100-year storm event with a 45% allowance for climate change, which is appropriate for peak rainfall. Additionally, the applicant's use of a 35% allowance for peak river flow is appropriate.*

Climate change allowances have been adhered to.

9. *The proposed finished floor levels should be minimum 300mm above the highest river flood level. This does not appear to have been provided for.*

The revision 0 version of this report indicated a minimum 300mm freeboard for floor levels above the 100yr+CC river event. The minimum design finish floor level is 136.18m aOD, discussed in sect 4.7.

10. *Sudden Brook is classified as a 'main river' by the Environment Agency, the applicant must obtain an environmental permit before connecting any drainage systems to it and agreement /confirmation in principle should be provided.*

N/A – not required.

Signed.....



D.S. Slattery BSc (Hons).

T J Booth Associates.

Authorised...

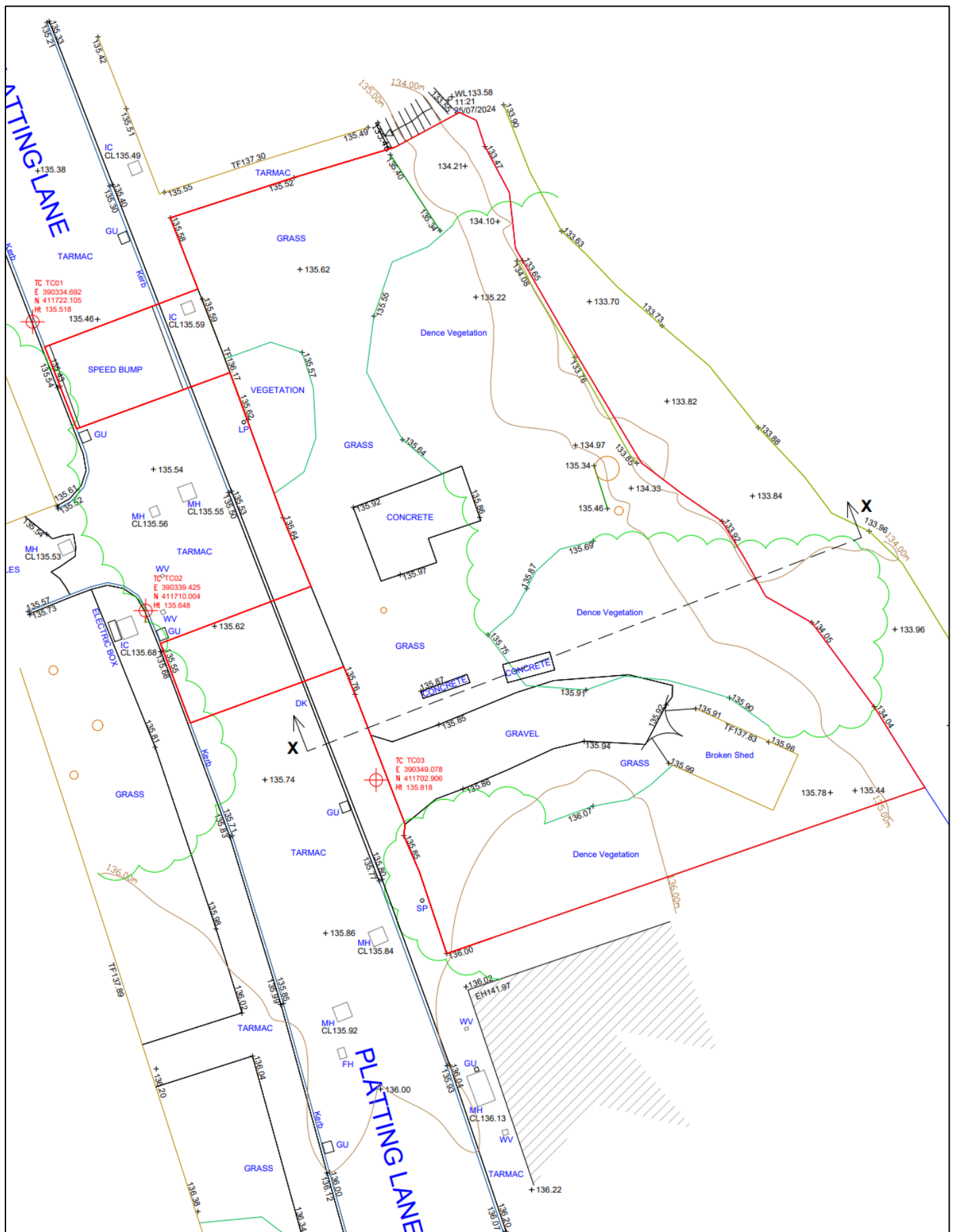


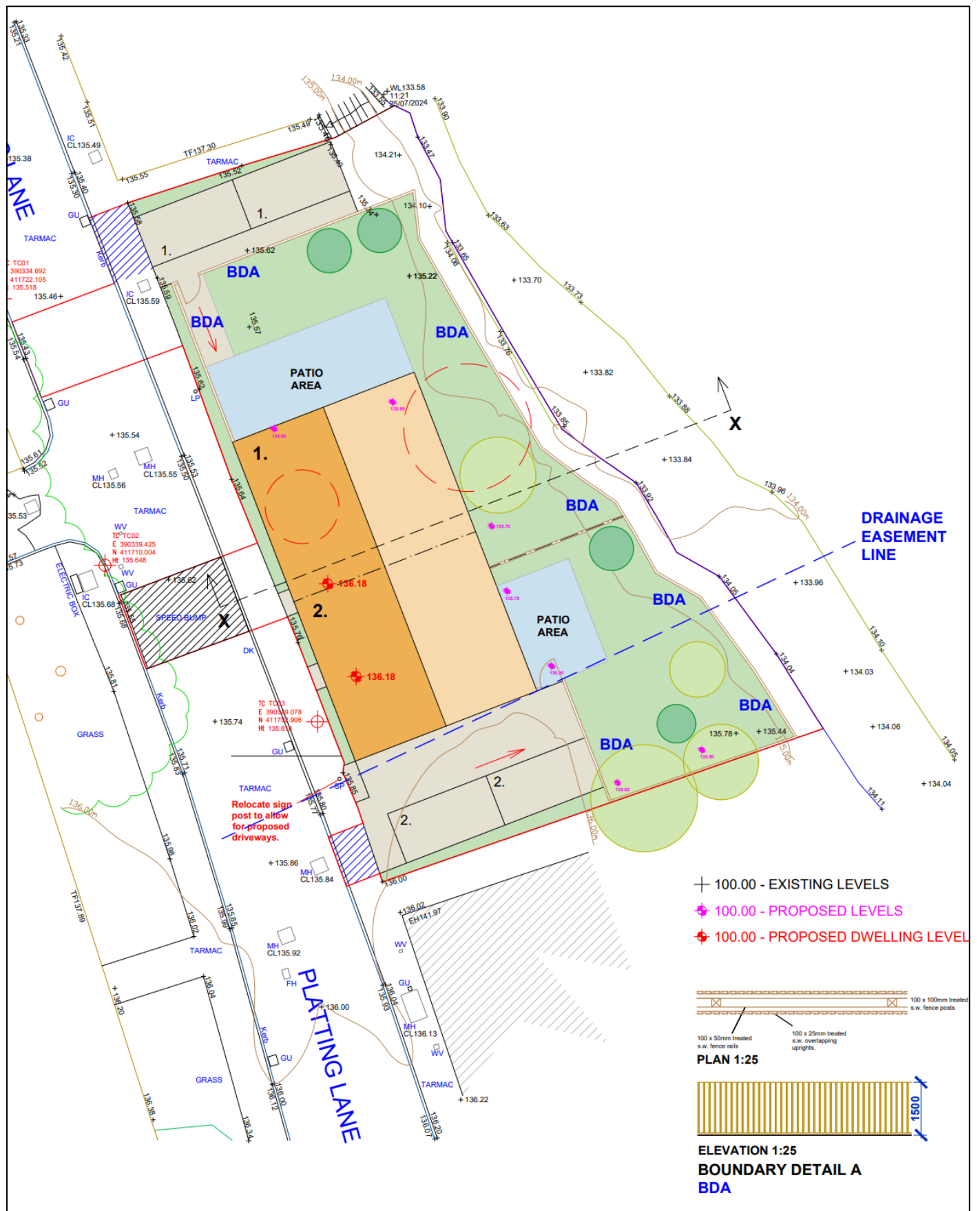
T J Booth BSc (Hons), C. Eng. C. Env. MICE.

T J Booth Associates.

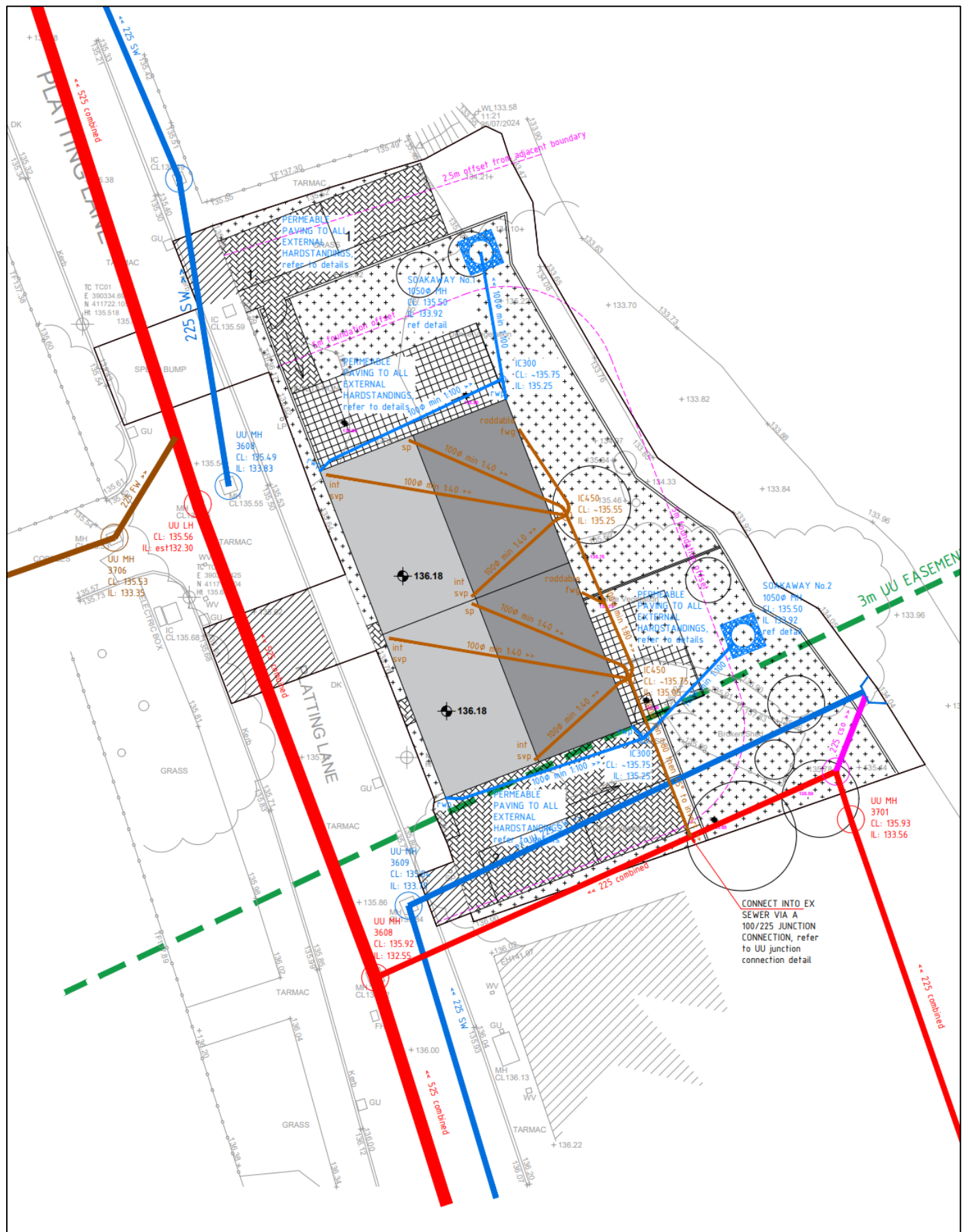
6 Appendix.**6.1 Location Plan.**

6.2 Existing Plans/Topographic Survey.



6.3 Proposed Site Plan.

6.4 Proposed Drainage Plan.



6.5 Infiltration Test & Proposed Drainage/Soakaway Calculations.**soakaway test**

as per BRE Digest 365

client B&L Homes
 project Platting Lane
 date 18.12.2024

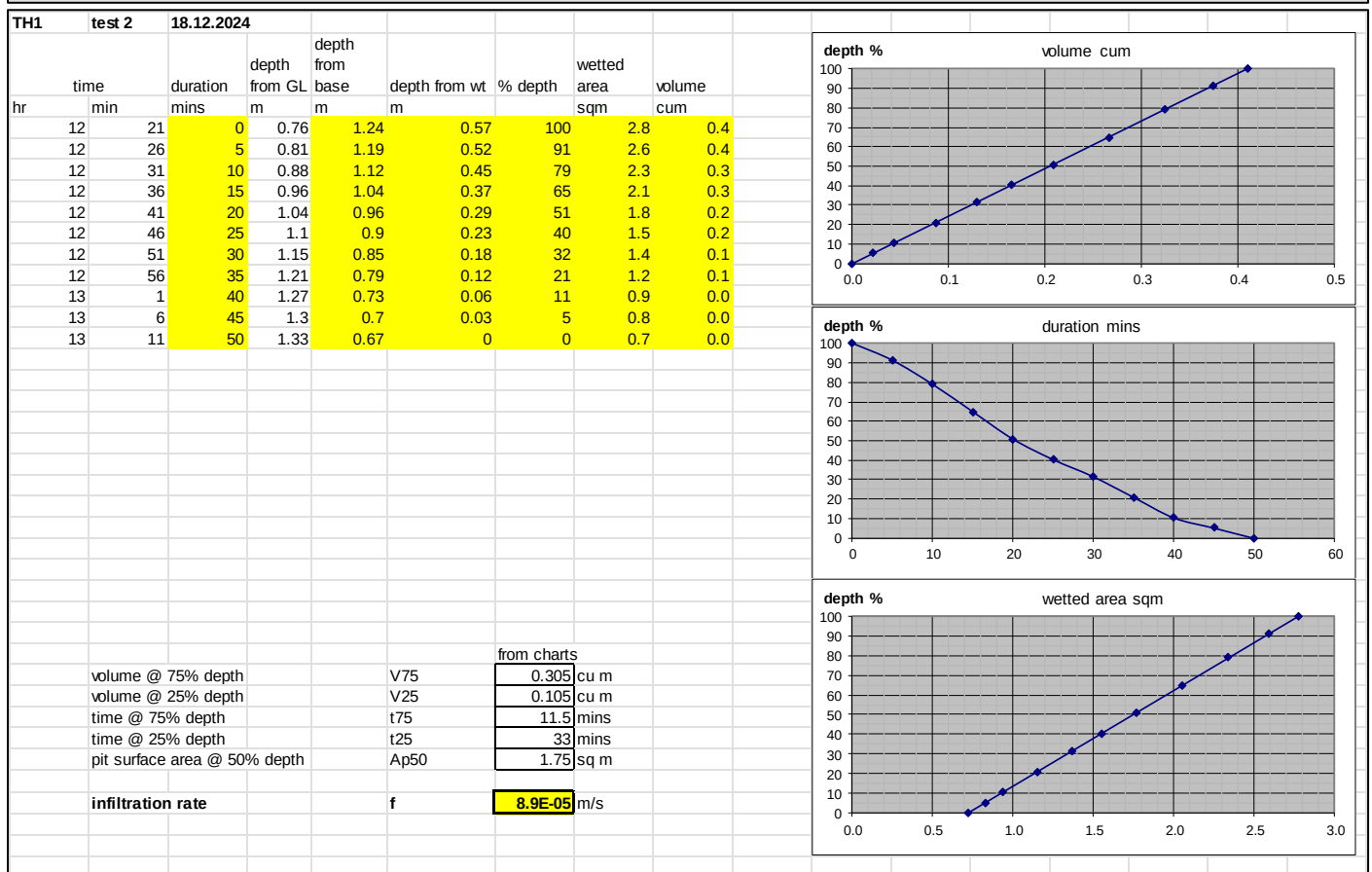
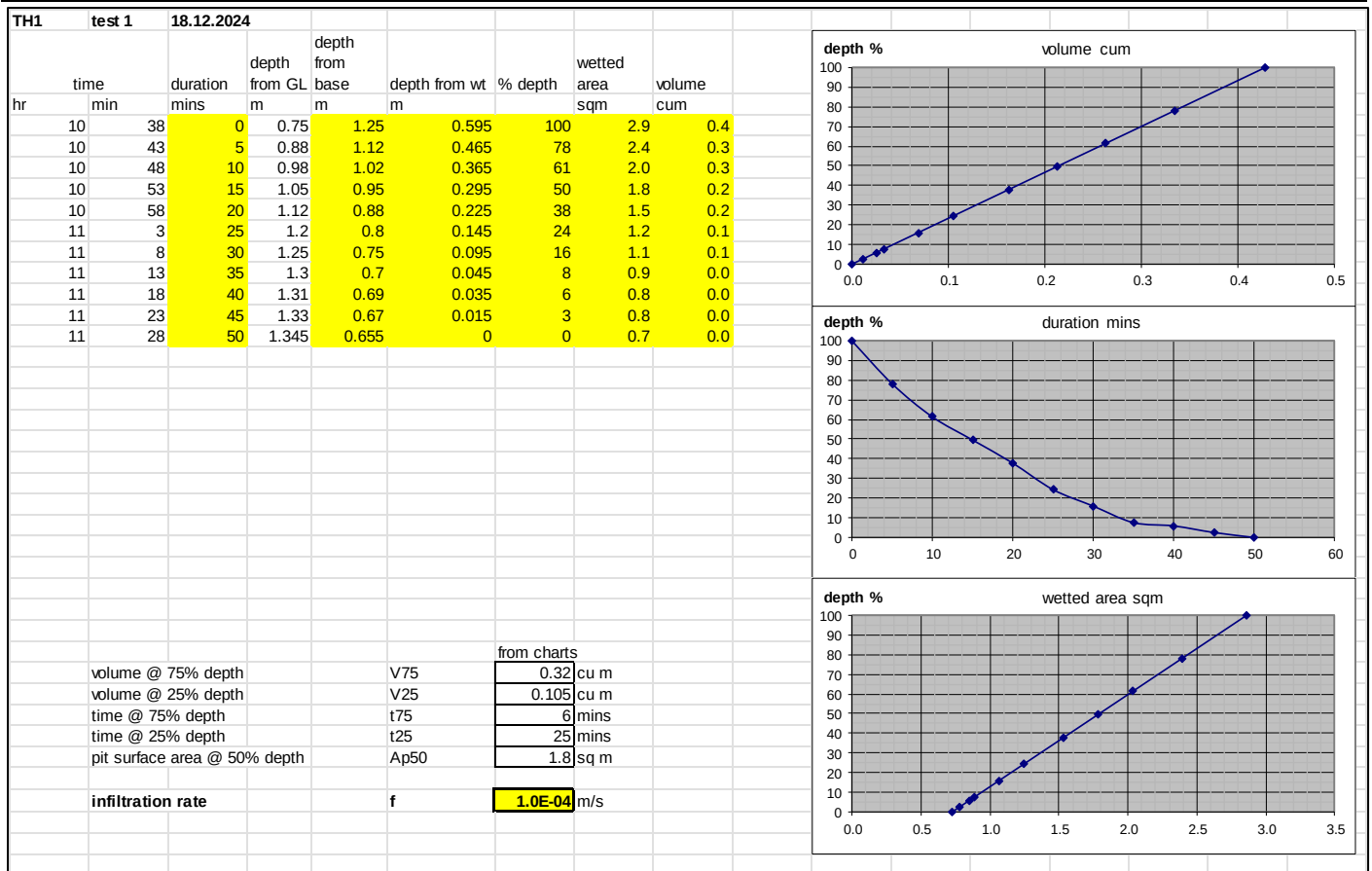
TH1

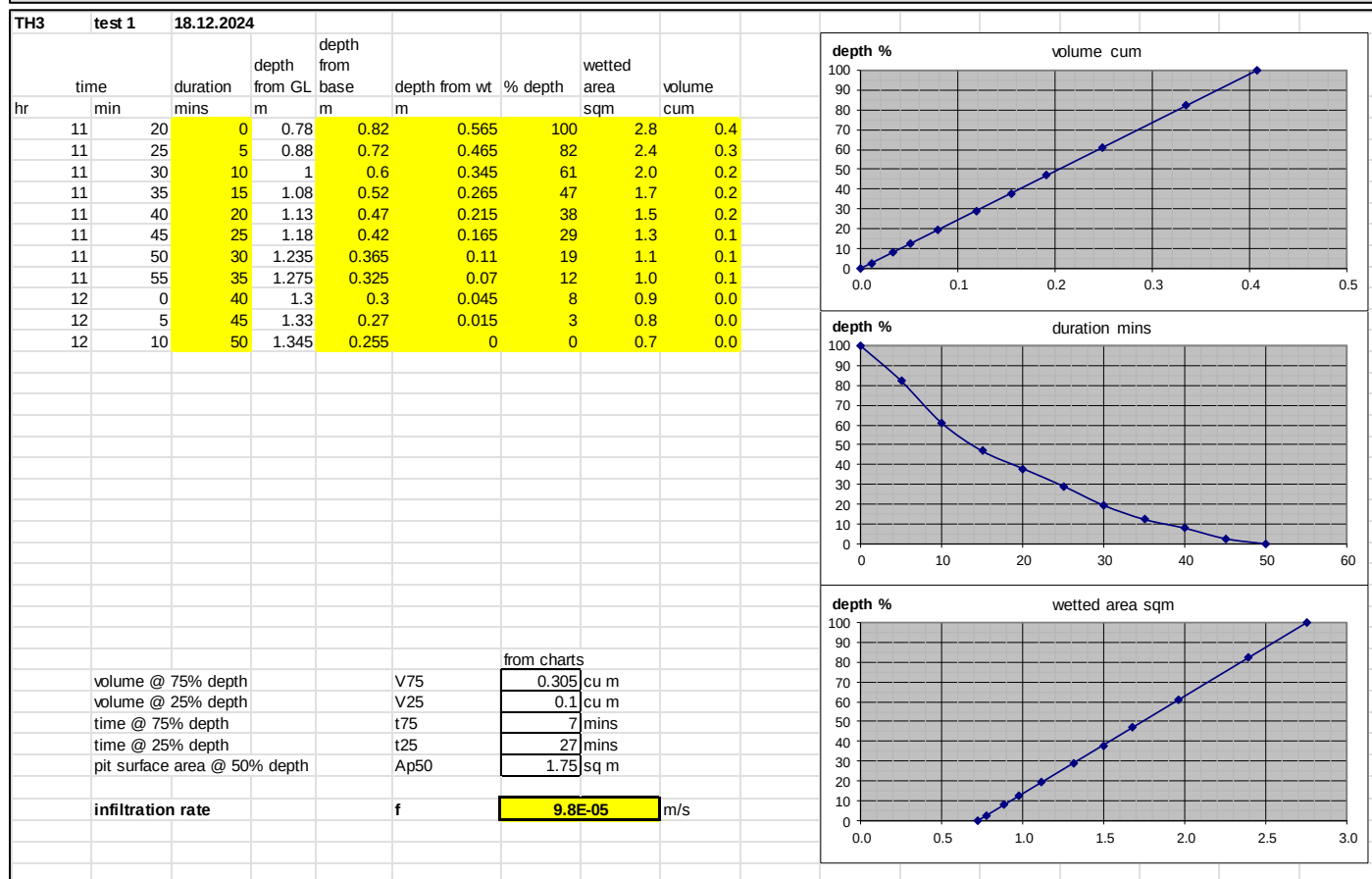
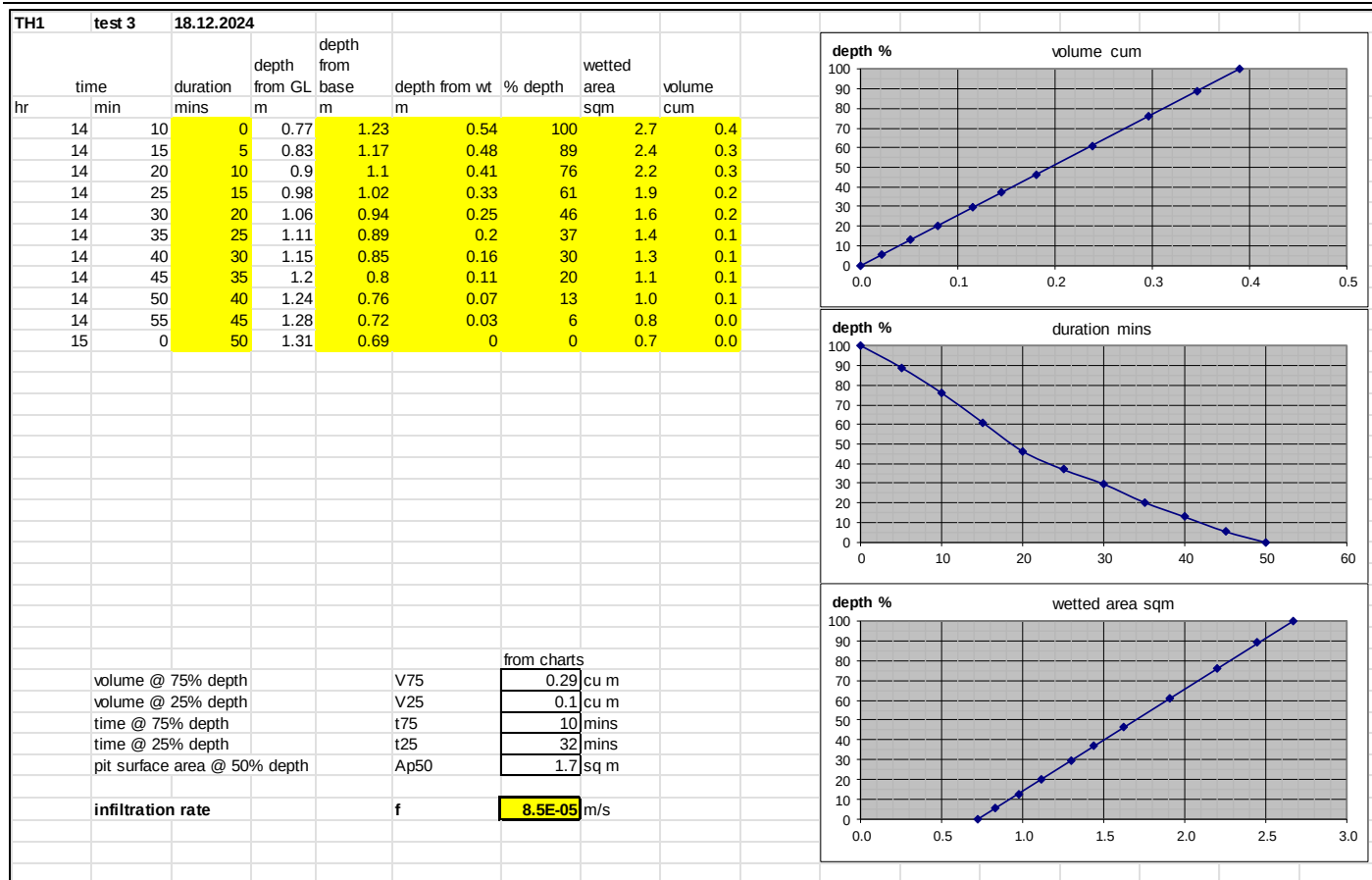
TEST	DATE	INFILTRATION RATE	
		m/s	m/hr
TEST 1	18.12.2024	1.0E-04	3.8E-01
TEST 2	18.12.2024	8.9E-05	3.2E-01
TEST 3	18.12.2024	8.5E-05	3.0E-01
Design infiltration rate		8.5E-05	3.0E-01

TH3

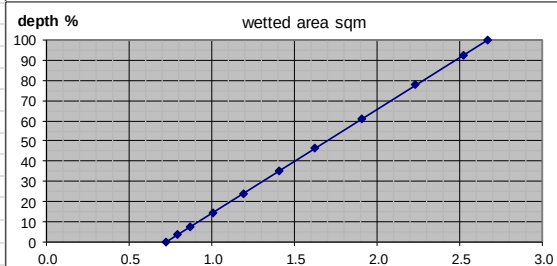
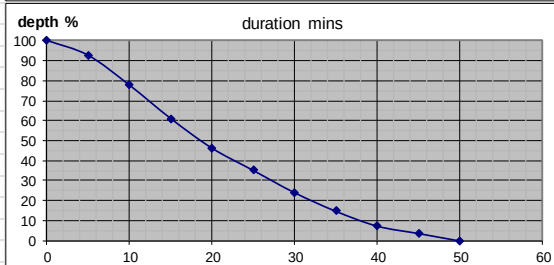
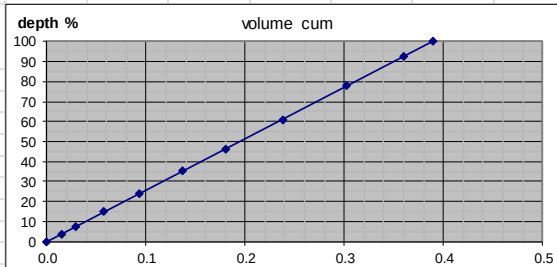
TEST	DATE	INFILTRATION RATE	
		m/s	m/hr
TEST 1	18.12.2024	9.8E-05	3.5E-01
TEST 2	18.12.2024	1.0E-04	3.7E-01
TEST 3	18.12.2024	8.0E-05	2.9E-01
Design infiltration rate		8.0E-05	2.9E-01

	m/s	m/hr
Overall Design infiltration rate (THs1 & 3)	8.0E-05	2.9E-01



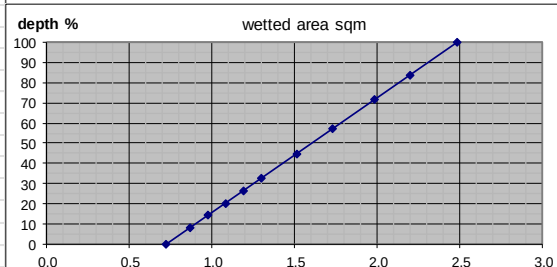
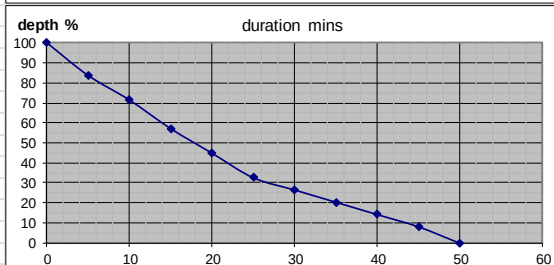
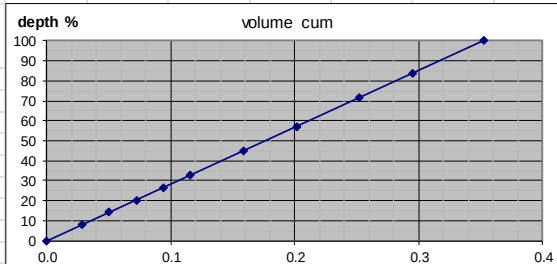


TH3		test 2	18.12.2024								
hr	time min	duration mins	depth from GL m	depth from base m	depth from wt m	% depth	wetted area sqm	volume cum			
13	10	0	0.79	0.81	0.54	100	2.7	0.4			
13	15	5	0.83	0.77	0.5	93	2.5	0.4			
13	20	10	0.91	0.69	0.42	78	2.2	0.3			
13	25	15	1	0.6	0.33	61	1.9	0.2			
13	30	20	1.08	0.52	0.25	46	1.6	0.2			
13	35	25	1.14	0.46	0.19	35	1.4	0.1			
13	40	30	1.2	0.4	0.13	24	1.2	0.1			
13	45	35	1.25	0.35	0.08	15	1.0	0.1			
13	50	40	1.29	0.31	0.04	7	0.9	0.0			
13	55	45	1.31	0.29	0.02	4	0.8	0.0			
14	0	50	1.33	0.27	0	0	0.7	0.0			



volume @ 75% depth	V75	0.29	cu m
volume @ 25% depth	V25	0.1	cu m
time @ 75% depth	t75	11	mins
time @ 25% depth	t25	29	mins
pit surface area @ 50% depth	Ap50	1.7	sq m
infiltration rate	f	1.0E-04	m/s

TH3		test 3	18.12.2024								
hr	time min	duration mins	depth from GL m	depth from base m	depth from wt m	% depth	wetted area sqm	volume cum			
15	0	0	0.81	0.79	0.49	100	2.5	0.4			
15	5	5	0.89	0.71	0.41	84	2.2	0.3			
15	10	10	0.95	0.65	0.35	71	2.0	0.3			
15	15	15	1.02	0.58	0.28	57	1.7	0.2			
15	20	20	1.08	0.52	0.22	45	1.5	0.2			
15	25	25	1.14	0.46	0.16	33	1.3	0.1			
15	30	30	1.17	0.43	0.13	27	1.2	0.1			
15	35	35	1.2	0.4	0.1	20	1.1	0.1			
15	40	40	1.23	0.37	0.07	14	1.0	0.1			
15	45	45	1.26	0.34	0.04	8	0.9	0.0			
15	50	50	1.3	0.3	0	0	0.7	0.0			



volume @ 75% depth	V75	0.26	cu m
volume @ 25% depth	V25	0.09	cu m
time @ 75% depth	t75	9	mins
time @ 25% depth	t25	31	mins
pit surface area @ 50% depth	Ap50	1.6	sq m
infiltration rate	f	8.0E-05	m/s

T J Booth Associates		Page 1
104 Yorkshire St Rochdale Lancashire OL16 1JY	individual soakaway B&L Homes Platting Lane	
Date feb 2025 - rev1 File CALC-T~1.SRC	Designed By ds Checked By	
Micro Drainage	Source Control W.10.4	

Summary of Results for 1 year Return Period

Half Drain Time : 18 minutes

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m ³)	Status
15 Summer	0.2	0.2	134.0578	0.1378	0.3	O K
30 Summer	0.2	0.2	134.0802	0.1602	0.3	O K
60 Summer	0.2	0.2	134.0892	0.1692	0.3	O K
120 Summer	0.2	0.2	134.0768	0.1567	0.3	O K
180 Summer	0.2	0.2	134.0587	0.1388	0.3	O K
240 Summer	0.2	0.2	134.0397	0.1198	0.2	O K
360 Summer	0.2	0.2	134.0083	0.0883	0.2	O K
480 Summer	0.2	0.2	133.9863	0.0663	0.1	O K
600 Summer	0.2	0.2	133.9722	0.0523	0.1	O K
720 Summer	0.1	0.1	133.9668	0.0467	0.1	O K
960 Summer	0.1	0.1	133.9597	0.0397	0.1	O K
1440 Summer	0.1	0.1	133.9507	0.0307	0.1	O K
2160 Summer	0.1	0.1	133.9442	0.0242	0.0	O K
2880 Summer	0.1	0.1	133.9402	0.0203	0.0	O K
4320 Summer	0.0	0.0	133.9357	0.0158	0.0	O K
5760 Summer	0.0	0.0	133.9328	0.0128	0.0	O K
7200 Summer	0.0	0.0	133.9312	0.0113	0.0	O K
8640 Summer	0.0	0.0	133.9297	0.0098	0.0	O K
10080 Summer	0.0	0.0	133.9292	0.0093	0.0	O K
15 Winter	0.2	0.2	134.0777	0.1577	0.3	O K
30 Winter	0.2	0.2	134.1008	0.1807	0.3	O K
60 Winter	0.2	0.2	134.1042	0.1842	0.3	O K
120 Winter	0.2	0.2	134.0773	0.1572	0.3	O K
180 Winter	0.2	0.2	134.0462	0.1263	0.2	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	28.17	14
30 Summer	19.18	23
60 Summer	12.80	40
120 Summer	8.41	74
180 Summer	6.56	106
240 Summer	5.47	138
360 Summer	4.21	198
480 Summer	3.50	256
600 Summer	3.03	310
720 Summer	2.70	370
960 Summer	2.25	490
1440 Summer	1.73	734
2160 Summer	1.33	1096
2880 Summer	1.11	1468
4320 Summer	0.85	2168
5760 Summer	0.71	2848
7200 Summer	0.61	3672
8640 Summer	0.54	4400
10080 Summer	0.49	5048
15 Winter	28.17	15
30 Winter	19.18	25
60 Winter	12.80	44
120 Winter	8.41	78
180 Winter	6.56	112

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104 Yorkshire St Rochdale Lancashire OL16 1JY		individual soakaway B&L Homes Platting Lane					
Date feb 2025 - rev1 File CALC-T~1.SRC		Designed By ds Checked By					
Micro Drainage		Source Control W.10.4					
Summary of Results for 1 year Return Period							
Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status	
240 Winter	0.2	0.2	134.0177	0.0978	0.2	O K	
360 Winter	0.2	0.2	133.9772	0.0573	0.1	O K	
480 Winter	0.1	0.1	133.9648	0.0447	0.1	O K	
600 Winter	0.1	0.1	133.9592	0.0392	0.1	O K	
720 Winter	0.1	0.1	133.9547	0.0347	0.1	O K	
960 Winter	0.1	0.1	133.9492	0.0292	0.1	O K	
1440 Winter	0.1	0.1	133.9427	0.0227	0.0	O K	
2160 Winter	0.1	0.1	133.9377	0.0178	0.0	O K	
2880 Winter	0.0	0.0	133.9348	0.0148	0.0	O K	
4320 Winter	0.0	0.0	133.9312	0.0113	0.0	O K	
5760 Winter	0.0	0.0	133.9292	0.0093	0.0	O K	
7200 Winter	0.0	0.0	133.9283	0.0083	0.0	O K	
8640 Winter	0.0	0.0	133.9272	0.0073	0.0	O K	
10080 Winter	0.0	0.0	133.9267	0.0068	0.0	O K	
Storm Duration (mins)		Rain (mm/hr)	Time-Peak (mins)				
240 Winter		5.47	142				
360 Winter		4.21	198				
480 Winter		3.50	250				
600 Winter		3.03	308				
720 Winter		2.70	372				
960 Winter		2.25	490				
1440 Winter		1.73	734				
2160 Winter		1.33	1092				
2880 Winter		1.11	1436				
4320 Winter		0.85	2140				
5760 Winter		0.71	2872				
7200 Winter		0.61	3720				
8640 Winter		0.54	4264				
10080 Winter		0.49	4992				
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104 Yorkshire St
Rochdale
Lancashire OL16 1JYindividual soakaway
B&L Homes
Platting LaneDate feb 2025 - rev1
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Page 3



Micro Drainage

Source Control W.10.4

Rainfall Details

Region	ENG+WAL	Shortest Storm (mins)	15
Return Period (years)	1	Longest Storm (mins)	10080
M5-60 (mm)	20.000	Summer Storms	Yes
Ratio-R	0.300	Winter Storms	Yes
Cv (Summer)	0.750	Climate Change %	+0
Cv (Winter)	0.840		

Time / Area Diagram

Total Area (ha) = 0.007

Time	(mins)	Area
from:	to:	(ha)
0	4	0.007

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104 Yorkshire St
Rochdale
Lancashire OL16 1JYindividual soakaway
B&L Homes
Platting Lane

Page 4

Date feb 2025 - rev1
File CALC-T~1.SRCDesigned By ds
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Micro Drainage

Source Control W.10.4

Lined Soakaway Details

Infil Coef - Base (m/hr)	0.290000	Pit Multiplier	1.8
Infil Coef - Sides (m/hr)	0.290000	Number Required	1
Safety Factor	1.5	Invert Level (m)	133.920
Porosity	0.62	Cover Level (m)	135.500
Ring Diameter (m)	0.9		

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T J Booth Associates				Page 1		
104 Yorkshire St Rochdale Lancashire OL16 1JY		individual soakaway B&L Homes Platting Lane				
Date feb 2025 - rev1 File CALC-T~1.SRC		Designed By ds Checked By				
Micro Drainage		Source Control W.10.4				
Summary of Results for 30 year Return Period (+40%)						
Half Drain Time : 37 minutes						
Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
15 Summer	0.3	0.3	134.4798	0.5597	1.0	O K
30 Summer	0.4	0.4	134.6022	0.6823	1.3	O K
60 Summer	0.4	0.4	134.6783	0.7583	1.4	O K
120 Summer	0.4	0.4	134.6858	0.7658	1.4	O K
180 Summer	0.4	0.4	134.6483	0.7283	1.4	O K
240 Summer	0.4	0.4	134.6053	0.6853	1.3	O K
360 Summer	0.4	0.4	134.5253	0.6053	1.1	O K
480 Summer	0.3	0.3	134.4552	0.5352	1.0	O K
600 Summer	0.3	0.3	134.3947	0.4747	0.9	O K
720 Summer	0.3	0.3	134.3422	0.4222	0.8	O K
960 Summer	0.3	0.3	134.2562	0.3362	0.6	O K
1440 Summer	0.2	0.2	134.1362	0.2162	0.4	O K
2160 Summer	0.2	0.2	134.0282	0.1083	0.2	O K
2880 Summer	0.2	0.2	133.9733	0.0532	0.1	O K
4320 Summer	0.1	0.1	133.9583	0.0382	0.1	O K
5760 Summer	0.1	0.1	133.9507	0.0307	0.1	O K
7200 Summer	0.1	0.1	133.9462	0.0262	0.0	O K
8640 Summer	0.1	0.1	133.9433	0.0232	0.0	O K
10080 Summer	0.1	0.1	133.9408	0.0208	0.0	O K
15 Winter	0.4	0.4	134.5547	0.6348	1.2	O K
30 Winter	0.4	0.4	134.6998	0.7798	1.5	O K
60 Winter	0.4	0.4	134.7803	0.8603	1.6	O K
120 Winter	0.4	0.4	134.7673	0.8473	1.6	O K
180 Winter	0.4	0.4	134.7003	0.7803	1.5	O K
Storm Duration (mins)	Rain (mm/hr)		Time-Peak (mins)			
15 Summer	68.99		16			
30 Summer	47.08		28			
60 Summer	30.81		44			
120 Summer	19.53		80			
180 Summer	14.75		114			
240 Summer	12.05		146			
360 Summer	9.05		212			
480 Summer	7.38		276			
600 Summer	6.29		338			
720 Summer	5.52		400			
960 Summer	4.49		522			
1440 Summer	3.35		764			
2160 Summer	2.49		1124			
2880 Summer	2.02		1468			
4320 Summer	1.50		2200			
5760 Summer	1.21		2896			
7200 Summer	1.03		3664			
8640 Summer	0.90		4352			
10080 Summer	0.81		5056			
15 Winter	68.99		16			
30 Winter	47.08		29			
60 Winter	30.81		48			
120 Winter	19.53		86			
180 Winter	14.75		122			
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T J Booth Associates		Page 2
104 Yorkshire St	individual soakaway	
Rochdale	B&L Homes	
Lancashire OL16 1JY	Platting Lane	
Date feb 2025 - rev1	Designed By ds	
File CALC-T~1.SRC	Checked By	
Micro Drainage	Source Control W.10.4	

Summary of Results for 30 year Return Period (+40%)

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m ³)	Status
240 Winter	0.4	0.4	134.6322	0.7123	1.3	O K
360 Winter	0.3	0.3	134.5132	0.5933	1.1	O K
480 Winter	0.3	0.3	134.4157	0.4957	0.9	O K
600 Winter	0.3	0.3	134.3357	0.4157	0.8	O K
720 Winter	0.3	0.3	134.2702	0.3502	0.7	O K
960 Winter	0.2	0.2	134.1682	0.2482	0.5	O K
1440 Winter	0.2	0.2	134.0363	0.1163	0.2	O K
2160 Winter	0.1	0.1	133.9657	0.0457	0.1	O K
2880 Winter	0.1	0.1	133.9567	0.0367	0.1	O K
4320 Winter	0.1	0.1	133.9478	0.0277	0.1	O K
5760 Winter	0.1	0.1	133.9422	0.0222	0.0	O K
7200 Winter	0.1	0.1	133.9393	0.0193	0.0	O K
8640 Winter	0.1	0.1	133.9368	0.0168	0.0	O K
10080 Winter	0.0	0.0	133.9348	0.0148	0.0	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
240 Winter	12.05	156
360 Winter	9.05	224
480 Winter	7.38	288
600 Winter	6.29	352
720 Winter	5.52	414
960 Winter	4.49	538
1440 Winter	3.35	778
2160 Winter	2.49	1088
2880 Winter	2.02	1468
4320 Winter	1.50	2156
5760 Winter	1.21	2872
7200 Winter	1.03	3648
8640 Winter	0.90	4400
10080 Winter	0.81	5136

T J Booth Associates		Page 3
104 Yorkshire St	individual soakaway	
Rochdale	B&L Homes	
Lancashire OL16 1JY	Platting Lane	
Date feb 2025 - rev1	Designed By ds	
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Micro Drainage	Source Control W.10.4	

Rainfall Details

Region	ENG+WAL	Shortest Storm (mins)	15
Return Period (years)	30	Longest Storm (mins)	10080
M5-60 (mm)	20.000	Summer Storms	Yes
Ratio-R	0.300	Winter Storms	Yes
Cv (Summer)	0.750	Climate Change %	+40
Cv (Winter)	0.840		

Time / Area Diagram

Total Area (ha) = 0.007

Time	(mins)	Area
from:	to:	(ha)
	0	4
		0.007

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104 Yorkshire St
Rochdale
Lancashire OL16 1JYindividual soakaway
B&L Homes
Platting Lane

Page 4

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Micro Drainage

Source Control W.10.4

Lined Soakaway Details

Infil Coef - Base (m/hr)	0.290000	Pit Multiplier	1.8
Infil Coef - Sides (m/hr)	0.290000	Number Required	1
Safety Factor	1.5	Invert Level (m)	133.920
Porosity	0.62	Cover Level (m)	135.500
Ring Diameter (m)	0.9		

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104 Yorkshire St Rochdale Lancashire OL16 1JY		individual soakaway B&L Homes Platting Lane																																																																															
Date feb 2025 - rev1 File CALC-T~1.SRC		Designed By ds Checked By																																																																															
Micro Drainage		Source Control W.10.4																																																																															
<u>Summary of Results for 100 year Return Period (+45%)</u> Half Drain Time : 45 minutes																																																																																	
Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status																																																																											
15 Summer	0.4	0.4	134.6873	0.7673	1.4	O K																																																																											
30 Summer	0.5	0.5	134.8743	0.9543	1.8	O K																																																																											
60 Summer	0.5	0.5	134.9988	1.0788	2.0	O K																																																																											
120 Summer	0.5	0.5	135.0288	1.1088	2.1	O K																																																																											
180 Summer	0.5	0.5	134.9783	1.0583	2.0	O K																																																																											
240 Summer	0.5	0.5	134.9193	0.9993	1.9	O K																																																																											
360 Summer	0.5	0.5	134.8113	0.8913	1.7	O K																																																																											
480 Summer	0.4	0.4	134.7178	0.7978	1.5	O K																																																																											
600 Summer	0.4	0.4	134.6373	0.7173	1.3	O K																																																																											
720 Summer	0.4	0.4	134.5677	0.6478	1.2	O K																																																																											
960 Summer	0.3	0.3	134.4538	0.5337	1.0	O K																																																																											
1440 Summer	0.3	0.3	134.2927	0.3727	0.7	O K																																																																											
2160 Summer	0.2	0.2	134.1422	0.2222	0.4	O K																																																																											
2880 Summer	0.2	0.2	134.0482	0.1283	0.2	O K																																																																											
4320 Summer	0.1	0.1	133.9673	0.0472	0.1	O K																																																																											
5760 Summer	0.1	0.1	133.9583	0.0382	0.1	O K																																																																											
7200 Summer	0.1	0.1	133.9523	0.0322	0.1	O K																																																																											
8640 Summer	0.1	0.1	133.9482	0.0282	0.1	O K																																																																											
10080 Summer	0.1	0.1	133.9453	0.0252	0.0	O K																																																																											
15 Winter	0.4	0.4	134.7878	0.8678	1.6	O K																																																																											
30 Winter	0.5	0.5	135.0088	1.0888	2.0	O K																																																																											
60 Winter	0.6	0.6	135.1423	1.2223	2.3	O K																																																																											
120 Winter	0.6	0.6	135.1492	1.2293	2.3	O K																																																																											
180 Winter	0.5	0.5	135.0628	1.1428	2.1	O K																																																																											
<table><tr><td>Storm Duration (mins)</td><td>Rain (mm/hr)</td><td>Time-Peak (mins)</td></tr><tr><td>15 Summer</td><td>89.23</td><td>17</td></tr><tr><td>30 Summer</td><td>61.54</td><td>29</td></tr><tr><td>60 Summer</td><td>40.51</td><td>46</td></tr><tr><td>120 Summer</td><td>25.63</td><td>80</td></tr><tr><td>180 Summer</td><td>19.23</td><td>114</td></tr><tr><td>240 Summer</td><td>15.63</td><td>148</td></tr><tr><td>360 Summer</td><td>11.65</td><td>214</td></tr><tr><td>480 Summer</td><td>9.44</td><td>278</td></tr><tr><td>600 Summer</td><td>8.01</td><td>340</td></tr><tr><td>720 Summer</td><td>7.00</td><td>404</td></tr><tr><td>960 Summer</td><td>5.65</td><td>528</td></tr><tr><td>1440 Summer</td><td>4.17</td><td>766</td></tr><tr><td>2160 Summer</td><td>3.07</td><td>1128</td></tr><tr><td>2880 Summer</td><td>2.46</td><td>1496</td></tr><tr><td>4320 Summer</td><td>1.81</td><td>2200</td></tr><tr><td>5760 Summer</td><td>1.45</td><td>2904</td></tr><tr><td>7200 Summer</td><td>1.23</td><td>3592</td></tr><tr><td>8640 Summer</td><td>1.07</td><td>4296</td></tr><tr><td>10080 Summer</td><td>0.95</td><td>4992</td></tr><tr><td>15 Winter</td><td>89.23</td><td>17</td></tr><tr><td>30 Winter</td><td>61.54</td><td>30</td></tr><tr><td>60 Winter</td><td>40.51</td><td>48</td></tr><tr><td>120 Winter</td><td>25.63</td><td>86</td></tr><tr><td>180 Winter</td><td>19.23</td><td>122</td></tr></table>							Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)	15 Summer	89.23	17	30 Summer	61.54	29	60 Summer	40.51	46	120 Summer	25.63	80	180 Summer	19.23	114	240 Summer	15.63	148	360 Summer	11.65	214	480 Summer	9.44	278	600 Summer	8.01	340	720 Summer	7.00	404	960 Summer	5.65	528	1440 Summer	4.17	766	2160 Summer	3.07	1128	2880 Summer	2.46	1496	4320 Summer	1.81	2200	5760 Summer	1.45	2904	7200 Summer	1.23	3592	8640 Summer	1.07	4296	10080 Summer	0.95	4992	15 Winter	89.23	17	30 Winter	61.54	30	60 Winter	40.51	48	120 Winter	25.63	86	180 Winter	19.23	122
Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)																																																																															
15 Summer	89.23	17																																																																															
30 Summer	61.54	29																																																																															
60 Summer	40.51	46																																																																															
120 Summer	25.63	80																																																																															
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240 Summer	15.63	148																																																																															
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104 Yorkshire St Rochdale Lancashire OL16 1JY		individual soakaway B&L Homes Platting Lane				
Date feb 2025 - rev1 File CALC-T~1.SRC		Designed By ds Checked By				
Micro Drainage		Source Control W.10.4				
Summary of Results for 100 year Return Period (+45%)						
Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
240 Winter	0.5	0.5	134.9693	1.0493	2.0	O K
360 Winter	0.5	0.5	134.8103	0.8903	1.7	O K
480 Winter	0.4	0.4	134.6813	0.7613	1.4	O K
600 Winter	0.4	0.4	134.5757	0.6558	1.2	O K
720 Winter	0.3	0.3	134.4877	0.5677	1.1	O K
960 Winter	0.3	0.3	134.3517	0.4317	0.8	O K
1440 Winter	0.2	0.2	134.1732	0.2532	0.5	O K
2160 Winter	0.2	0.2	134.0228	0.1028	0.2	O K
2880 Winter	0.1	0.1	133.9668	0.0467	0.1	O K
4320 Winter	0.1	0.1	133.9543	0.0342	0.1	O K
5760 Winter	0.1	0.1	133.9478	0.0277	0.1	O K
7200 Winter	0.1	0.1	133.9433	0.0232	0.0	O K
8640 Winter	0.1	0.1	133.9402	0.0203	0.0	O K
10080 Winter	0.1	0.1	133.9382	0.0182	0.0	O K
Storm Duration (mins)	Rain (mm/hr)		Time-Peak (mins)			
240 Winter	15.63		158			
360 Winter	11.65		226			
480 Winter	9.44		290			
600 Winter	8.01		356			
720 Winter	7.00		418			
960 Winter	5.65		540			
1440 Winter	4.17		782			
2160 Winter	3.07		1144			
2880 Winter	2.46		1456			
4320 Winter	1.81		2132			
5760 Winter	1.45		2944			
7200 Winter	1.23		3608			
8640 Winter	1.07		4272			
10080 Winter	0.95		4952			
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B&L Homes
Platting LaneDesigned By ds
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Source Control W.10.4

Page 3

Rainfall Details

Region	ENG+WAL	Shortest Storm (mins)	15
Return Period (years)	100	Longest Storm (mins)	10080
M5-60 (mm)	20.000	Summer Storms	Yes
Ratio-R	0.300	Winter Storms	Yes
Cv (Summer)	0.750	Climate Change %	+45
Cv (Winter)	0.840		

Time / Area Diagram

Total Area (ha) = 0.007

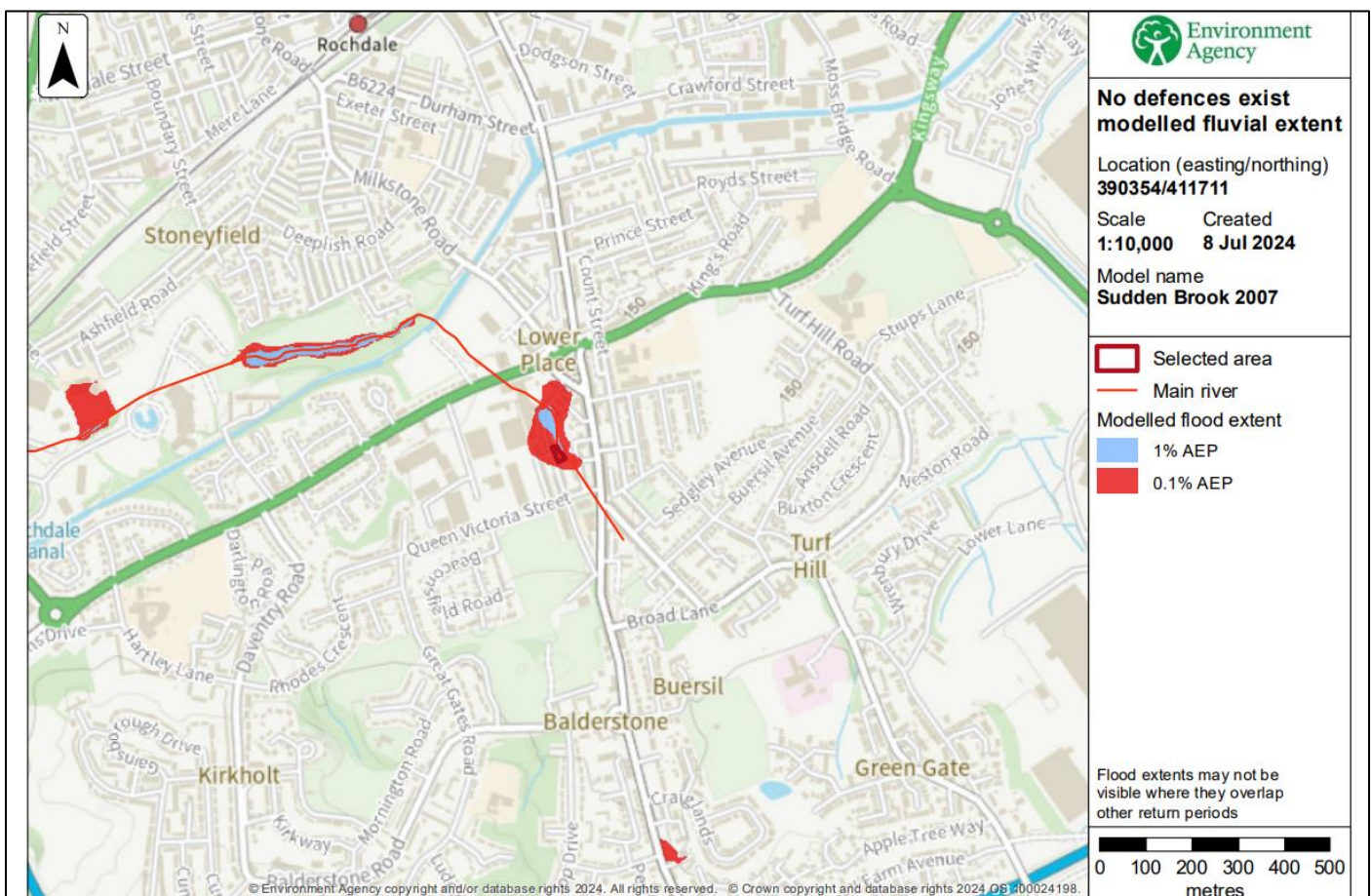
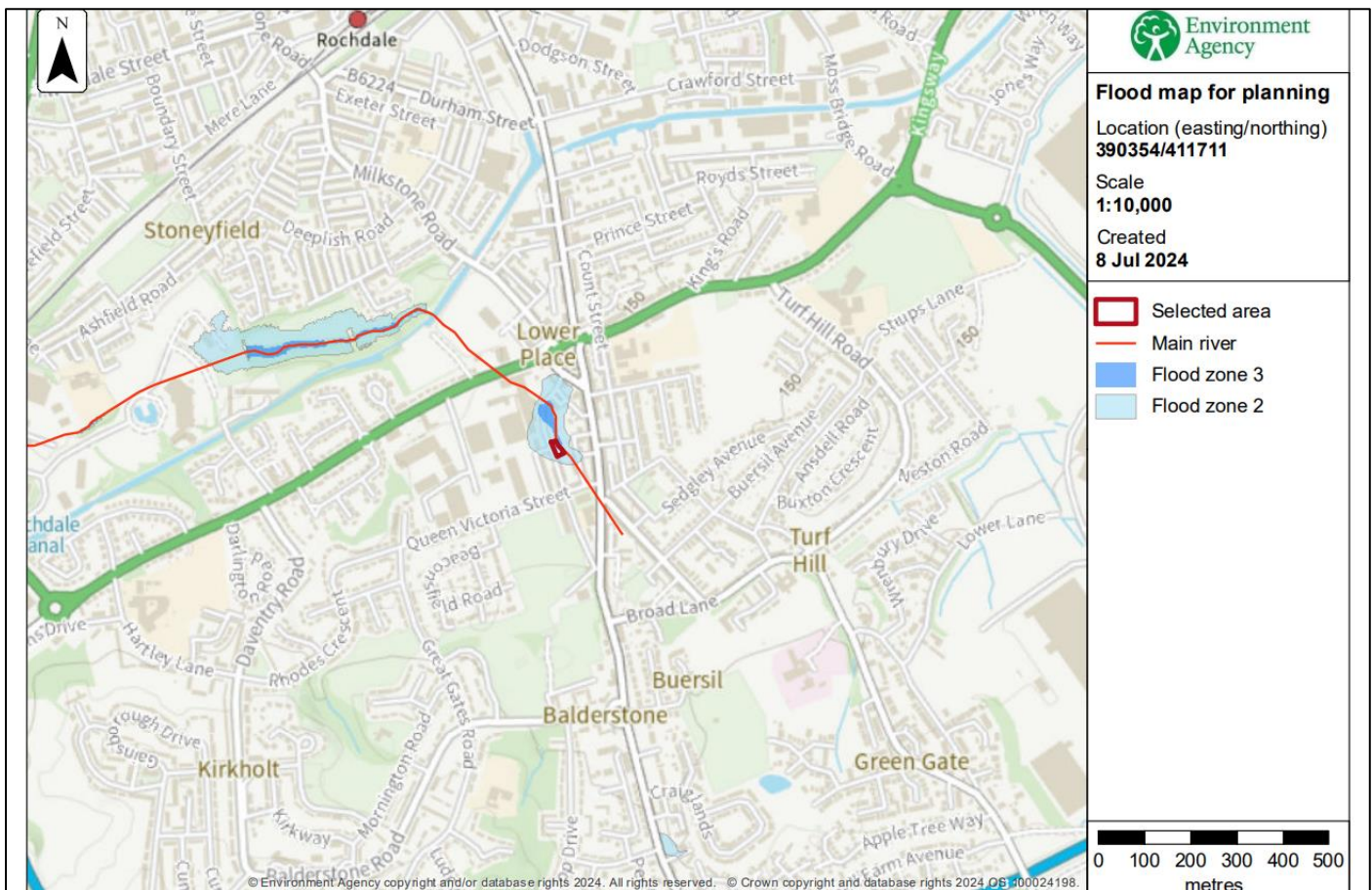
Time	(mins)	Area
from:	to:	(ha)
0	4	0.007

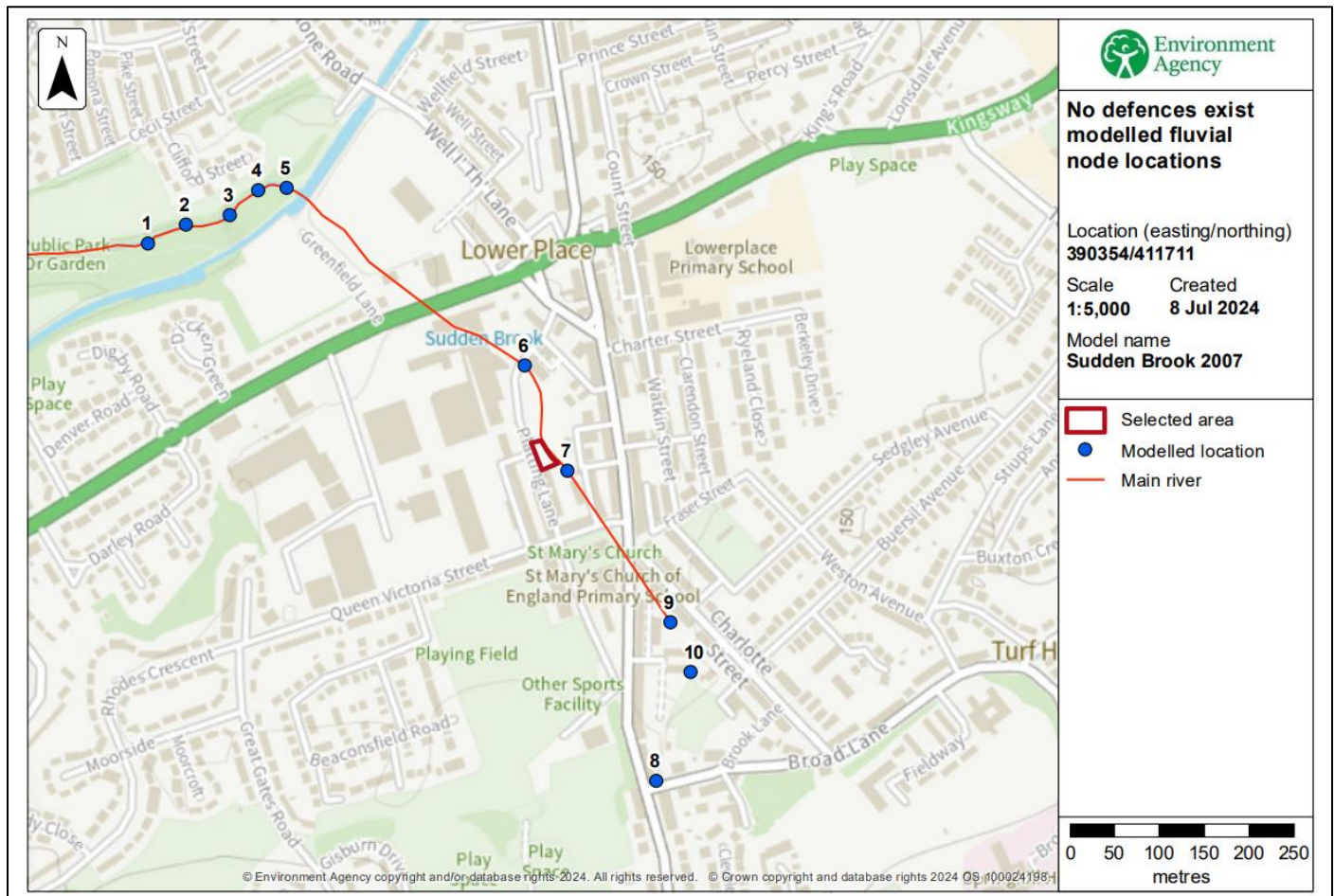
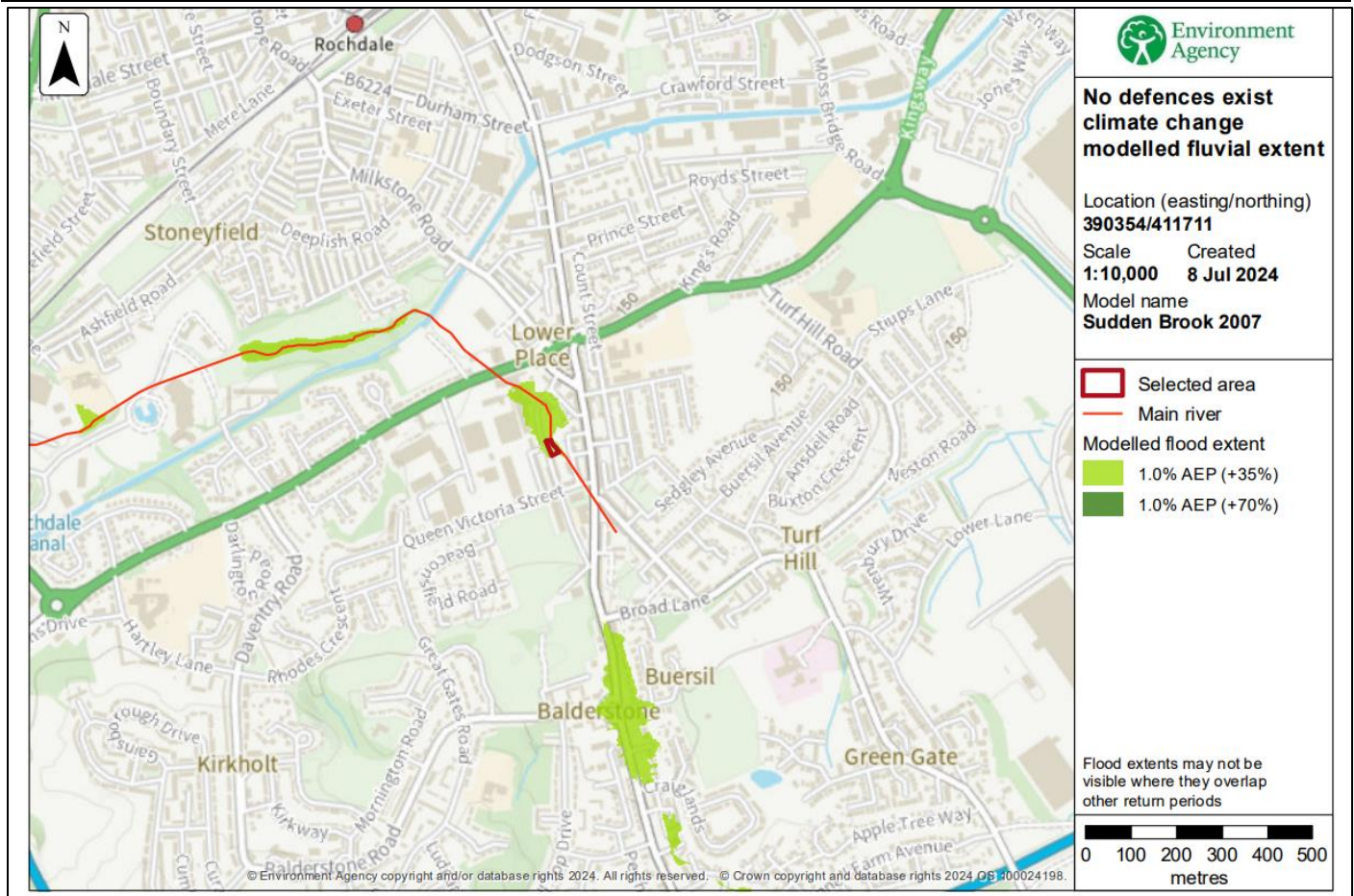
T J Booth Associates		Page 4
104 Yorkshire St Rochdale Lancashire OL16 1JY	individual soakaway B&L Homes Platting Lane	
Date feb 2025 - rev1 File CALC-T~1.SRC	Designed By ds Checked By	
Micro Drainage		Source Control W.10.4

<u>Lined Soakaway Details</u>			
Infil Coef - Base (m/hr)	0.290000	Pit Multiplier	1.8
Infil Coef - Sides (m/hr)	0.290000	Number Required	1
Safety Factor	1.5	Invert Level (m)	133.920
Porosity	0.62	Cover Level (m)	135.500
Ring Diameter (m)	0.9		

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6.6 Environment Agency Fluvial Flood Risk Maps.





**Modelled node locations data****No defences exist**

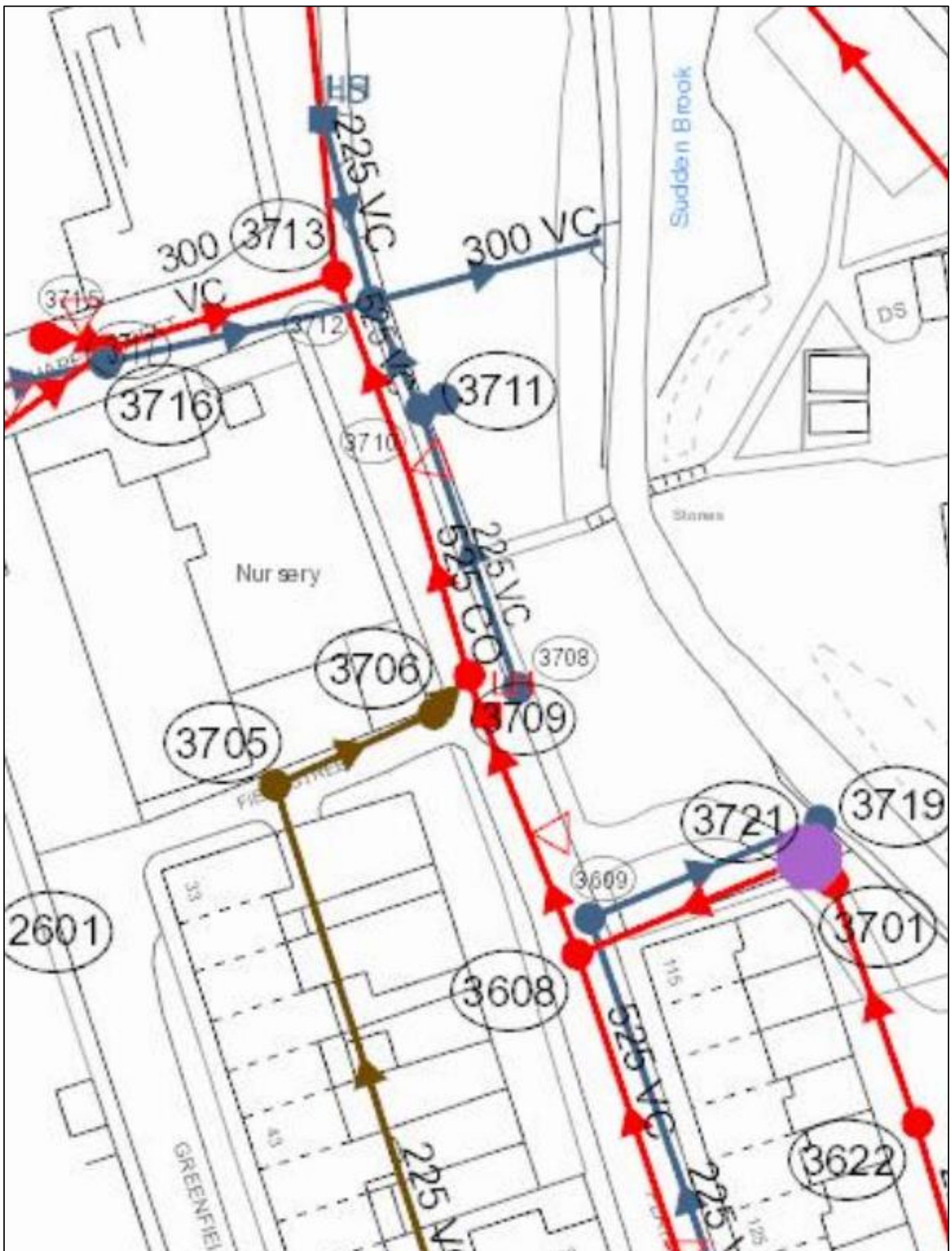
Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	1502051	389913	411948							130.45	7.85			131.0	10.73
2	1502077	389955	411968							130.51	7.87			131.02	10.70
3	1502047	390005	411979							130.60	7.89			131.04	10.68
4	1502081	390037	412007							130.86	7.90			131.11	10.68
5	1502088	390068	412010							131.27	7.90			131.51	10.68
6	1502070	390334	411811							134.79	7.06			137.34	9.84
7	1502053	390382	411694							134.88	4.77			137.34	9.04
8	1502044	390481	411347							140.06	4.78			140.55	9.25
9	1502084	390497	411524							136.38	4.79			138.57	9.12
10	1502043	390519	411468							138.04	4.78			138.71	9.22

Data in this table comes from the Sudden Brook 2007 model.
 Level values are shown in mAOD, and flow values are shown in cubic metres per second.
 Any blank cells show where a particular scenario has not been modelled for this location.

Modelled node locations data**No defences exist climate change**

Label	Modelled location ID	Easting	Northing	1.0% AEP (+35%)		1.0% AEP (+70%)	
				Level	Flow	Level	Flow
1	1502051	389913	411948	130.72	9.25	130.91	10.22
2	1502077	389955	411968	130.75	9.26	130.93	10.20
3	1502047	390005	411979	130.80	9.27	130.97	10.19
4	1502081	390037	412007	130.97	9.27	131.06	10.19
5	1502088	390068	412010	131.38	9.27	131.45	10.19
6	1502070	390334	411811	135.89	8.43	136.81	9.35
7	1502053	390382	411694	135.88	6.33	136.81	7.89
8	1502044	390481	411347	140.28	6.45	140.47	8.11
9	1502084	390497	411524	136.75	6.44	137.76	8.08
10	1502043	390519	411468	138.23	6.45	138.41	8.11

Data in this table comes from the Sudden Brook 2007 model.
 Level values are shown in mAOD, and flow values are shown in cubic metres per second.
 Any blank cells show where a particular scenario has not been modelled for this location.

6.7 United Utilities Sewer Plans.

6.8 NPPF Planning Practice Guidance Table 1.**Table 1: Flood Zones**

These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's [Flood Map for Planning \(Rivers and Sea\)](#), available on the Environment Agency's web site, as indicated in the table below.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

6.9 NPPF Planning Practice Guidance Table 2.**More vulnerable**

- Hospitals
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.
- Non-residential uses for health services, nurseries and educational establishments.
- Landfill* and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

6.10 NPPF Planning Practice Guidance Table 3.

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 †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Notes to table 3:

- This table does not show the application of the **Sequential Test** which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and **Exception Tests** do not need to be applied to **minor developments** and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

6.11 Environment Agency Climate Change Allowances.**Table 1 peak river flow allowances by river basin district (use 1961 to 1990 baseline)**

River basin district	Allowance category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
North West	Upper end	20%	35%	70%
	Higher central	20%	30%	35%
	Central	15%	25%	30%

In flood zone 2

- essential infrastructure – use the higher central and upper end to assess a range of allowances
- highly vulnerable – use the higher central and upper end to assess a range of allowances
- more vulnerable – use the central and higher central to assess a range of allowances
- less vulnerable – use the central allowance
- water compatible – use none of the allowances

In flood zone 3a

- essential infrastructure – use the upper end allowance
- highly vulnerable – development should not be permitted
- more vulnerable – use the higher central and upper end to assess a range of allowances
- less vulnerable – use the central and higher central to assess a range of allowances
- water compatible – use the central allowance