

Kings Arms, Trowbridge

Flood Risk Assessment & Drainage Strategy

For: Doric Developments Ltd

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B	23/07/26	Updated Site Plan	RP	BF
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Executive Summary

Tumu Consulting Ltd has been appointed by Doric Developments Ltd to undertake a Flood Risk Assessment & Drainage Strategy for a proposed residential development to support an full planning submission, at Kings Arms, Trowbridge.

The drainage strategy considers the National Planning Policy Framework, The National Standards for SuDS, as well as the Wiltshire Council Drainage and Betterment Strategy.

The site proposes to mitigate against the pluvial flood risk associated with the site by raising the finished floor level above the calculated 0.1% AEP (Annual Exceedance Probability) pluvial event. Further resilience measures are proposed above this.

The surface water drainage strategy proposes to discharge surface water via the existing connection to the existing culverted watercourse to the south of the site. The flow will be limited to 7.0l/s, for all storms up to and including the 1% AEP rainfall event with a 45% allowance for climate change and 10% allowance for urban creep.

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1 Introduction

Tumu Consulting Ltd has been appointed by Doric Developments Ltd to undertake a Flood Risk Assessment & Drainage Strategy to support a planning permission submission for the development of the car park at Kings Arms, Trowbridge, into 7 residential units.

The report considers the National Planning Policy Framework (NPPF), The National Standards for SuDS (NSS), CIRIA753 The SuDS Manual, as well as the Wiltshire Council Drainage and Betterment Policy (2024)

1.1 Site Location

The site is located north of Trowbridge, at the former public house – The Kings Arms, BA14 8RS. The site is accessed from Marsh Road and Hammond Way. The Easting, Northing coordinates are 386120 , 160190.



Figure 1-1 Site Location Plan

1.2 Existing Site Usage

The existing site comprises the car park for the former public house. It is accessed from the north and the south and comprises asphalt surfacing, as well as landscape areas through the centre and edges of the site.

1.3 Topography

A topographic survey has been undertaken by South West Surveys in April 2025 ref. SWS032502. The topography of the site falls from approximately 41.00mAOD in the north to 38.50mAOD in the south. The general gradient across the existing site is 1:35 The total site area is approximately 0.288ha. Refer to Appendix A for the Topographic Survey.

1.4 Geology & Hydrogeology

British Geological Survey (BGS) Geology Viewer shows the site is underlain with a Kellaways Formation – Sandy Mudstone. The BGS describe the strata as *'Mudstone, grey, commonly silici-silty or silici-sandy, with (predominantly in the upper part) beds of generally calcareous siltstone and sandstone.'* The BGS Geology Viewer confirmed no superficial deposits are anticipated to be found at the site location.

Infiltration to BRE365 specification has been undertaken by Ground Testing Ltd, ref. 1476 – R.01. The testing could not calculate an infiltration rate due to the impermeability of the strata. Therefore, soakaways and infiltration based SuDS are not appropriate for the development. Refer to Appendix B for the Infiltration & CBR Testing.

The Natural England Magic Maps demonstrate that the site is not located within a Source Protection Zone and located within an unproductive aquifer.

1.5 Hydrology

There are a number of watercourses in relative proximity to the site. To the south east of the site, passing beneath Hammond Way, is a culverted watercourse. The culverted watercourse is approximately 700m long and receives surface water discharge from an open ordinary watercourse to the north of Marsh Road. It eventually discharges to an ordinary watercourse between Staverton Recreation Ground and Marina Drive. The ordinary watercourse eventually discharges into the River Avon. A section of the culverted watercourse was surveyed as part of the CCTV survey conducted by Point Surveys Ltd, ref. 2405, as shown in Appendix C.

Approximately 40m north west of the boundary of the site, the Kennet and Avon Canal flows north to south. This eventually discharges into the River Avon in Bath.

1.6 Existing Drainage

The CCTV survey, as shown in Appendix C shows the routing of foul and surface water drainage within, and in the vicinity of the site. Serving the Kings Arms building is a private drainage network. Both rainwater downpipes and SVPs/foul stubs discharge through the network, and junctions on to the Wessex Water Foul Sewer located within Marsh Road. The Wessex Water foul sewer transitions to a combined sewer after chamber 1202. Refer to the figure below for the Wessex Water asset maps.

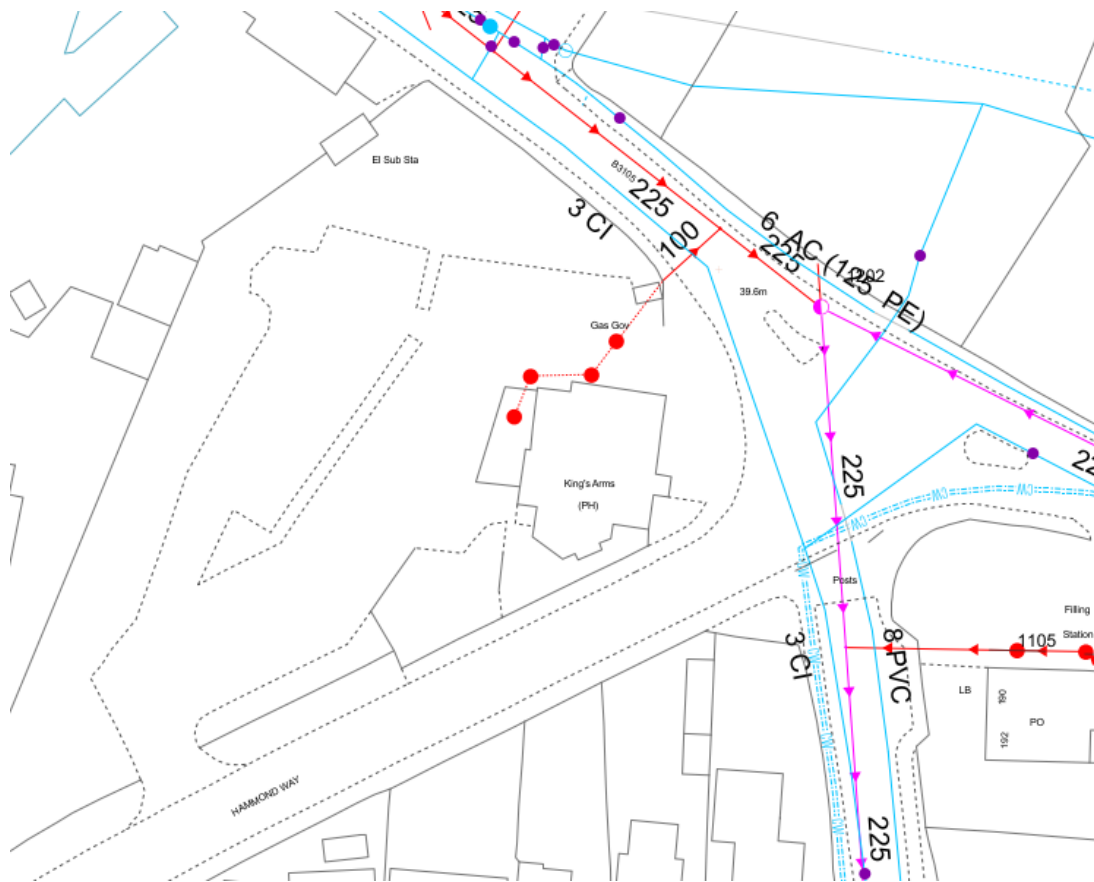


Figure 1-2 Wessex Water Asset Maps

Surface water from the hard standing car park discharges to a singular gully to the south of the site, located at the entrance, which forms the low point of the site. The outlet from the gully discharges westwards, assumed to discharge into the aforementioned culverted watercourse which discharges west.

1.7 Existing Discharge Rates

The site can be considered brownfield, with the asphalt car parking area currently being drained by a singular gully at the entrance way. Therefore the modified rationale approach has been used to calculate the existing discharge rates from the development, using FEH22 rainfall data. The 15 minute storm has been considered for this site, which is appropriate considering the relatively small site area. This has been tabulated below.

Return Period (yr)	Area, A (ha)	R _i (mm/hr)	Brownfield Discharge Rate (l/s)
Q ₂	0.146	27.00	10.9
Q ₃₀	0.146	76.76	30.9
Q ₁₀₀	0.146	98.52	39.7

Table 1-1 Existing Brownfield Discharge Rates

The table above demonstrates that the existing discharge rate from the site can be considered as 39.7l/s in the 1% AEP rainfall event.

2 Development Proposals

2.1 Description of the Proposed Works

It is proposed to develop the existing hard landscaped car park serving the Kings Arms, Public House, with 7 no. residential dwellings (Class C3), as well as associated infrastructure including drainage, access road and utilities. Refer to Appendix D for the Proposed Site Plan.

2.2 Design Life

As the use of the site is residential, it is anticipated that the design life of the site will be 100 years.

3 Flood Risk

A flood risk assessment has been undertaken, in order to ensure that the development proposals are safe from any associated flood risk which is posed to the development. A number of desktop sources have been considered, including the Environment Agency (EA) Flood Map for Planning (FMfP) and the Wiltshire Level 1 Strategic Flood Risk Assessment (SFRA) 2024.

3.1 Fluvial & Tidal Flood Risk

The figure below shows the whole site within Flood Zone 1, according to the Environment Agency (EA) Flood Map for Planning (FMfP). Flood Zone 1 designates an area at the lowest fluvial and tidal flood risk; less than 0.1% Annual Exceedance Probability (AEP). It can therefore be considered that the site is not at risk of fluvial and tidal flooding.



Figure 3-1 Environment Agency Flood Map for Planning – Flood Zones

3.2 Pluvial Flood Risk

Pluvial flood risk can be categorised in to 4 main levels of risk, depending on the annual exceedance probability of the pluvial event.

- High Risk - Greater than 3.3% AEP of pluvial flooding.
- Medium Risk - Greater than 1.0% AEP of pluvial flooding.
- Low Risk - Greater than 0.1% AEP of pluvial flooding.
- Very Low Risk – Less than 0.1% AEP of pluvial flooding.

The figures below, show the inundation to the site, in 3.3%, 1.0% and 0.1% pluvial flood events, as an extract from the EA's FMfP. The figures demonstrate there is inundation to the south of the site, which increases in scale in the less frequent, but more intense events. To the south of the site, Hammond Way forms a relative low point to the surrounding area. In addition to this, the culverted watercourse discharges westwards, between Kennet Cottage and The Lodge.

It is important to note, pluvial flood risk mapping does not account for underground surface water drainage assets, and therefore the mapping is considered very conservative. In an actual event, the culverted watercourse, highways drainage and private drainage in the surrounding area would provide capacity, which isn't accounted for in the mapping, to reduce local inundation.

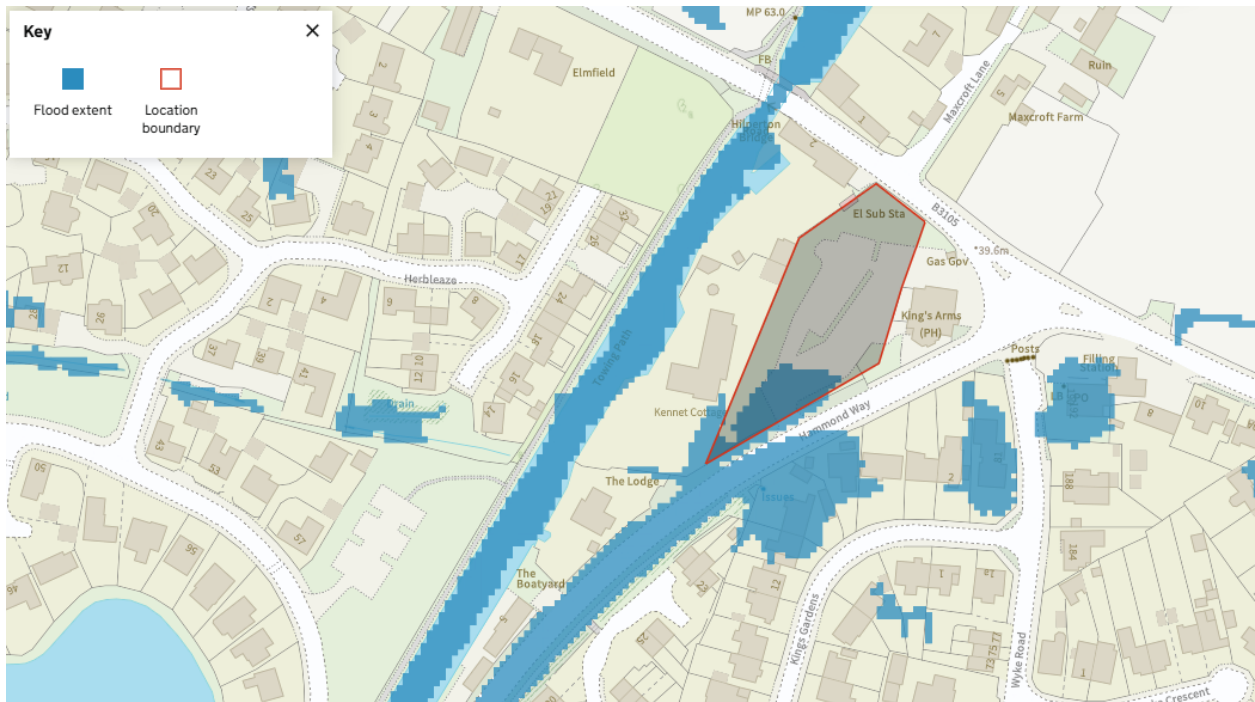


Figure 3-2 Environment Agency Flood Map for Planning – Pluvial Flood Risk 3.3% AEP

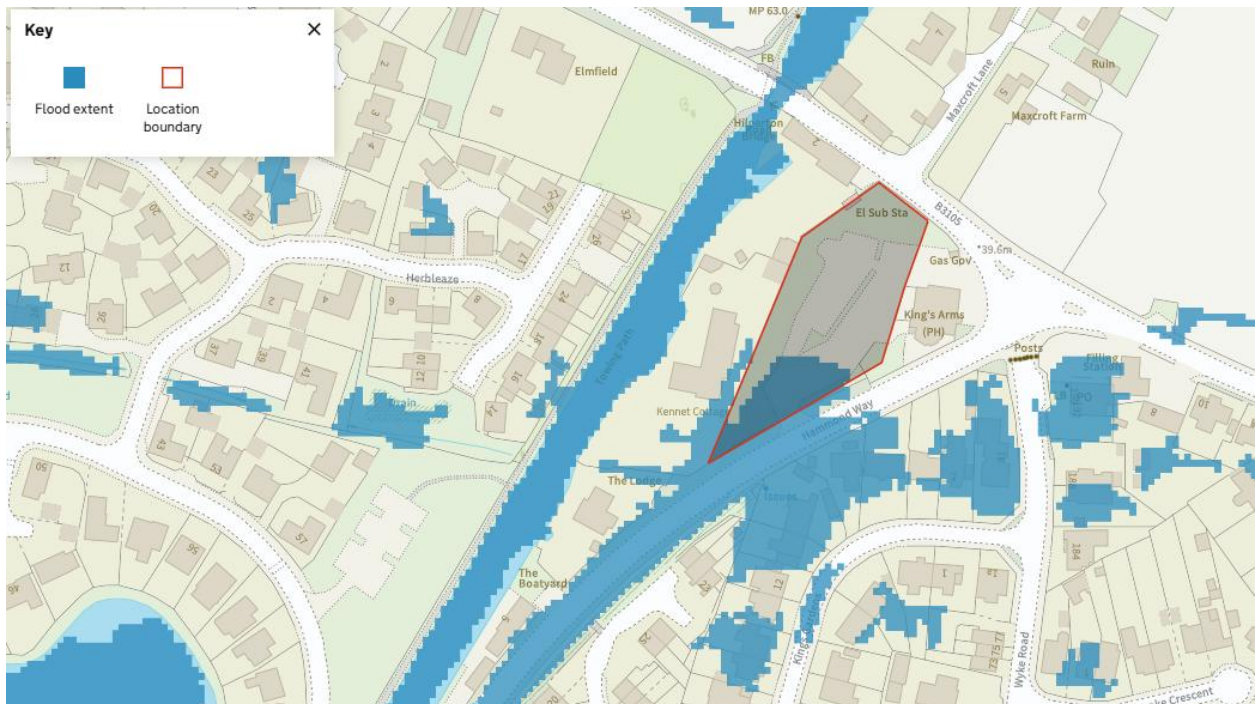


Figure 3-3 Environment Agency Flood Map for Planning – Pluvial Flood Risk 1.0% AEP

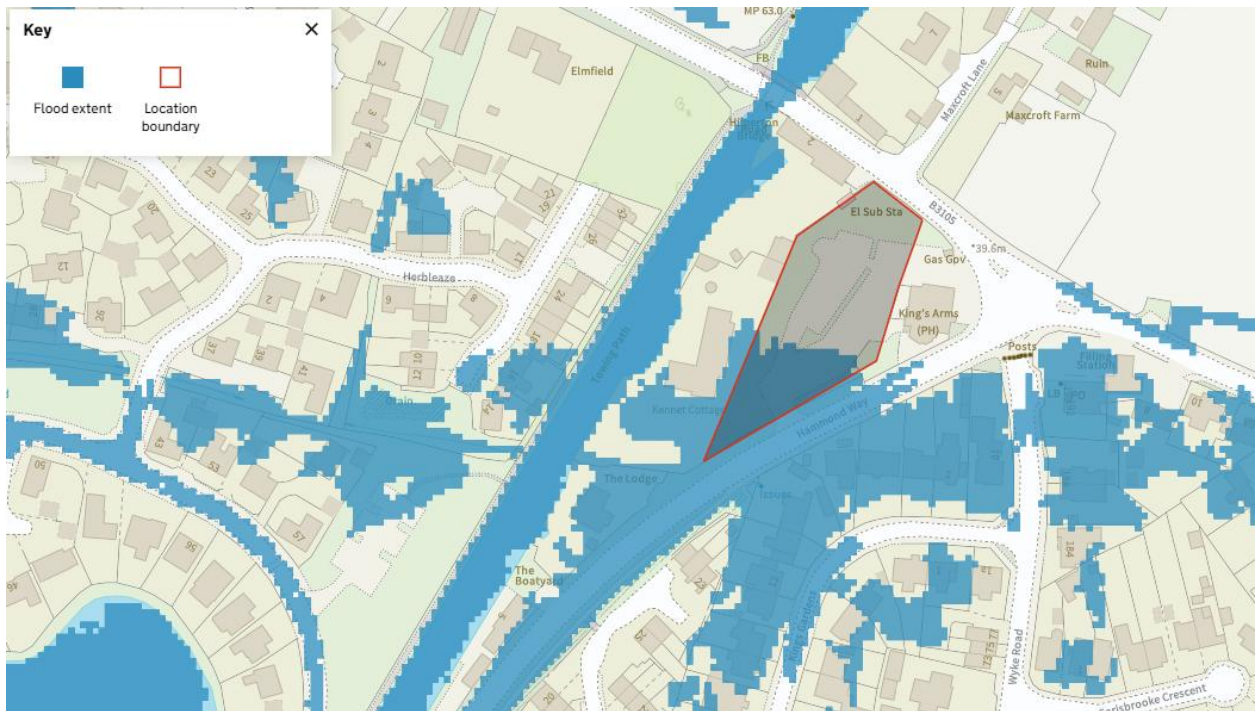


Figure 3-4 Environment Agency Flood Map for Planning – Pluvial Flood Risk 0.1% AEP

Appendix E of the Wiltshire Level 1 SFRA shows the risk of flooding from surface water. This extent of inundation in the 3 modelled storms, are reduced from the areas shown in the EA FMfP, with the site only becoming inundated in the 0.1% AEP event; the mapping shows the site is at low risk.

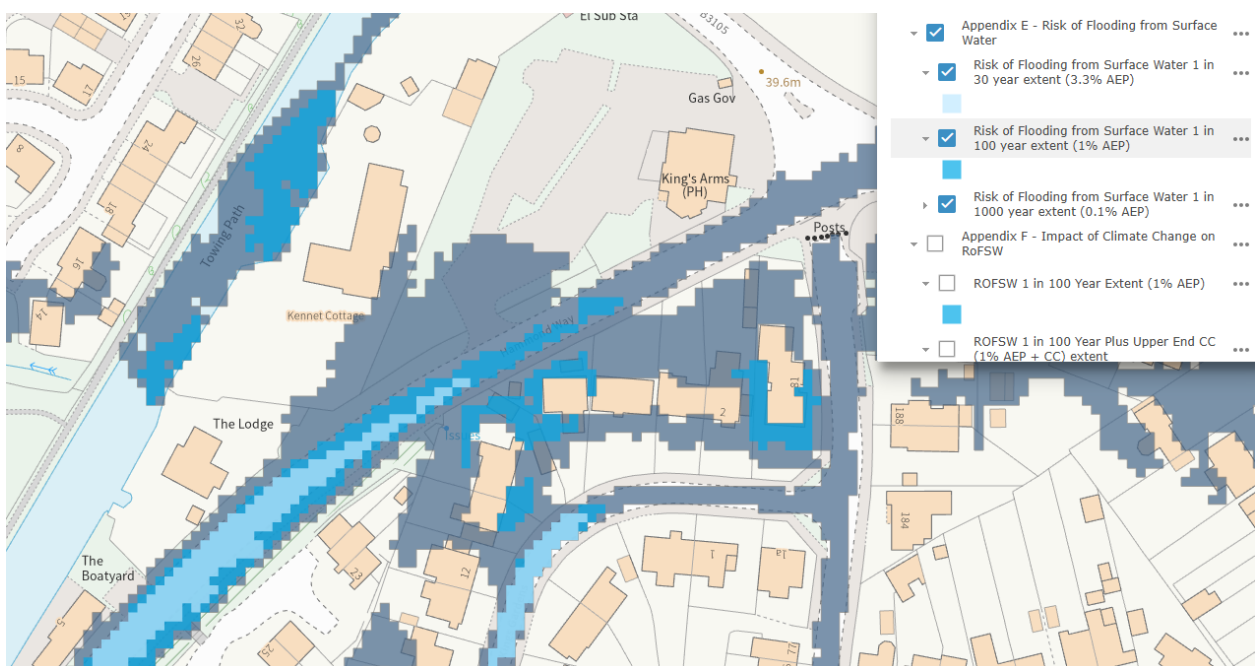


Figure 3-5 Risk of Flooding from Surface Water – Wiltshire SFRA 2024 Viewer

However, as a conservative approach, the FMfP pluvial levels have been approximated in the table below, by overlaying the pluvial extents onto the topographic survey.

Pluvial Event (AEP)	Risk	Elevation (mAOD)
3.3%	High	38.85
1.0%	Medium	39.00
0.1%	Low	39.10

Table 3-1 Pluvial Flood Elevations

3.3 Groundwater

The figure below shows an extract from the Wiltshire SFRA, relating to the potential of groundwater emergence in the local area. The site is classified as being located within an area of negligible risk, the SFRA's lowest classification.



Figure 3-6 Groundwater Emergence – Wiltshire SFRA 2014 Viewer

3.4 Other Sources of Flooding

- The site is at very low risk of reservoir flooding, according to the Wiltshire SFRA 2014 viewer and Long Term EA Flood Maps.
- There has no recorded sewer flood incidents according to the Wiltshire SFRA 2014 viewer. As levels fall away to the south of the site, any future flooding incident, flows will discharge to Hammond Way and
- There has been no recorded historic instances of flooding according to the Wiltshire SFRA 2014 viewer.

3.5 Flood Risk Summary

The only notable source of flood risk to the development is pluvial flooding. The extents which are shown on the EA FMfP are conservative, in comparison to the Wiltshire SFRA. In addition, underground drainage assets are not modelled in pluvial flood mapping, and in an actual event, pluvial inundation may be reduced.

4 Flood Risk Mitigation

In order to mitigate against the pluvial flood risk posed to the development. Flood risk mitigation measures have been proposed in order to protect the occupants of the properties, and promote recovery of the dwellings in a flooding event.

4.1 Finished Floor Levels

It is proposed that all dwellings will have a Finished Floor Level set a minimum of 39.15mAOD. This provides a 150mm freeboard above the medium (1.0% AEP) pluvial event, and 50mm freeboard above the low risk (0.1% AEP) pluvial event. This is considered appropriate, considering the conservative flood extents shown in the EA FMfP.

5 Surface Water Drainage Strategy

The surface water drainage strategy has been developed in accordance with the relevant design standard and guidance, including but not limited to; CIRIA C753 The SuDS Manual, The NPPF, The Approved Documents: Building Regulations 2010 Part H: Drainage and Waste Disposal, and the National Standards for SuDS (NSS) and The Wiltshire Surface Water Betterment Policy 2024.

The NSS states that for a previously developed site, the rate of discharge should never exceed the rate pre redevelopment. The NSS also states that flooding should not occur to any part of the site in the 1 in 30 year event, and no flooding to buildings or utility plant should occur in the 1 in 100 year event.

5.1 Surface Water Drainage Hierarchy

In line with National Standards for SuDS – Standard 1: Runoff Destinations, surface water discharge receptors should consider the surface water hierarchy priority to: Water re-use; Soakaways/Infiltrating Drainage System; Watercourse; Public Surface Water Sewer; Combined Sewer.

The development will incorporate water re-use through the implementation of rainwater butts/planters. These will fill up with water during rainfall events and provide irrigation for planting within gardens. The butts will feature planters at the top. Each water butt will have an overflow into the private surface water network, as it cannot be guaranteed that the butt remains empty at the instance of a rainfall event, and therefore will need an ultimate receptor.

As discussed in section 1.4, and shown in Appendix B, infiltration testing to BRE365 specification confirmed that soakaways are not a viable surface water receptor from the development. .

The development will discharge surface water to the existing culverted watercourse, utilising the existing connection, and therefore maintaining the existing arrangement.

Refer to Appendix E for the Proposed Drainage Layout and Appendix F for the standard drainage details.

5.2 Surface Water Drainage System

Rainwater planter water butts will intercept rainfall in lower intensity storms from the roof areas of the proposed dwellings. This water can be re-used for irrigation purposes within the properties gardens. A high level overflow will discharge water to the wider private surface water network.

The access road is to remain private, and will be finished with a type c permeable surfacing system which allows the percolation of surface water through the surface, to the sub base below. The sub base is tanked with an impermeable liner, resulting in the sub base attenuating surface water. The private surface water network serving the dwellings drains directly to the sub base of the permeable paving. Due to the change in level, sub-surface baffles will be placed at 9m intervals with a flat invert level. Underdrains will draw down between baffles, post rainfall event.

A flow control device will be utilised in order to restrict the flow rate from the development to a minimum of 30% betterment on pre-development rates for all storms up to and including the 1% AEP with an allowance for climate change, and 10% urban creep to roof areas.

Refer to Appendix E for the Proposed Drainage Layout and Appendix F for the Standard Drainage Details.

5.3 Climate Change

As a lifespan of 100 years is being considered, the end of life can be estimated as 2127. According to government guidance, a development with a lifespan exceeding 2100 should use the Upper end Allowance for a 2070's epoch when considering peak rainfall climate change allowances. For the Avon Bristol and North Somerset Streams Management Catchment, the climate change allowance to consider should be 40% for the 3.3%, and 45% for the 1% AEP events as shown in the figure below.

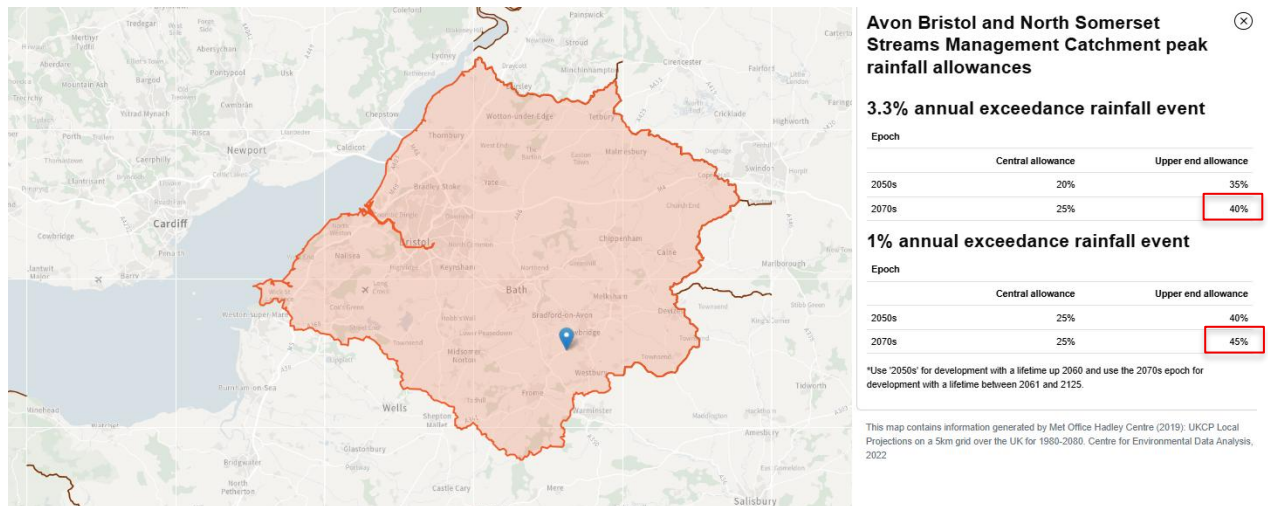


Figure 5-1 Avon Bristol and North Somerset Streams Management Catchment Peak Rainfall Allowances

5.4 Discharge Rates

The contributing area comprises 0.086ha hard standing area and 0.044ha roof area. The roof area has increased by 10% to account for urban creep, to 0.049ha.

The existing brownfield rates have been calculated as for the 2, 30 and 100 year rainfall events. In accordance with Wiltshire Council's Betterment Policy 2014, discharge rates post-development are to provide a minimum of a 36% betterment on the Q_2 rate, i.e. 7.0l/s.

Return Period (yr)	Proposed Area, A (ha)	Pre-Development Discharge Rate (l/s)	Post-Development Discharge Rate (l/s)	Betterment
Q_2	0.135	10.9	4.6	58%
$Q_{30+40\%}$	0.135	30.9	7.0	77%
$Q_{100+45\%}$	0.135	39.7	7.0	82%

Table 5-1 Surface Water Discharge Rates

The table above shows that in a 1% AEP rainfall event, ie 1 in 100 discharge rate, the rate will be limited to 7.0l/s providing a 81% betterment to pre-development rates for the 1% AEP rainfall event, with a 45% allowance for climate change. Since the flow control discharges at a rate dictated by the head of the water in the attenuation, the resulting post-development flow in the Q_2 event is lower, 4.6l/s, than the max design rate of 7.0l/s.

5.5 Calculations

Causeway FLOW modelling software has been used to size the permeable paving sub base, for the development, which forms the storage for all events up to and including the 1% AEP event with a 45% allowance for climate change, and 10% allowance for urban creep of roof area.

Parameter	Input
Rainfall Data	FEH22
Rainfall Event (AEP)	50,3.33,1%
Climate Change (%)	0,40,45%
Urban Creep	10%
Summer, Winter Cv	1.0,1.0
Additional Storage (m ³ /ha)	0
Time of Entry (mins)	5

Table 5-2 Causeway FLOW Simulation Parameters

No flooding was encountered in the 1% AEP rainfall event with a 45% allowance for climate change, and 10% allowance for urban creep to roof areas. Refer to Appendix G for the FLOW calculations.

5.6 Water Quality

The CIRIA 753 SuDS Manual has been consulted to ensure that the SuDS provided successfully mitigate the anticipated pollutants, which may arise from the proposed land use. Table 26.2 of CIRIA753 outlines the pollution hazard indices for the anticipated worst case land use type. This has been tabulated against the mitigation indices of the proposed SuDS for each surface water network, found in table 26.3 of CIRIA753.

Land Use	Hazard Level	TSS	Metals	Hydrocarbons
Low Traffic Road (<300 Movements)	Low	0.5	0.4	0.4
SuDS		TSS	Metals	Hydrocarbons
Permeable Paving		0.7	0.6	0.7
Mitigation>Pollution?		Y	Y	Y

Table 5-3 Simple Index Approach

Since the mitigation indices are greater than the pollution hazard indices, the SuDS provided successfully mitigate against the anticipated pollutants associated with the proposed land use.

5.7 Flood Exceedance Routing

In the unlikely event the on-site drainage becomes blocked, or the system experiences a storm more intense than current design standards, exceedance routes need to be considered.

Flood exceedance routes will fall from north to south. Dwellings are to be raised a minimum of 150mm from external ground levels, allowing any exceedance from the private surface water system to flow around the property. The access will be lower lying than the dwellings, therefore exceedance flows will discharge to the access road, where if not intercepted by the permeable paving, discharge into Hammond Way, away from people, property and utility. Eventually highways gullies will drain exceedance flows from the proposed site, and surrounding area, into the culverted watercourse post event.

5.8 Maintenance Arrangements

Drainage serving the development will need to adhere to a maintenance regime, to ensure its performance throughout the lifecycle of the development. Plot drainage is to be the responsibility of the plot owner. Shared drainage features will remain the responsibility of the a management company as selected by the client.

Operation and maintenance of SuDS and drainage features will be undertaken in accordance with the recommendations outlined in the SuDS Manual (CIRIA C753), provided in Tables 4-3, 4-4 and 4-5.

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Inspect surface structures, removing obstructions and silt as necessary. Check there is no physical damage.	Monthly
	Remove cover and inspect, ensuring water is flowing freely and that the exit route for water is unobstructed. Remove any debris and silt Undertake inspection after leaf fall in autumn.	Annually
	Jet the pipes leading from overflow structures and check water is going through the overflow	Annually
Remedial Actions	Repair physical damage	As required

Table 5-4 Operation and Maintenance Requirements for Chambers, Drains and Inspection Chambers

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspection of the tank for debris and sediment build-up, inlets/outlets/withdrawal devices, overflow areas, pumps, filters	Annually (and following poor performance)
	Cleaning of tank, inlets, outlets, gutters, withdrawal devices and roof drain filters of silts and other debris	Annually (and following poor performance)
Occasional Maintenance	Cleaning and/or replacement of any filters	Three monthly (or as required)
Remedial Actions	Repair of overflow erosion damage or damage to tank	As required
	Pump repairs	As required

Table 5-5 Operation and Maintenance Requirements for Rainwater Harvesting

Maintenance Schedule	Required Action	Typical Frequency
Regular inspections	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturers recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional Maintenance	Removal of weeds	As required – once per year on less frequently used pavements.
Remedial action	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 5-6 Operation and Maintenance Requirements for Permeable Surfacing

6 Foul Water Drainage Strategy

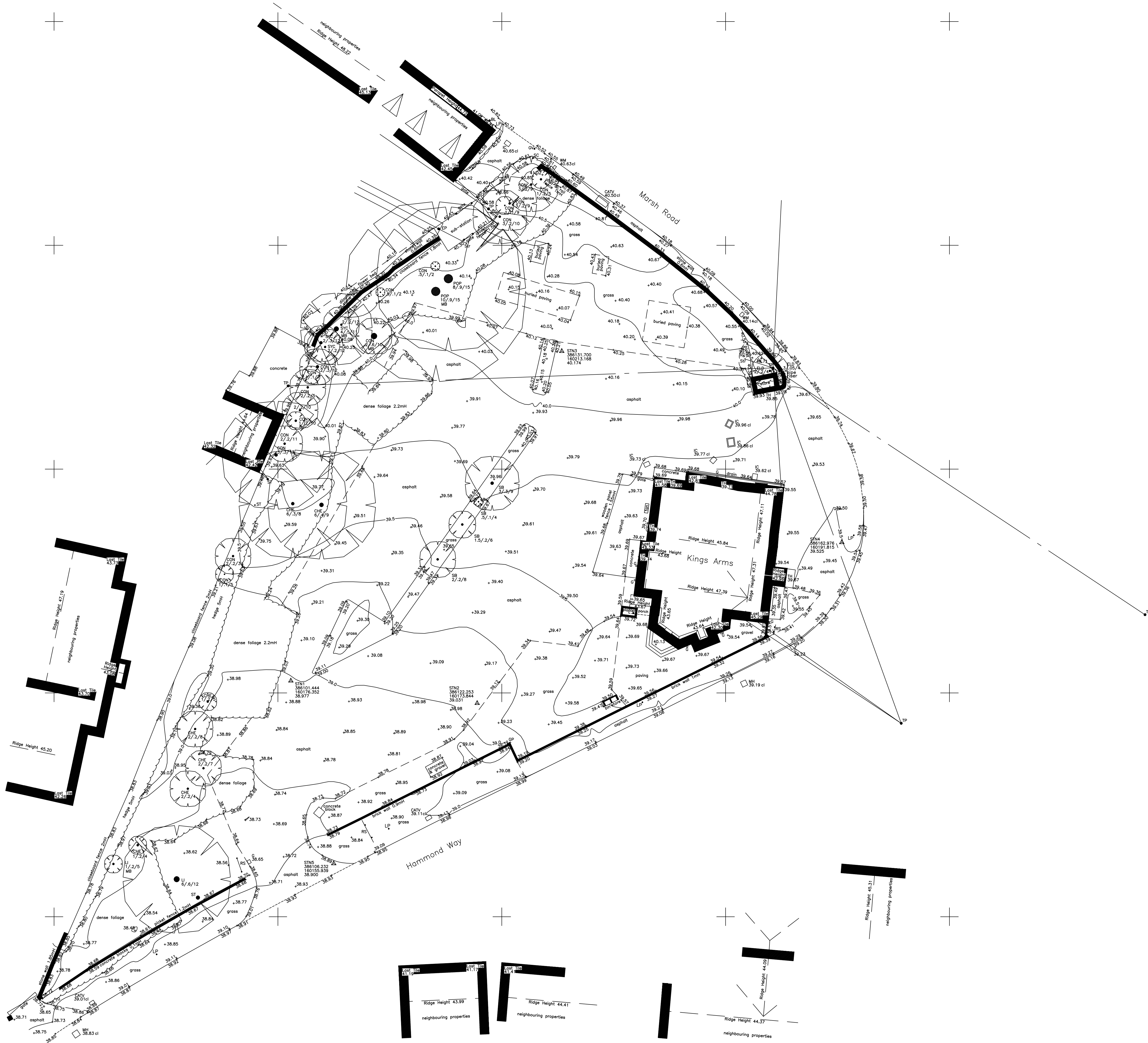
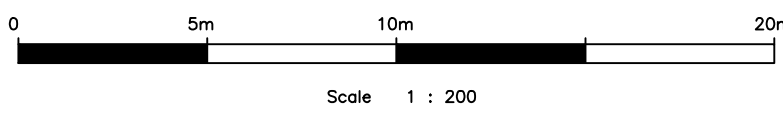
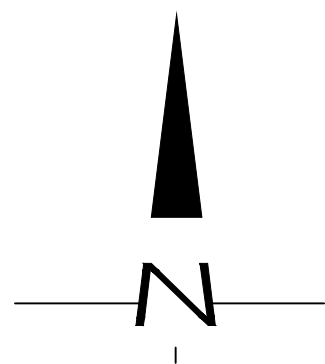
It is proposed to discharge foul flows to the existing private foul system serving the Kings Arms Public House. Due to the levels of the existing drainage, 2 dwellings will discharge via gravity to the existing private system. The remaining 5 dwellings will discharge to a private package pumping station. Flows will be pumped via a rising main to the proposed gravity system. The connection into the existing system is private and therefore indirect. It is anticipated that a section 106 agreement is therefore not required by Wessex Water. The existing private system discharges to the 225mm foul sewer as a junction connection just upstream of Wessex Water chamber 1202. Thereafter chamber 1202, the sewer is classified as combined.

7 Conclusion

- The EA FMfP shows that the site is within Flood Zone 1, the lowest classification of fluvial and tidal flooding. The southern part of the development is at risk of pluvial flooding. Following review of the drainage apparatus close to the site boundary, the flood extents shown are very conservative as there is a 1050mm culvert very close to the site that will collect most of the surface water flow in the southern part of the site, and surrounding area. Based on precautionary principle, the FMfP 0.1% pluvial extents were used to determine approximate water levels on the sites. The 0.1% AEP pluvial flood level has been calculated as 39.10mAOD. It is therefore proposed to raise FFLs on site to a minimum of 39.15mAOD. The flood risk from other sources is low.
- The existing car park can be considered brownfield. Flows discharge to a singular gully at the south of the site. This discharges to an existing culverted watercourse. It is anticipated in more intense rainfall events, the gully becomes surcharged and flows arising from the car park bypass the gully.
- The underlying strata is not suitable for surface water disposal using soakaways. This has been confirmed by onsite BRE365 infiltration testing.
- Proposed surface water discharge from the development will maintain the existing arrangement, and discharge to the culverted watercourse to the south west of the development, utilising the existing connection.
- Planted water butts will be provided to each dwelling. The water butts will provide amenity, biodiversity, and interception benefits, as well as rainwater re-use, where draw down from the water butt can be used for irrigation.
- Flows will be limited via a flow control device to a maximum of 7l/s for all storms up to and including the 1% AEP rainfall event with a 45% allowance for climate change, and 10% allowance for urban creep.
- Calculations show no flooding in the 3.3% AEP event with a 40% allowance for climate change or the 1% AEP with a 45% allowance for climate change.
- As the system will remain private, the landowner, or management company selected by landowner, are responsible for the maintenance of the drainage system.
- Flood Exceedance flows will be directed to the south of the development, away from people, utility and structure. They will discharge to Hammond Way, where any inundation will be intercepted by Highways gullies.

It is concluded that the development can be undertaken in a sustainable manner without increasing the flood risk to the proposed development or to existing properties/systems.

Appendix A – Topographic Survey



Trees/Tree Abbreviations			
ASH	Ash	LP	London Plane
BAY	Bay	MAP	Maple
BEE	Beech	OM	Oak
CB	Copper Beech	POP	Poplar
CE	Cedar	RM	Red Maple
CH	Cherry	RW	Redwood
CO	Cornus	SB	Silver Birch
ELD	Eldestery	SER	Service Tree
FR	Fruit	ST	Stump
HAW	Hawthorn	SYC	Sycamore
HAZ	Hazel	WAL	Walnut
HC	Horse Chestnut	WIL	Willow
HOL	Holly	WP	Weeping Willow
LAE	Larabum	YEW	Yew
LAU	Laurel		
LI	Lime	*MS	Multiple stemmum Overall dia. shown

Tree Dimensions (Average)	
Spread/Trunk Dia/Height	
Trees denoted with "approx" have been surveyed by remote methods and therefore their positions & dimensions cannot be guaranteed.	

Abbreviations			
AV	Air Valve	LP	Lamp Post
BL	Ballast	M	Meter
BM	Boundary Mark	MH	Manhole Cover
BT	Boundary Plant	MK	Marker
BT	BT Cover	MS	Milestone
CATV	Cable Television Cover	RG	Ridge Level
CAB	Cabinet	RS	Road Sign
CL	Cover Level	rp	Rain Water Pipe
EP	Electric Power Pole	SC	Stop Cock
EV	Eaves Level	SR	Strainer
FH	Fire Hydrant	SV	Stop Valve
FL	Floor Level	sp	Sub Vent Pipe
FP	Fence Post	TH	Threshold Level
G	Gully	TL	Traffic Light
GP	Gate Post	TP	Telephone Pole
GV	Gas Valve	UTL	Unable To Lift
IC	Inspection Chamber	VP	Vent Pipe
IL	Invert Level	WM	Water Meter
KD	Kerb Outlet	WO	Wash Out

Linetypes	
Bank	-----
Building	=====
Drop kerb	-----
Electric	-----
Fence	-----
Folage	-----
FWS	-----
Hedge	-----
Kerb	-----
Pipe	-----
SWIS	-----
Telephone	-----
Track/Path	-----
Tree Canopy	-----
Wagon	-----
Water Line	-----
Well	-----
Bore Hole	-----
Trunk	-----
Station Control	-----
Tree Dimensions (Average)	-----
Spread/Trunk Dia/Height	-----

SWS

SouthWestSurveys

Tel: 01454 501053

Mobile: 07955464495

www.southwestsurveys.co.uk

info@southwestsurveys.co.uk

28 Rudgeway Park

Rudgeway

Stroud

GL53 9JY

Drawing Title:

Topographical Survey

Project Name:

The Kings Arms

79 Wyke Road, Trowbridge, BA14 7NZ

Client:

n/a

Agent:

Deoric Group

Site Level Datum

Grid Orientation

OSN Height

OSN

Date:

Scale:

4th April 2023

1:250 to A3

Surveyed By

Drawn By

Sheet ID

Rev

CLB

CLB

SW00000000

01

Appendix B – Ground Investigation



GROUND TESTING LTD

INSITU TESTING REPORT



27904

Report No.	1476 - R.01(00)	Date	23 March 2026
Contract	Kings Arms, Trowbridge		
Client	Doric Developments (Bath) Ltd	Client Address	Doric House Middleton Drive Bradford on Avon Wiltshire BA15 1GB
Contact(s)	Nathaniel Timbrell-Whittle		
Order No.	NA	Client Reference	NA
Test Date(s)	23/03/2026		

UKAS Accredited Tests

3no. In-situ CBR Tests in accordance with BS1377: Part 9: 2025

Not UKAS Accredited Tests

2no. Soakaway Tests in accordance with BRE:365

Remarks:

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our company

The results represent the ground conditions at the specified locations and depths at the time of testing.

All tests have unique 'Sample Identification' which is given by the combination of the contract reference number and 'Position I.D'

Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

Approved signatories - Steven Philp & Sam Handcock

Ground Testing Ltd, 54 George Street, W-S-M, BS23 3AS - Company Registration 12200980

Contact: ask@groundtesting.co.uk

IN-SITU CALIFORNIA BEARING RATIO TEST

In accordance with BS1377:Part 9:2025

Position Ref:

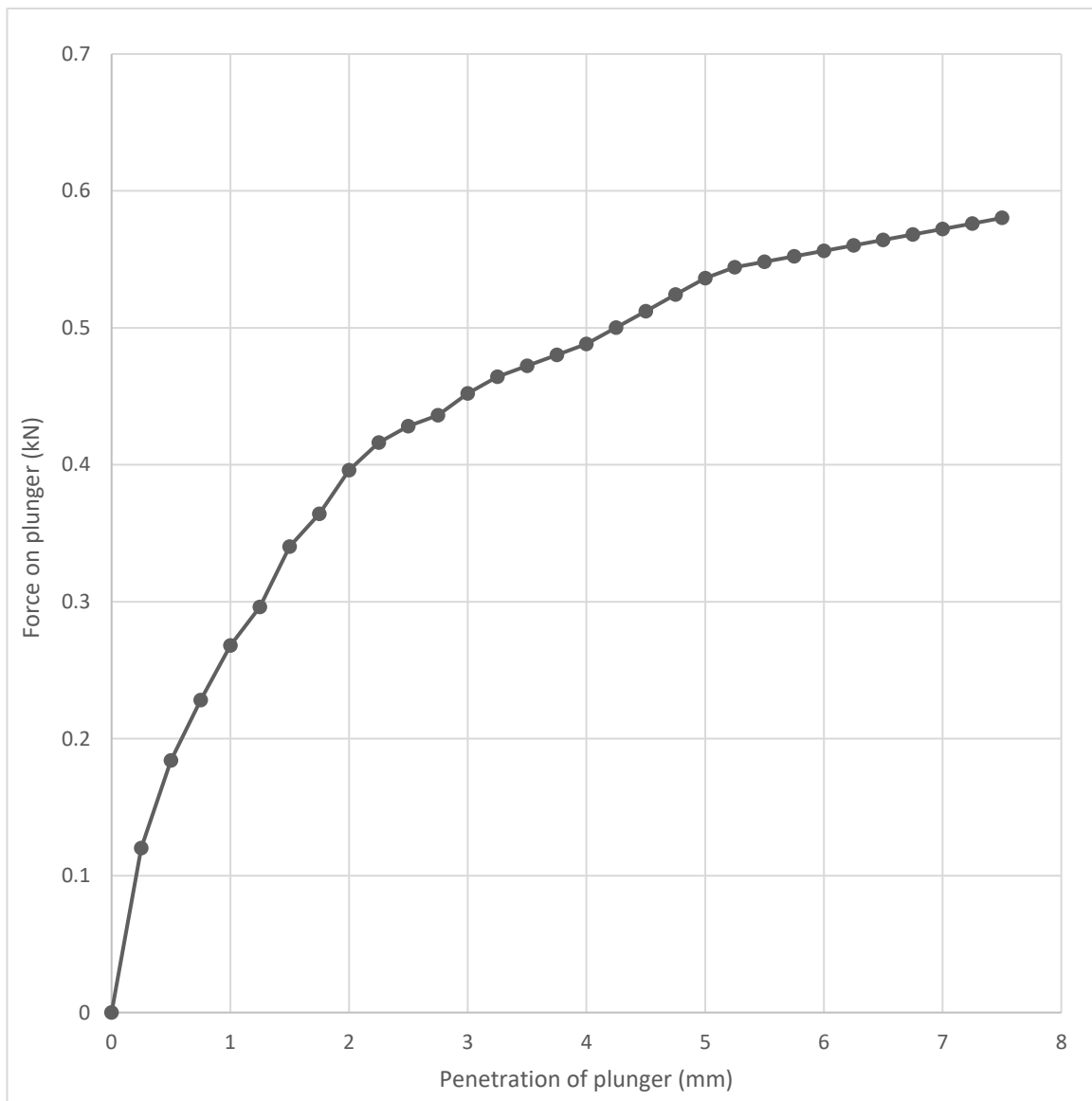
CBR 2

Depth (m):

0.8

Date:

23/03/2026



Test Details		Test Conditions		Test Results	
Surcharge (kg): 9.08		Weather: Clear		CBR Value (%): 3.2	
Surcharge Pressure (kPa): 2		Temperature (°C): 10			
Sample Description			Test Notes		
Greyish brown sandy CLAY			Estimated Particles >20mm (%) 0		
			Size and position of particles >20mm in relation to the plunger: Unknown		
Remarks: NGR: ST 86102 60163					
		Checked By:		Contract Ref:	
		Steven Philp		1476	
		23 March 2026		Kings Arms, Trowbridge	
		<i>S. Philp</i>			

IN-SITU CALIFORNIA BEARING RATIO TEST

In accordance with BS1377:Part 9:2025

Position Ref:

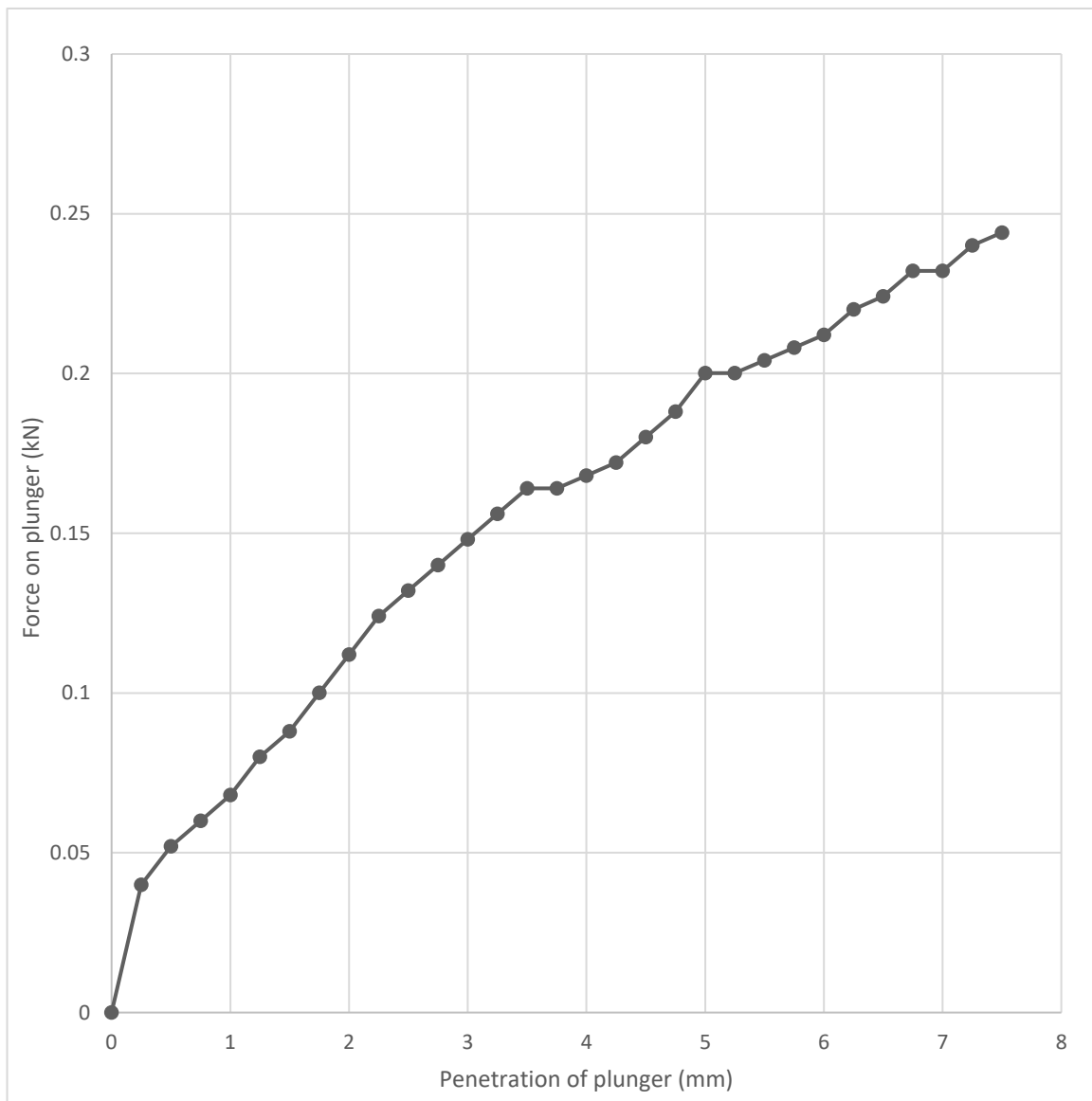
CBR 1

Depth (m):

0.8

Date:

23/03/2026



Test Details		Test Conditions		Test Results	
Surcharge (kg): 9.08		Weather: Clear		CBR Value (%): 1.0	
Surcharge Pressure (kPa): 2		Temperature (°C): 12			
Sample Description			Test Notes		
Greyish brown sandy CLAY			Estimated Particles >20mm (%) 0		
			Size and position of particles >20mm in relation to the plunger: Unknown		
Remarks: NGR: ST 86109 60183					
		Checked By:		Contract Ref:	
		Steven Philp		1476	
		23 March 2026		Kings Arms, Trowbridge	
		<i>S. Philp</i>			

IN-SITU CALIFORNIA BEARING RATIO TEST

In accordance with BS1377:Part 9:2025

Position Ref:

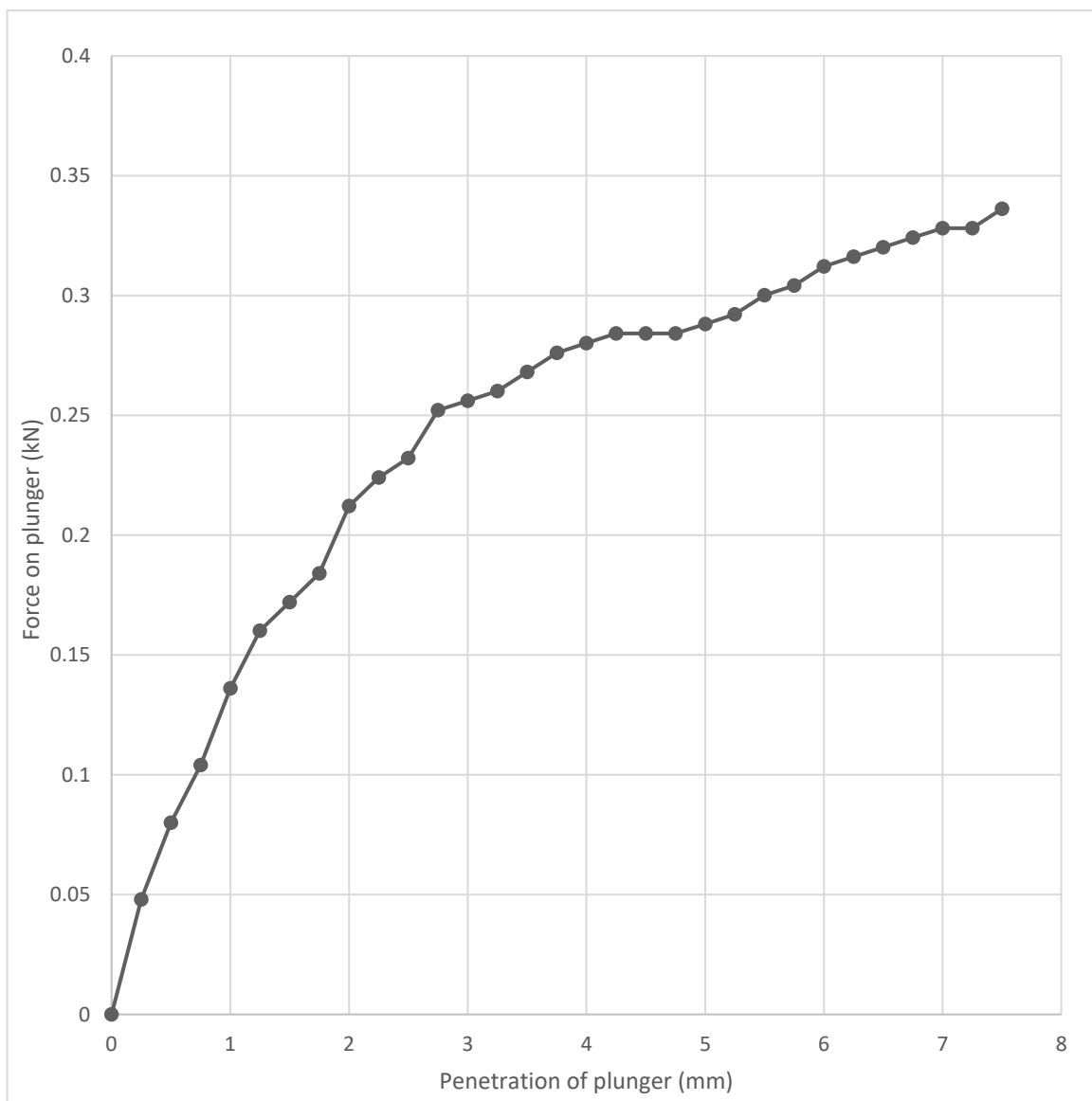
CBR 3

Depth (m):

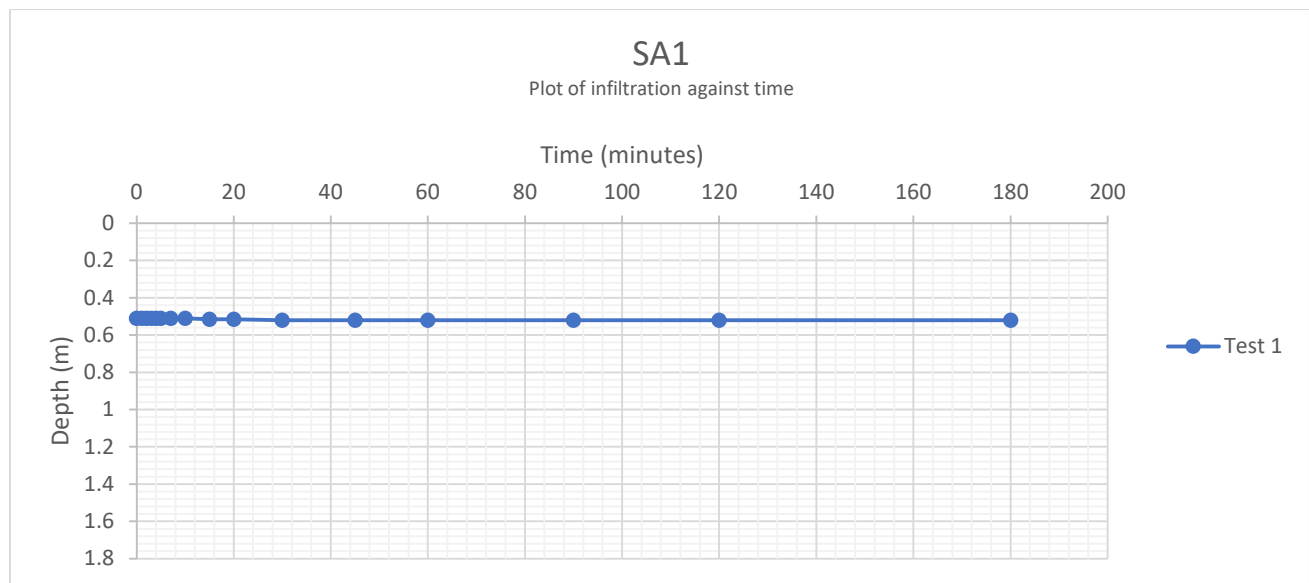
0.8

Date:

23/03/2026



Test Details		Test Conditions		Test Results	
Surcharge (kg): 9.08		Weather: Clear		CBR Value (%): 1.8	
Surcharge Pressure (kPa): 2		Temperature (°C): 12			
Sample Description			Test Notes		
Brown sandy CLAY			Estimated Particles >20mm (%) 0		
			Size and position of particles >20mm in relation to the plunger: Unknown		
Remarks: NGR: ST 86131 60209					
		Checked By:		Contract Ref:	
		Steven Philp		1476	
		23 March 2026		Kings Arms, Trowbridge	
		<i>S. Philp</i>			

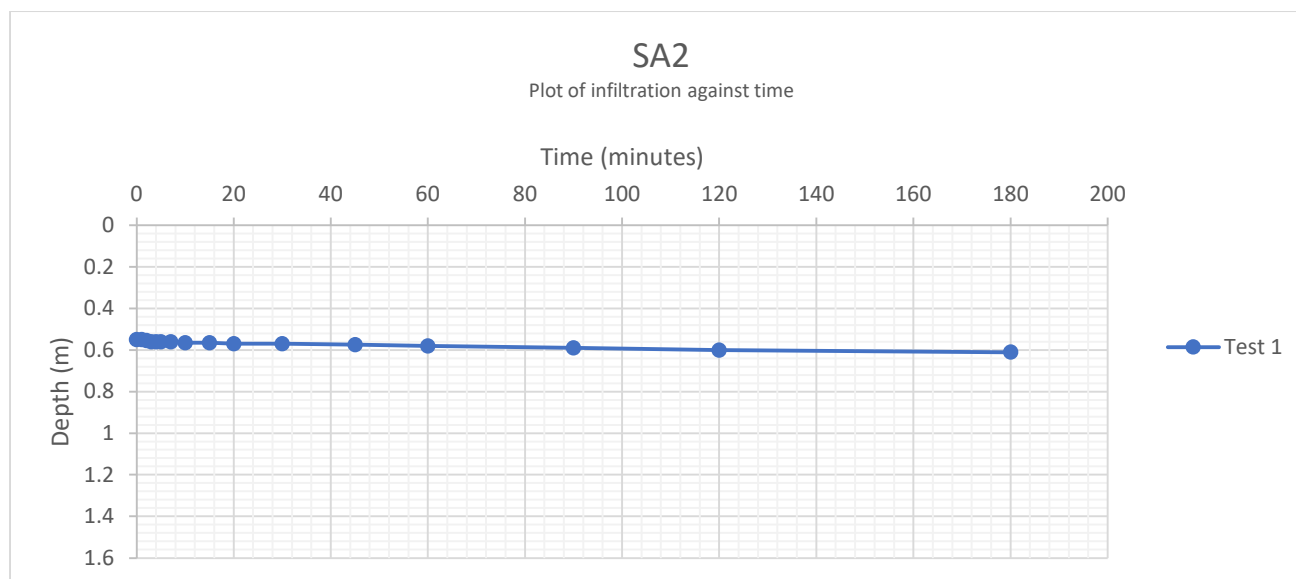


	Test 1 (23.03.26)	Test 2	Test 3
	●	●	●
Total pit depth at start of test (m)	1.70	-	-
Total pit depth at end of test (m)	1.70	-	-
Effective Depth, D_e (m)	1.19	-	-
Effective Storage Volume, V_{p75-25} (m ³)	0.40	-	-
Surface Area, a_{p50} (m ²)	3.18	-	-
Time, t_{p75-25} (seconds)	NA	-	-
Infiltration rate, f (m/s)	NA	-	-

Depth	Soil Description
0 – 0.10m	Tarmac
0.10 – 0.5m	Pinkish grey sandy GRAVEL
0.50 – 0.90m	Blueish grey sandy CLAY
0.90 – 1.50	Orangish brown slightly sandy CLAY

Notes:

Slight ingress of water prior to testing
Weather was sunny.
Pit was dug with a 8T JCB
Pit was filled using a 1000Ltr bowser.
Pit dimensions: **L 1.70m x W 0.40m x D 1.70m**
NGR: **ST 86102 60163**
Unable to calculate an infiltration rate due to insufficient drainage.



	Test 1 (23.03.26)	Test 2	Test 3
	●	●	●
Total pit depth at start of test (m)	1.50	-	-
Total pit depth at end of test (m)	1.50	-	-
Effective Depth, D_e (m)	1.95	-	-
Effective Storage Volume, V_{p75-25} (m ³)	0.46	-	-
Surface Area, a_{p50} (m ²)	3.62	-	-
Time, t_{p75-25} (seconds)	NA	-	-
Infiltration rate, f (m/s)	NA	-	-

Depth	Soil Description
0.00 – 0.50m	Pinkish grey sandy GRAVEL
0.50 – 1.20m	Grey very sandy CLAY
1.20 – 1.50m	Orangish brown SAND

Notes:

Slight ingress of water prior to testing

Weather was sunny.

Pit was dug with a 8T JCB

Pit was filled using a 1000Ltr bowser.

Pit dimensions: **L 2.40m x W 0.40m x D 1.50m**

NGR: **ST 86109 60183**

Unable to calculate an infiltration rate due to insufficient drainage.



Comment SA1	Project Kings Arms, Trowbridge
	Photo Plate 1
	Date 23/03/26
	Originator S.Philp
	 GROUND TESTING LTD Ground Testing Ltd ask@groundtesting.co.uk www.groundtesting.co.uk VAT: 332931414 Reg: 12200980

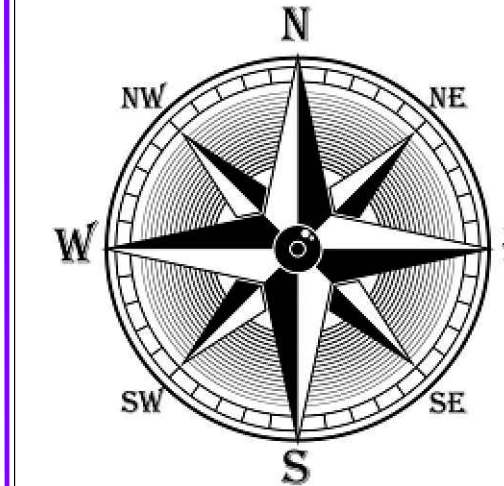


Comment SA2	Project Kings Arms, Trowbridge
	Photo Plate 2
	Date 23/03/26
	Originator S.Philp
	 GROUND TESTING LTD Ground Testing Ltd ask@groundtesting.co.uk www.groundtesting.co.uk VAT: 332931414 Reg: 12200980



Comment GW Pit Slight ingress of water. 0.00-0.40m Brown slightly sandy gravelly CLAY many roots and rootlets (TOPSOIL) 0.40-1.80 Orangish greyish brown slightly sandy silty CLAY 1.80-2.30 Orangish brownish grey very sandy silty CLAY Weather was sunny. Pit was dug with a 8T JCB Pit dimensions: L 2.40m x W 0.40m x D 2.30m NGR: ST 86086 60164	Project Kings Arms, Trowbridge
	Photo Plate 3
	Date 23/03/26
	Originator S.Philp
	 Ground Testing Ltd ask@groundtesting.co.uk www.groundtesting.co.uk VAT: 332931414 Reg: 12200980

Appendix C – CCTV Survey



160250 N

160200 N

160150 N

160100 N

386000 E

386050 E

386100 E

386150 E

386200 E

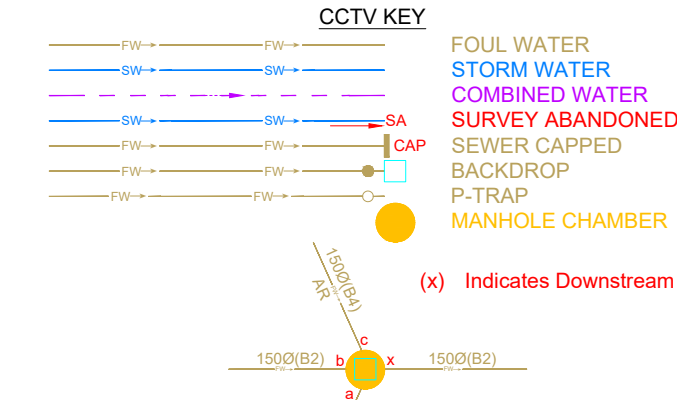
0m 4m 8m 12m 16m 20m 24m 28m 32m

Drainage Notes:

- Grid and elevation measurements are based on the OSGB36 National Datum, sourced from the National GPS network.
- We work to a standard specification as recommended by the Royal Institute of Chartered Surveyors (RICS) for measured surveys of Land, Buildings and Utilities.
- Drainage details have been ascertained without direct access to chambers. While diligent efforts have been made for accuracy, it's advisable to independently verify critical information for future planning.
- Unless verified by tracing techniques, all sewer segments are assumed to be linear between chambers.
- The OS site & Topo data provided is sourced from a third party and has not been confirmed through field verification.

CCTV & DRAINAGE

- Survey to be read in conjunction with the CCTV Report.
- Attempts were made to carry out CCTV Surveys of all assets across the site. Surveys may have been abandoned due to structural defects or a build up of debris. Furthermore some sewers may have not been surveyed due to access to the pipe inside the manhole being impeded, too deep or blocked.
- All findings from the CCTV Survey have been added to the drawing. Positioning of pipes is indicative using CCTV Change unless these have been proved using underground positioning techniques.

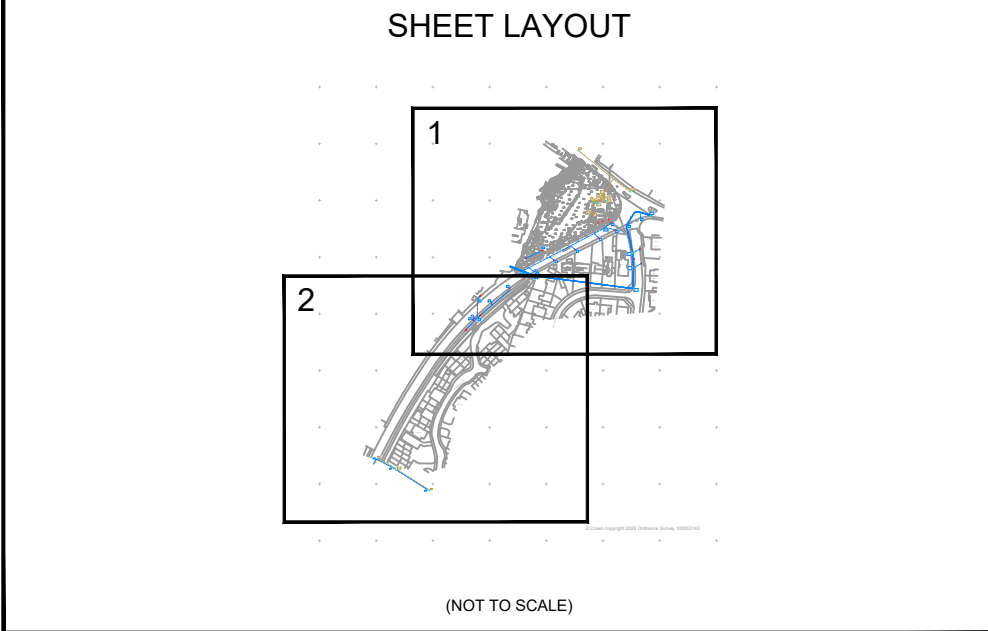


ABBREVIATIONS

AC Acoustic Connection	IL Invert Level	SOF Soft Level
AR Assumed Route	IC Inspection Cover	SOFd Soft Depth
BO Backdrop	KO Kerb Outlet	SP Soil Pipe
BD Base Depth	LP Lamp Post	SS Soil Stack
BL Base Level	MH Manhole	SV Stop Valve
CL Cover Level	NFI No Further Information	SVP Soil Vent From Records
CP Catchout	OSA Out of Survey Area	TFR Taken From Records
DCH Drainage Channel	PTG Pipe to Ground	TL Traffic Light
DP Down Pipe	PTS Pipe to Surface	TP Telegraph Pole
ECI End Of Trace	RE Rooting Eye	UTF Unable to Trace Further
EP Electric Pole	RS Road Stop	UTL Unable to Locate
ER Earth Rod	RWP Rain Water Pipe	UTR Unable to Raise
FI Fire Hydrant	SA Survey Abandoned	UTS Unable to Survey
GV Gas Valve	Sd Silt Depth	UTT Unable to Trace
GY Gully	SL Soil Level	WD Water Depth
Id Invert Depth	SP Soil Pipe	WL Water Level

Survey Type	Quality Level	Description
Q1 - Desktop (RAW) Records Search	QL-D	Provisional location has been provided by a utility record search only. This is the lowest quality level a survey can provide.
Q2 - Data Recommendation	QL-C	Provisional location has been confirmed by the client or other reference to street function. Topographical location or evidence of previous street works, such as a manhole or man, is not required.
Q3 - Data Recommendation	QL-B	Provisional location has been confirmed. The utility or segment of utility is expected to exist but was not detected by the geophysical techniques used.
B - Detection	QL-BSP	Provisional location has been detected by one of the geophysical techniques but with no confidence in depth.
	QL-BSP	Provisional location has been detected by one of the geophysical techniques but with no confidence in depth.
	QL-BSP	Provisional location has been detected by one of the geophysical techniques but with no confidence in depth.
A - Verification	QL-A	Provisional location has been confirmed by one of the geophysical techniques but with no confidence in depth.

Method	ESL	GPR	Other	Quality Levels Achievable	Typical Application
M1	Original records and/or field notes	Yes	Yes	B1-B3, B3-B4	Used when the quality of records is high and the location is well known.
M2	Original records and/or field notes	Yes	Yes	B1-B3, B3-B4	Used when the quality of records is high and the location is well known.
M3	Original records and/or field notes	Yes	Yes	B1-B3, B3-B4	Used when the quality of records is high and the location is well known.
M4	Original records and/or field notes	Yes	Yes	B1-B3, B3-B4	Used when the quality of records is high and the location is well known.



Project:

Kings Arms

Client:

tumu

Title:

CCTV Drainage Survey

R5		
R4		
R3		
R2		
R1	21/08/26	Scale Bar added
R0	05/05/26	CCTV Drainage Survey
No.	Date	Drawing Revisions

Job No.:	2405	Date:	21/08/26
Scale:	1:250	Expiry Date:	21/08/27
Sheet Size:	A0	Revision:	R1
Sheet No.:	1	Approved:	LF

Survey Notes:

When surveying GY1 behind the truck we were pulled up by someone who said they worked for the council who insisted we had traffic management for surveying the Gullies, hence why the highway gullies haven't been surveyed.

The FW system around the property appears to be working as intended.

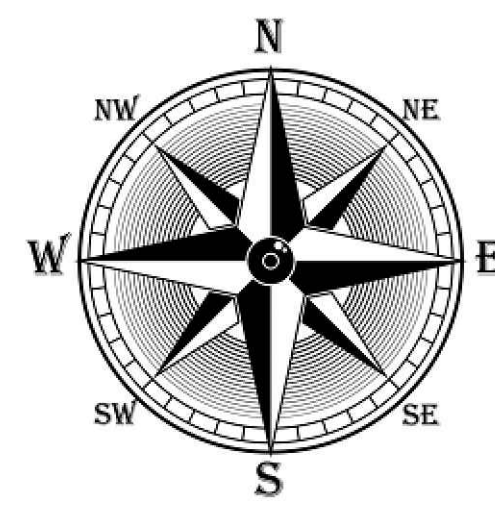
Some of the SW system on Wyke road was surcharged and could do with HPWU to clean out.

MH14's cover is a tapered Triangular cover and the hinges appeared to be seized so we could only open it slightly.

We couldn't survey Outlet1. The pipe was offset back under the fence and the access wasn't very safe.

We couldn't survey Culvert1. The opening was blocked by a section of concrete pipe.

Weather - Clear and Dry at time of Survey.



160100 N

160050 N

160000 N

159950 N

385900 E

385950 E

386000 E

386100 E

386100 E

0m 4m 8m 12m 16m 20m 24m 28m 32m



POINT SURVEYS LTD
TOPOGRAPHICAL SURVEYS, PAS128 UTILITY SURVEYS, CCTV DRAINAGE SURVEYS, AS-BUILT SURVEYS, 3D LASER SCANNING, SETTING OUT.

0 Holly Close
Dorchester
Dorset DT1 1XP

01752 402747
07553 345000
sales@point-surveys.co.uk

Drainage Notes :

- Grid and elevation measurements are based on the OSGB36 National Datum, sourced from the National GPS network.
- We work to a standard specification as recommended by the Royal Institute of Chartered Surveyors (RICS) for measured surveys of Land, Buildings and Utilities.
- Drainage details have been ascertained without direct access to chambers. While diligent efforts have been made for accuracy, it's advisable to independently verify critical information for future planning.
- Unless verified by tracing techniques, all sewer segments are assumed to be linear between chambers.
- The OS site & Topo data provided is sourced from a third party and has not been confirmed through field verification.

CCTV & DRAINAGE

- Survey to be read in conjunction with the CCTV Report.
- Attempts were made to carry out CCTV Surveys of all assets across the site. Surveys may have been abandoned due to structural defects or a build up of debris. Furthermore some sewers may have not been surveyed due to access to the pipe inside the manhole being impeded, too deep or blocked.
- All findings from the CCTV Survey have been added to the drawing. Positioning of pipes is indicative using CCTV Change unless these have been proved using underground positioning techniques.

CCTV KEY

FOUL WATER

COMBINED WATER

COMBINED WATER SURVEY ABANDONED

SEWER CAPPED

BACKDROP

P-TRAP

MANHOLE CHAMBER

(x) Indicates Downstream Pipe

ABBREVIATIONS

AC Acoustic Connection	IL Invert Level	SOF Soft Level
AR Assumed Route	IC Inspection Cover	SOFd Soft Depth
BO Backdrop	KO Kerb Outlet	SP Soil Pipe
BL Base Depth	LP Lamp Post	SS Soil Stack
BL Base Level	MH Manhole	SV Stop Valve
CL Cover Level	NFI No Further Information	SVP Soil Vent Pipe
CP Callout	OSA Out of Survey Area	TFR Taken From Records
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DP Down Pipe	PTS Pipe to Surface	TP Telegraph Pole
ECI End Of Trace	RE Rooting Eye	UTF Unable to Trace Further
EP Electric Pole	RS Rod Stop	UTL Unable to Locate
ER Earth Rod	RWP Rain Water Pipe	UTR Unable to Raise
FI Fire Hydrant	SA Survey Abandoned	UTS Unable to Survey
GV Gas Valve	Sd Silt Depth	UW Unable to Trace
GY Gully	SL Silt Level	WD Water Depth
Id Invert Depth	SP Soil Pipe	WL Water Level

PAS128:2022 UTILITY CLASSIFICATION

Survey Type	Quality Level	Description
D - Desktop / WMS Records Search	QL-D	Provisional location has been provided by a utility record search only. This is the lowest quality level a survey can provide.
C - Data Reconnaissance	QL-C	Provisional location has been confirmed by field inspection and reference to street furniture. Topographical features or evidence of previous street works, such as a manhole cover, are used to confirm the location.
B - Detection	QL-BSP QL-BSP QL-BSP	Provisional location has been detected by one of the geophysical techniques but with no confidence in depth. This is a moderate confidence in the survey accuracy in quality level.
A - Verification	QL-A	Provisional location has been confirmed by one of the geophysical techniques but with no confidence in depth. This is a high degree of confidence in the survey accuracy in quality level.

PAS128:2022 DETECTION METHODS

Method	ESL	GPR	Other	Quality Levels	Typical Application
M1	Oblique resistivity	Yes	No	B1-B3, B1-B4	Used to detect the location of buried objects.
M2	Oblique resistivity	Yes	No	B1-B3, B1-B4	Used to detect the location of buried objects.
M3	Oblique resistivity	Yes	No	B1-B3, B1-B4	Used to detect the location of buried objects.
M4	Oblique resistivity	Yes	No	B1-B3, B1-B4	Used to detect the location of buried objects.

SHEET LAYOUT

Project:

Kings Arms

Client:

Title:

CCTV Drainage Survey

R5	
R4	
R3	
R2	
R1	21/08/26 Scale Bar added
R0	05/05/26 CCTV Drainage Survey

No.	Date	Drawing Revisions

Job No.:	2405	Date:	21/08/26
Scale:	1:250	Expiry Date:	21/08/27
Sheet Size:	A0	Revision:	R1
Sheet No.:	2	Approved:	LF

Survey Notes :

When surveying GY1 behind the truck we were pulled up by someone who said they worked for the council who insisted we had traffic management for surveying the Gullies, hence why the highway gullies haven't been surveyed.

The F/W system around the property appears to be working as intended.

Some of the SW system on Wyke road was surcharged and could do with HPWU to clean out.

MH14's cover is a hinged Triangular cover and the hinges appeared to be seized so we could only open it slightly.

We couldn't survey Outfall1. The pipe was offset back under the fence and the access wasn't very safe.

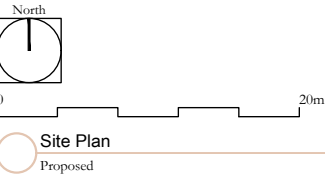
We couldn't survey Outfall1. The access was blocked by a section of concrete pipe.

Weather - Clear and Dry at time of Survey.

Appendix D – Proposed Site Plan

LEGEND

- Site Boundary
- Tarmac surfaces
- Block paved roads/footpaths
- Private gardens
- Soft landscaping areas
- Paving slabs
- Dark grey colour roof tiles
- Terracotta colour roof tiles
- New trees
- Native hedgerows
- 1.8m high brick boundary walls
- 1.8m high close boarded fence
- Root protection areas



TEA ARCHITECTS
5 Argyle Street
Bath
BA2 4BA
www.tea-architects.co.uk

Do not scale: use only figured dimensions unless for planning purposes. Dimensions are displayed in millimetres unless stated otherwise. All dimensions and setting out are to be checked on site prior to starting work: report any discrepancies immediately. This drawing is not to be used for either the valuation or purchase of a property or building site.

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Project Name:	Kings Arms, Staverton
Drawing Title:	Site Plan - Proposed
Project Number:	2435
Drawing No:	010
Revision:	H
Date:	22/06/2026
Status:	Planning
Scale @ A3 HORIZONTAL	1:500

Appendix E – Proposed Drainage Strategy

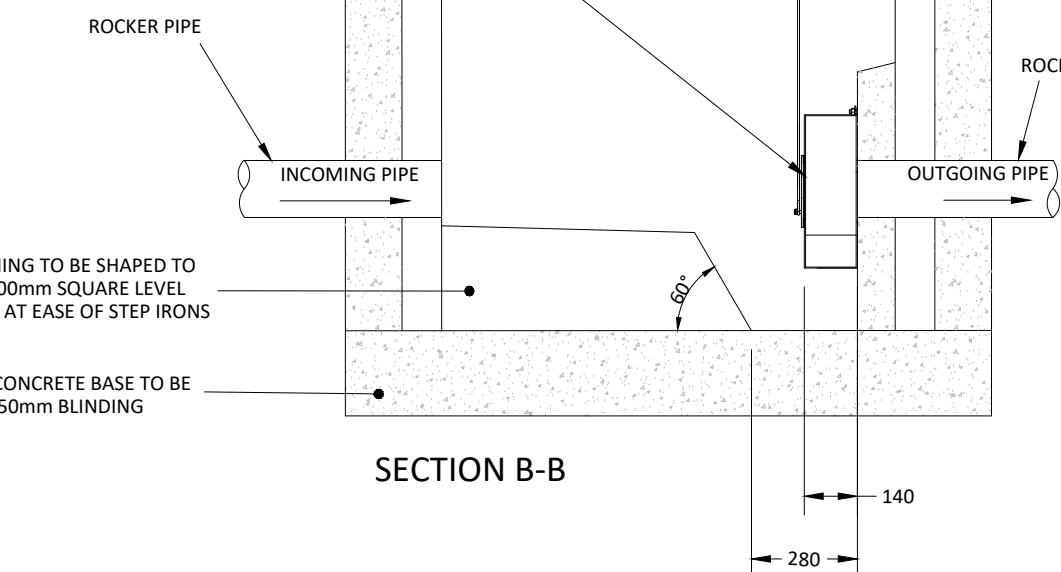


KEY	
EXISTING	
WESSEX WATER FOUL SEWER	
WESSEX WATER COMBINED SEWER	
HIGHWAYS DRAINAGE	
CULVERTED WATERCOURSE	
PRIVATE FOUL WATER DRAINAGE	
PRIVATE SURFACE WATER DRAINAGE	
PROPOSED	
PRIVATE SURFACE WATER DRAIN	
PRIVATE FOUL DRAIN	
PRIVATE FOUL RISING MAIN	
POLYPROPELENE INSPECTION CHAMBER	
MINI ACCESS CHAMBER	
RODDING EYE	
RAINWATER DOWNPIPE	
SOIL VENT PIPE/SUB STACK	
TYPE C TANKED PERMEABLE PAVING WITH CHECK DAM	
FLOW CONTROL DEVICE	
DISTRIBUTION BOX	
WATER BUTT	
NOTES	
1. ALL DRAINAGE ON SITE IS TO REMAIN PRIVATE.	
2. OUTFALL OF ALL DRAINAGE TO BE CONSTRUCTED IN THE FIRST INSTANCE IN ORDER TO DETERMINE EXISTING INVERT LEVELS OF CONNECTION POINTS.	
3. ALL SWP AND RWP LOCATIONS ARE ILLUSTRATIVE. TO BE SET OUT BY ARCHITECT AT DETAILED DESIGN STAGE	
4. THE DRAINAGE STRATEGY HAS BEEN COMPILED TO SUPPORT A FULL PLANNING	

B	UPDATED SITE PLAN	23.07.26	RJP	BF
A	FIRST ISSUE	22.05.26	RJP	BF
REV.	DESCRIPTION	Date	BY	CHK
DESIGN BY:				
CLIENT:				
DORIC GROUP				
DRAWING STATUS:				
PLANNING APPLICATION				
SCALE @ A1:				
PROJECT:				
KINGS ARMS, TROWBRIDGE				
TITLE:				
DRAINAGE STRATEGY				
Project Ref: Originator: Stage: Phase: Number:				REV:
20055-TUM-PL-XXX-0200				B

Appendix F – Standard Drainage Details

SCALE 1:20



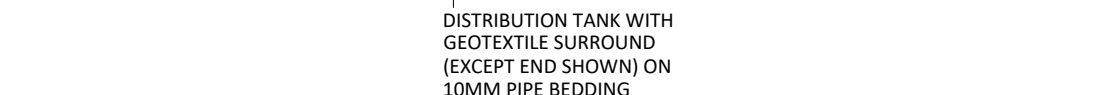
SCALE 1:20



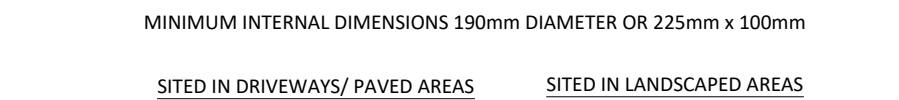
SCALE 1:20

(HEAVY DUTY CONSTRUCTION) 1:20

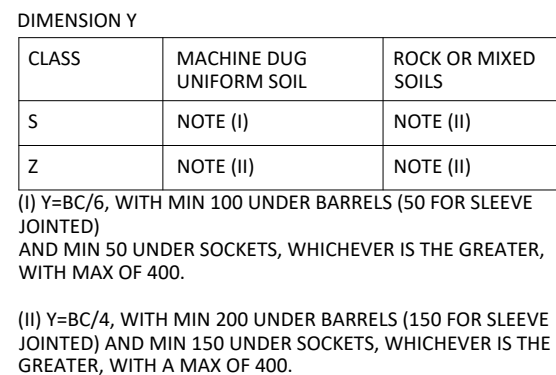
1-30



SCALE 1:20



SCALE 1:20



SCALE 1-20



DESIGN BY:

CLIENT:

DORIC GROUP

DRAWING STATUS:

PLANNING APPLICATION

SCALE @ A1:

PROJECT:

KINGS ARMS, TROWBRIDGE

TITLE:	
--------	--

STANDARD DRAINAGE DETAILS

Project Ref: Originator: Stage: Phase: Number:
 20055-TUM-PL-XXX-0280

REV:

B

Appendix G – Causeway FLOW Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	10	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
PP	0.135	5.00	38.900	1200	386108.503	160160.716	0.720	38.180

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	40	10	0
100	45	10	0

Node PP Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	38.130	Product Number	CTL-SHE-0131-7000-0460-7000
Design Depth (m)	0.460	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	7.0	Min Node Diameter (mm)	1200

Node PP Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	38.180	Slope (1:X)	9999.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	108	Depth (m)	0.410
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.30	Length (m)	113.000		

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute summer	PP	76	38.228	0.048	10.5	7.1032	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute summer	PP	Hydro-Brake®	4.6	20.9

Results for 30 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	PP	90	38.464	0.284	40.3	46.6480	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
120 minute summer	PP	Hydro-Brake®	7.0	80.1

Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 99.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute summer	PP	98	38.590	0.410	53.5	68.0889	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute summer	PP	Hydro-Brake®	7.0	106.3