Waterman Infrastructure & Environment Limited
Pickfords Wharf, Clink Street, London, SE1 9DG
www.watermangroup.com

Response to Objection to Outline planning permission for Extension of MIRA Technology Park

Technical Note

Date: 29/11/2022

Client Name: ERI MTP Limited

Document Reference: EED13833-118-TN-3-1-3

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS EN ISO 45001:2018)

Issue	Prepared by	Checked & Approved by
	Sean Whelan Senior Engineer	Brendan McCarthy Technical Director

Introduction

1.1. Waterman was commissioned by ERI MTP Limited to address objections raised to an outline planning application for the Extension of MIRA Technology Park to comprise employment use (Class B2); associated office and service uses (Class Eg); storage (Class B8); new spine road; car parking, landscaping and enabling works - all matters reserved. The Site is located to the south of Watling Street, Caldecote, CV10 0TS.

1.2. The full response is provided in Appendix A and the further information required to overcome the objection, as outlined by Warwickshire County Council, is summarised below:

1) The LLFA requires further information regarding the capacity and flood risk associated with the on-site watercourse to demonstrate that proposals will not increase flood risk on site and elsewhere. Further evidence should include:

- An evaluation of the on-site channel capacity including surveyed cross sections demonstrating that there is sufficient capacity to accommodate contributing flows from the site. This is particularly pertinent given the proposals to remove storage capacity on site by infilling the southern ditch and increase the contributing catchment area to the watercourse.
- Discussion around the potential risk of bank overtopping and anticipated flow routes and flood outlines.
- Information on the condition of the downstream culvert passing under the A444 demonstrating that flow will not be constricted and pose an increase to flood risk.

2) Given the proposed catchment changes, indicative site levels and further discussion should be provided on the anticipated increase in cross catchment flows and flow routes demonstrating that flood risk will not be increased on site or elsewhere as a result. This should also provide clarification as to whether land raising is proposed as part of the strategy.

3) Given the above requirements for further flood risk investigation in point 1, demonstrate that the proposed drainage features are outside the 8m watercourse easement and any anticipated flood outlines. This is to ensure their performance will not be compromised should the watercourse overtop, and that there will be adequate access for maintenance. This should include further details on the drainage layout plan 'Attenuation Summary' illustrating where the watercourse lies in relation to the drainage features and further detail on the outfall locations.

4) The proposed discharge rate of 6.2l/s/ha is higher than the usual average QBAR discharge rate for areas underlain with clay (Soil type 4). The LLFA requires further evidence demonstrating that calculations are correct and follow best practice methodology.

5) The LLFA notes the proposals for Permeable paving and multiple ponds to provide surface water attenuation and a treatment train, which is welcomed. However, the current drainage strategy still relies on substantial storage volumes from underground tanks. The LLFA therefore requires further evidence that opportunities to maximise above ground SuDS within the strategy have been explored and further justification is provided for the chosen methodologies.

Item 1 - Capacity and flood risk associated with the on-site watercourse

1.3. The channel capacity of the on-site watercourse has been assessed using topographic survey information (Appendix B) and Manning's Equation for open-channel flow (calculation details provided in Appendix C).

1.4. The estimated contribution from the upstream catchment for the 1:100 + 22% climate change event is 1.66 m^3/s, as detailed within the submitted FRA (EED13833-118-R-2-4-3-FRA).

1.5. The proposed total runoff rate from the Site, based on restricting runoff from impermeable surfaces to greenfield runoff rates is 0.236 m^3/s.

1.6. The minimum capacity of the channel is 2.38 m^3/s at the upper end of the watercourse.

1.7. Therefore, there is sufficient capacity within the channel to convey the maximum design flow (1.90 m^3/s), allowing for both the upstream contribution (1.66 m^3/s) and the proposed discharge from the Site (0.24 m^3/s).

1.8. The outflow structure at the downstream end of the watercourse consists of two 900mm diameter culverts. Survey information for the downstream end of the culverts is not available. However, the gradient has been estimated as 1:270 based on LiDAR ground levels at the upstream and downstream ends. The 1:270 gradient has been sense-checked based on the watercourse upstream of the culverts, which is has a gradient of 1:272. Each 900mm culvert has a pipe full capacity of 1.55 m^3/s[1] based on the assumed gradient. Therefore, the outflow structure has sufficient capacity (2 x 1.553 = 3.10 m^3/s) to convey the maximum design flow (1.90 m^3/s).

1.9. It is expected that the culvert will be cleared of any siltation and surveyed at the next design stage to facilitate a condition survey, confirm its downstream dimensions, and ensure it can function as designed.

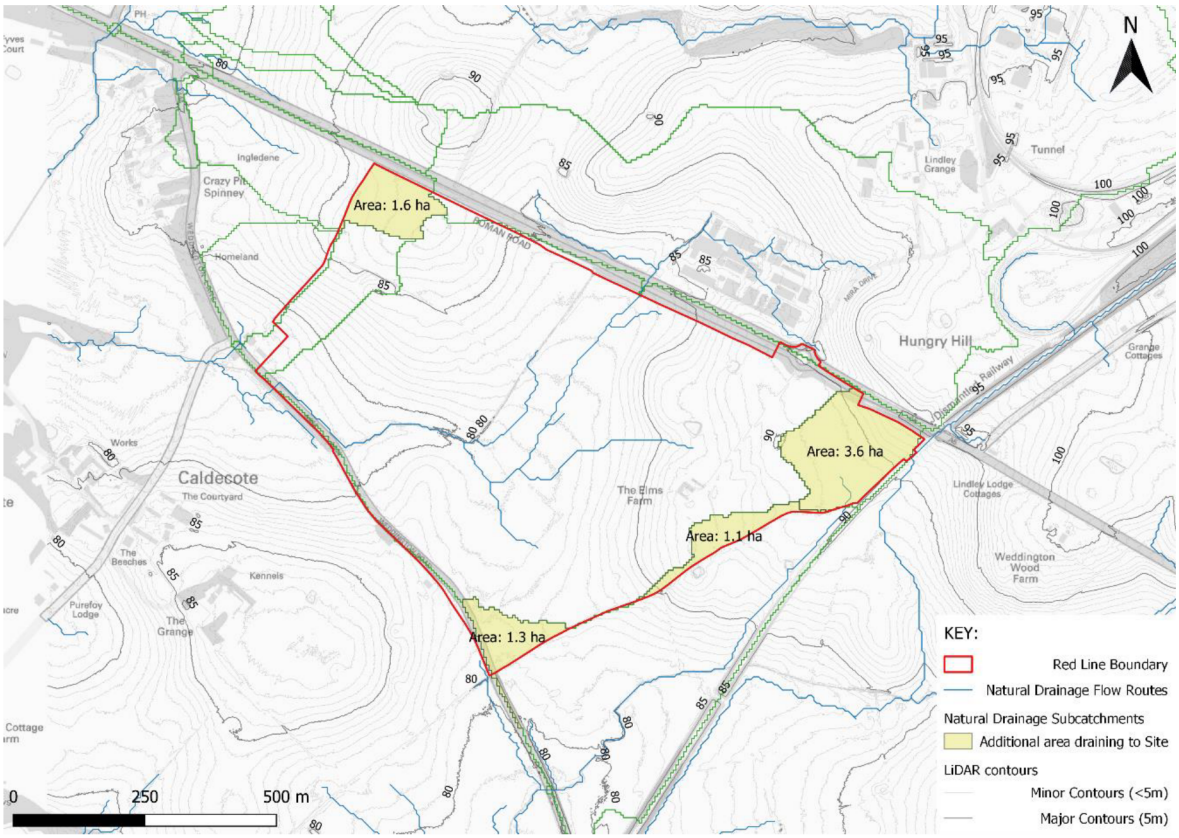
[1] HR Wallingford, 1990. *Tables for the hydraulic design of pipes and sewers.* Fifth Edition. London: Thomas Telford Ltd

Item 2 - Catchment contributions

1.10. All of the runoff from the Site currently drains to the River Anker which is the proposed discharge location of the drainage strategy. Therefore, there will be no increased discharge to the River Anker as a result of the development proposals based on the contributing catchment area.

1.11. The change in natural drainage sub-catchments has been assessed and is shown in Figure 1. There is an additional area of 7.6 ha being drained to the on-site watercourse, passing through the culvert at the downstream end of the Site, and eventually discharging to the River Anker.

Figure 1: Overview of the natural drainage flow routes



1.12. Although the proposed drainage strategy will increase the area draining to the on-site watercourse, this will all be attenuated to the Greenfield QBAR rate for the existing catchment area so there will be no increase in total runoff from the Site.

1.13. It is demonstrated by the previous assessment that the on-site watercourse has sufficient capacity to accommodate the proposed design flow.

1.14. As noted in paragraph 3.17 of the FRA (EED13833-118-R-2-4-3-FRA), the LLFA have previously raised concerns regarding historical flooding in the area of Weddington to the east of the Site. The eastern sub-catchments of the Site within the existing Weddington catchment area will be actively drained as part of the proposed drainage strategy. Therefore, flows will be transferred from the

Weddington, known to be at risk of flooding, to the on-site drainage network and watercourse, which has been confirmed to have sufficient capacity to accommodate the additional flows.

1.15. Land in the northern corner the Site that currently drains to the catchment to the west will also drain to the on-site drainage network and watercourse, both of which have sufficient capacity to accommodate the additional flows.

Item 3 - Drainage features outside 8m easement and flood extents

1.16. There are two ponds on the previously submitted drainage strategy that do not provide the full 8m easement. These are currently being redesigned as part of the next stage of the design and the ponds will be removed and replaced with a swale. The 8m easement will be considered and included within the updated drainage strategy and supporting drawings

Item 4 - Review of the greenfield discharge rate

1.17. Updated calculation of the greenfield runoff rate (4.32 l/s/ha) for the site, is provided in Appendix D. The revised greenfield runoff rate is 30% lower than the previous calculation (6.2 l/s/ha), which was based on an overestimated annual average rainfall (SAAR). The revised discharge rate for the site area is 264.52 l/s, based on a total site area of 61.0 ha.

1.18. The volume of attenuation for the site will be updated based on the revised greenfield run-off and optimised using hydrobrakes to restrict the flow throughout the proposed development. This will be issued as part of the Reserved Matter application.

Item 5 - Justification of the proposed SuDS features

1.19. The drainage design is based on an outline parameter plan to support an outline planning application. The primary objective is to ensure that the Site is space proofed to provide sufficient surface water attenuation, storage, and water quality treatment. There will be an opportunity at the Reserved Matters stage to incorporate further SuDS features (such as rain garden, bioretention areas, etc.) as increasing levels of detail become available for specific plots and construction phases.

1.20. The currently proposed surface water drainage strategy includes a mix of ponds, tanks, and permeable paving. It provides storage and attenuation while ensuring surface water is treated at source through the extensive use of permeable paving.

APPENDIX A

Your ref: PAP/2022/0423
Our ref: WCC002597/FRM/GF/001
Your letter received: 21/09/2022

SENT BY EMAIL

Mr Jeff Brown
Head of Development Control
North Warwickshire Borough Council
The Council House
South Street
Atherstone CV9 1DE

Flood Risk Management
Warwickshire County Council
Shire Hall
Warwick
Warwickshire
CV34 4RL
Tel: 01926 412982
FRMPlanning@warwickshire.gov.uk
www.warwickshire.gov.uk

FAO Jeff Brown

10 October 2022

Dear Mr Brown

PROPOSAL: **Outline planning permission for Extension of MIRA Technology Park to comprise employment use (Class B2); associated office and service uses (Class Eg); storage (Class B8); new spine road; car parking, landscaping and enabling works - All matters reserved**

LOCATION: **Land to the south of, Watling Street, Caldecote, CV10 0TS**

Warwickshire County Council as the Lead Local Flood Authority (LLFA) has reviewed the application which was received on the 21 September 2022. Based on the information submitted the LLFA currently recommends refusal of planning permission and **objects** to the development based on the following reasons.

Reason
The information submitted with this application does not comply with the requirements set out in the National Planning Policy Framework[i] (NPPF) and supporting Flood Risk & Coastal Change guidance[ii]. Specifically:

- The Flood Risk Assessment may be considered insufficient in assessing the flood risk to or from the proposed development.
- The details relating to the surface water drainage are insufficient.

The submitted information does not therefore allow a suitable assessment of the proposed development, considering flood risk and surface water drainage matters.

Overcoming our objection

You can overcome our objection by submitting further information which is detailed below. This information should provide a suitable assessment of the flood risk both to and from the development and provide details of the proposed surface water drainage considering the scale and nature of the development to ensure the site will not increase risk elsewhere and where possible reduces flood risk overall. If this cannot be achieved we are likely to maintain our objection to the application.

At the ‘outline’ planning stage the Surface Water Drainage Strategy should be developed to inform the masterplan or indicative site layout. This should be based on SuDS principles and provide opportunity to attenuate surface water runoff, improve water quality and provide amenity and biodiversity. This should be supported by suitable high-level calculations demonstrating the performance of the attenuation and that adequate space is provided.

Given the above, the following comments are made and further information required is outlined. This forms the basis of our current objection:

1. The LLFA requires further information regarding the capacity and flood risk associated with the on site watercourse to demonstrate that proposals will not increase flood risk on site and elsewhere. Further evidence should include:
    - An evaluation of the on site channel capacity including surveyed cross sections demonstrating that there is sufficient capacity to accommodate contributing flows from the site. This is particularly pertinent given the proposals to remove storage capacity on site by infilling the southern ditch and increase the contributing catchment area to the watercourse.
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We ask to be re-consulted with the results of any additional information. We will provide you with bespoke comments within 21 days of receiving formal reconsultation.

Informative

a) Surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management. Sustainable Drainage Systems (SuDS) are an approach to managing surface water run-off which seeks to mimic natural drainage systems and retain water on-site as opposed to traditional drainage approaches which involve piping water off-site as quickly as possible.
b) The LLFA does not consider oversized pipes or box culverts as sustainable drainage. Where such attenuation is considered necessary, this should be supplemented with suitable above ground

features such as green roofs, rain-gardens and tree pits to provide water quality, amenity and bio-diversity benefits.

c) Reference is made to the LLFA's *Flood Risk & Sustainable Drainage Local guidance for developers*[iii] which provides further advice and guidance as to how surface water drainage proposals should be designed.

Advisory

Section 23 of the Land Drainage Act 1991 requires that before the erection or alteration of any obstruction to the flow in an ordinary watercourse, a written consent is obtained from the Lead Local Flood Authority (LLFA) for the area. The proposed alterations to ordinary watercourses including outfall structures and diversions will require consent. Our guidance and application form can be found at the following link: https://www.warwickshire.gov.uk/watercourse.

Yours sincerely



Georgina Flower
Flood Risk Management Engineer

Documents Reviewed:

- Design and Access Statement_MIRA technology Park, South Site_Rev P09_Aug 2022
- Application Boundary_MIRA South Site_ 21092 SGP xx 00 DR A 111001_Rev D
- Parameters Plan_MIRA South Site_ 21092 SGP XX 00 DR A 111003_H
- Masterplan option 10 B_MIRA South Site_ 21092 SGP XX 00 DR A 111010_M
- Flood Risk Assessment and Outline Drainage Strategy_ MIRA Technology Park South Site_ EED13833-118-R-2-4-3-FRA_Issue 4
- Preliminary Risk Assessment_ MIRA, Land South of A5, Nuneaton_ WIE13833-118-R-1.3.1-RJM_Issue 1.3.1
- Planning Statement_ MIRA Technology Park South Site_ 27220_Rev 1_01 August 2022

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[i] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

[ii] https://www.gov.uk/guidance/flood-risk-and-coastal-change

[iii] https://api.warwickshire.gov.uk/documents/WCCC-1039-95

APPENDIX B

435400 E | 435500 E | 435600 E | 435700 E | 435800 E | 435900 E

295500 N | 295400 N | 295300 N | 295200 N

Notes:

1. GRID AND LEVELS BASED ON ORDNANCE DATUM, DERIVED FROM THE NATIONAL GNSS NETWORK. LOCAL SCALE FACTOR OF 0.99991 APPLIED.
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Coordinate Table

Station	Description	Easting	Northing	Level
M1	Nail	436238.011	295237.042	86.753
M2	Nail	436284.982	295214.974	88.083
M3	Nail	436331.113	295192.885	89.566
M4	Nail	436373.785	295171.201	90.525
M5	Nail	436412.468	295152.111	90.333
M6	Nail	436457.193	295129.607	90.744
M7	Nail	436494.185	295107.202	91.603
M8	Nail	436533.396	295082.679	92.670
M9	Nail	436576.872	295048.434	93.505
M10	Nail	436624.719	295028.104	95.305
M11	Nail	436700.170	295000.882	97.441
M12	Nail	436710.660	295015.561	92.893
M13	Nail	436683.538	294989.033	92.569
M14	Nail	436651.596	294961.870	91.186
M15	Nail	436606.762	294924.180	90.805
M16	Nail	436551.228	294863.367	90.516
M17	Nail	436511.741	294822.917	90.255
M18	Nail	436482.782	294792.099	90.142
M19	Nail	435519.661	295009.979	78.685
M20	Nail	435562.895	294951.753	79.290
M21	Nail	435586.343	294912.928	79.704
M22	Nail	435608.967	294873.234	80.637
M23	Nail	435635.630	294838.364	81.336
M24	Nail	435683.052	294795.769	82.861
M25	Nail	435712.364	294768.079	82.695
M26	Nail	435753.309	294731.557	82.014
M27	Nail	435785.724	294694.789	81.926
M28	Nail	435811.330	294644.902	82.283
M29	Nail	435832.762	294592.169	81.270
M30	Nail	435848.401	294543.225	80.866
M31	Nail	435876.128	294484.658	80.724

TOPOGRAPHICAL KEY

SURVEY STATION | BANKING | HEDGE SPREADS | WOODLAND CANOPY | ARROW ON STEPS / RAMPS INDICATES DIRECTION UP/KERBS | TREES | GATE | KERB CHANNEL | ROAD UNKERBED | FOOTPATH | CHANGE IN SURFACE | FENCE | WALL | OVERHEAD ELECTRIC | OVERHEAD TELECOM | FOUL SEWER | SURFACE SEWER | P-TRAP | BACK DROP (EXTERNAL) | BACK DROP (INTERNAL) | BUILDING | OPEN SIDED BUILDING | OVERHANG / CANOPY | GLASSHOUSE | CONTOUR | SPOT LEVEL | SONAR LEVEL | BORE HOLE | TRIAL HOLE

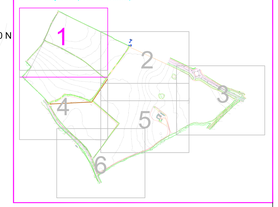
GENERAL ABBREVIATIONS

AIR CONDITIONING UNIT	ACU	
AIR VALVE	AV	
AVERAGE	Av.	
BACK DROP	BD	
BASE LEVEL	BL	
BELISHA BEACON	BB	
BOLLARD	BO	
BOLLARD LIGHT	BOL	
BUS	BS	
BUS STOP	BS	
CABLE RISER	CR	
CABLE TV COVER	CATV	
CABLES TO GROUND	CTG	
CATCH PIT	CP	
CONTROL BOX	CB	
COVER LEVEL	CL	
CROSSING CONTROL BUTTON	CCB	
DAMP PROOF COURSE	DPC	
DRAINAGE CHANNEL	DCH	
DROP KERB	DK	
ELECTRICITY POLE	EP	
EARTH ROD	ER	
FIRE HYDRANT	FH	
FLOOR LEVEL	FL	
FOOTPATH	FP	
FOUL WATER	FW	
GAS RISER	GR	
GAS VALVE	GV	
GULLY	GY	
HARD BED	HB	
INSPECTION COVER	IC	
INVERT LEVEL	IL	
LAMP OUTLET	LO	
LIGHT	LP	
MANHOLE	MH	
MARKER POST	MK	
METER	MT	
OUTLET PIPE	OP	
ORDNANCE SURVEY BENCH MARK	OSBM	
PUMP	PU	
POST	PO	
POST BOX	P.BOX	
RODDING EYE	RE	
ROAD SIGN	RS	
RAIN WATER PIPE	RWP	
RETAINING WALL	RW	
SOIL PIPE	SP	
STOP COCK	SC	
STREET NAME PLATE	SNP	
STOP VALVE	SV	
SOIL PIPE	SP	
SURFACE PIPE	SWP	
SURFACE WATER	SW	
TACTILE PAVING	TAC	
TELECOM POLE	TP	
TELECOM INSPECTION COVER	TEL	
TELEPHONE CALL BOX	TCB	
TICKET MACHINE	TM	
TRAFFIC LIGHT	TRAFFIC LIGHT	
TRAFFIC LIGHT COVER	TLC	
THRESHOLD LEVEL	THL	
UNABLE TO LOCATE	UTL	
UNABLE TO RAISE	UTR	
UNABLE TO SURVEY	UTS	
VENT	V	
WELL	WL	
WATER METER	WM	
WASH OUT	WO	
WATER RISER	WR	
WATER TAP	WT	

FENCE ABBREVIATIONS

BARBED WIRE FENCE	B/W	IRON RAILINGS	I/R
CLOSE BOARDED FENCE	C/B	LARCH LAP FENCE	L/L
CORRUGATED IRON FENCE	C.I.	POST AND RAIL FENCE	P/R
CHAIN LINK FENCE	C/L	POST AND WIRE FENCE	P/W
CHESTNUT PALING	CNP	WIRE MESH FENCE	W/M

Sheet Layout: (Not to Scale)



Revision	Description	Surv. by	Check by	Appr. by	Date
1	MH Information and Watercourse Added	ML	TS	TS	September 2021

0m 5 10 15 20 25 30 35 40 45 50 55

Topographical Survey

Client:

A McLAREN COMPANY MIRA

Southern Fields
Horiba MIRA
Watling Street
Nuneaton
CV10 0TU

Scale:	Sheet Size:	Sheet Number:	Date:
1:500	A0	1	August 2021

Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
30080	1	ML/MB/BP	TS	TS

mksurveys

www.mksurveys.com www.surveys4bim.co.uk
Head Office: Milton Keynes t: 01908 565561 e: mail@mksurveys.co.uk

435900 E
436000 E
436100 E
436200 E
436300 E
295300 N
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M25	Nail	435712.364	294768.079	82.695
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CHANGE IN SURFACE
FENCE
WALL
OVERHEAD ELECTRIC
OVERHEAD TELECOM
FOUL SEWER
SURFACE SEWER
P-TRAP
BACK DROP (EXTERNAL)
BACK DROP (INTERNAL)
BUILDING
OPEN SIDED BUILDING
OVERHANG / CANOPY
GLASSHOUSE
CONTOUR
SPOT LEVEL
SONAR LEVEL
BORE HOLE
TRIAL HOLE

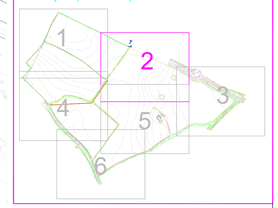
GENERAL ABBREVIATIONS

AIR CONDITIONING UNIT	ACU	CROSSING CONTROL BUTTON	CCB
AIR VALVE	AV	DAMP PROOF COURSE	DPC
AVERAGE	Av.	DRAINAGE CHANNEL	DCH
BACK OF KERB	BK	DROP KERB	DK
BASE LEVEL	BL	ELECTRICITY POLE	EP
BELISHA BEACON	BB	EARTH ROD	ER
BOLLARD	BO	FIRE HYDRANT	FH
BOLLARD LIGHT	BOL	FLOOR LEVEL	FL
BUSH	BS	FOOTPATH	FP
BUS STOP	BS	FOUL WATER	FW
CABLE RISER	CR	GAS RISER	GR
CABLE TV COVER	CATV	GAS VALVE	GV
CABLES TO GROUND	CTG	GULLY	GY
CATCH PIT	CP	HARD BED	HB
CONTROL BOX	CB	INSPECTION COVER	IC
CROSSING	CR	INVERT LEVEL	IL
		LAMP OUTLET	LO
		LIP	LP
		MANHOLE	MH
		MARKER POST	MK
		METER	MT
		OUTLET PIPE	OP
		ORDNANCE SURVEY BENCH MARK	OSBM
		PUMP	PU
		POST	PO
		POST BOX	P.BOX
		RODDING EYE	RE
		ROAD SIGN	RS
		RAIN WATER PIPE	RWP
		RETAINING WALL	RW
		SOIL VENT	SV
		STOP COCK	SC
		STREET NAME PLATE	SNP
		STOP VALVE	SV
		SOIL PIPE	SP
		SURFACE PIPE	SWP
		SURFACE WATER	SW
		TACTILE PAVING	TAC
		TELECOM POLE	TP
		TELECOM INSPECTION COVER	TEL
		TELEPHONE CALL BOX	TCB
		TICKET MACHINE	TM
		TOP OF WALL	TOW
		TRAFFIC LIGHT	TL
		TRAFFIC LIGHT COVER	TLC
		THRESHOLD LEVEL	THL
		UNABLE TO LOCATE	UTL
		UNABLE TO RAISE	UTR
		UNABLE TO SURVEY	UTS
		VENT	V
		WATER LEVEL	WL
		WATER METER	WM
		WASH OUT	WO
		WATER RISER	WR
		WATER TAP	WT

FENCE ABBREVIATIONS

BARBED WIRE FENCE	B/W	IRON RAILINGS	I/R
CLOSE BOARDED FENCE	C/B	LARCH LAP FENCE	L/L
CONCRETE POST FENCE	C/P	POST AND RAIL FENCE	P/R
CORRUGATED IRON FENCE	C/I	POST AND WIRE FENCE	P/W
CHAIN LINK FENCE	C/L	WIRE MESH FENCE	W/M
CHESTNUT PALING	CNP		

Sheet Layout: (Not to Scale)



Revision	Description	Surv. by	Check by	Appr. by	Date
1	MH Information and Watercourse Added	ML	TS	TS	September 2021

0m 5 10 15 20 25 30 35 40 45 50 55

Topographical Survey

Client:

Southern Fields
Horiba MIRA
Watling Street
Nuneaton
CV10 0TU

Scale:	Sheet Size:	Sheet Number:	Date:
1:500	A0	2	August 2021

Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
30080	1	ML/MB/BP	TS	TS

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Notes:

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Coordinate Table

Station	Description	Easting	Northing	Level
M1	Nail	436238.011	295237.042	86.753
M2	Nail	436284.982	295214.974	88.083
M3	Nail	436331.113	295192.885	89.566
M4	Nail	436373.785	295171.201	90.525
M5	Nail	436412.468	295152.111	90.333
M6	Nail	436457.193	295129.607	90.744
M7	Nail	436494.185	295107.202	91.603
M8	Nail	436533.396	295082.679	92.670
M9	Nail	436576.872	295048.434	93.505
M10	Nail	436624.719	295028.104	95.305
M11	Nail	436700.170	295000.882	97.441
M12	Nail	436710.660	295015.561	92.893
M13	Nail	436683.538	294989.033	92.569
M14	Nail	436651.596	294961.870	91.186
M15	Nail	436606.762	294924.180	90.805
M16	Nail	436551.228	294863.367	90.516
M17	Nail	436511.741	294822.917	90.255
M18	Nail	436482.782	294792.099	90.142
M19	Nail	435519.661	295009.979	78.685
M20	Nail	435562.895	294951.753	79.290
M21	Nail	435586.343	294912.928	79.704
M22	Nail	435608.967	294873.234	80.637
M23	Nail	435635.630	294838.364	81.336
M24	Nail	435683.052	294795.769	82.861
M25	Nail	435712.364	294768.079	82.695
M26	Nail	435753.309	294731.557	82.014
M27	Nail	435785.724	294694.789	81.926
M28	Nail	435811.330	294644.902	82.283
M29	Nail	435832.762	294592.169	81.270
M30	Nail	435848.401	294543.225	80.866
M31	Nail	435876.128	294484.658	80.724

TOPOGRAPHICAL KEY

GENERAL ABBREVIATIONS

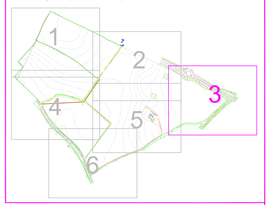
SURVEY STATION
BANKING
HEDGE SPREADS
WOODLAND CANOPY
ARROW ON STEPS / RAMPS INDICATES DIRECTION UPWARDS
TREES
GATE
KERB CHANNEL
ROAD UNKERBED
FOOTPATH
CHANGE IN SURFACE
FENCE
WALL
OVERHEAD ELECTRIC
OVERHEAD TELECOM
FOUL SEWER
SURFACE SEWER
P-TRAP
BACK DROP (EXTERNAL)
BACK DROP (INTERNAL)
BUILDING
OPEN SIDED BUILDING
OVERHANG / CANOPY
GLASSHOUSE
CONTOUR
SPOT LEVEL
SONAR LEVEL
BORE HOLE
TRIAL HOLE

AIR CONDITIONING UNIT	ACU
AIR VALVE	AV
AVERAGE	Av.
BACK OF KERB	BK
BASE LEVEL	BL
BELISHA BEACON	BB
BOLLARD	BO
BOLLARD LIGHT	BOL
BUS STOP	BS
CABLE RISER	CR
CABLE TV COVER	CATV
CABLES TO GROUND	CTG
CATCH PIT	CP
CONTROL BOX	CB
CROSSING	CR
CROSSING CONTROL BUTTON	CCB
DAMP PROOF COURSE	DPC
DRAINAGE CHANNEL	DCH
DROP KERB	DK
ELECTRICITY POLE	EP
EARTH ROD	ER
FIRE HYDRANT	FH
FLOOR LEVEL	FL
FOOTPATH	FP
FOUL WATER	FW
GAS RISER	GR
GAS VALVE	GV
GULLY	GY
HARD BED	HB
INSPECTION COVER	IC
INVERT LEVEL	IL
LAMP OUTLET	LO
MAST	MP
MANHOLE	MH
MARKER POST	MK
METER	MT
OUTLET PIPE	OP
ORDNANCE SURVEY BENCH MARK	OSBM
PUMP	PU
POST	PO
POST BOX	P.BOX
RODDING EYE	RE
ROAD SIGN	RS
RAIN WATER PIPE	RWP
RETAINING WALL	RW
SOIL VENT	SV
STOP COCK	SC
STREET NAME PLATE	SNP
STOP VALVE	SV
SOIL PIPE	SP
SURFACE WATER PIPE	SWP
SURFACE WATER	SW
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TELECOM POLE	TP
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TELEPHONE CALL BOX	TCB
TICKET MACHINE	TM
TOP OF WALL	TOW
TRAFFIC LIGHT	TL
TRAFFIC LIGHT COVER	TLC
THRESHOLD LEVEL	THL
UNABLE TO LOCATE	UTL
UNABLE TO RAISE	UTR
UNABLE TO SURVEY	UTS
VENT PIPE	VP
WATER LEVEL	WL
WATER METER	WM
WASH OUT	WO
WATER RISER	WR
WATER TAP	WT

FENCE ABBREVIATIONS

BARBED WIRE FENCE	B/W
CLOSE BOARDED FENCE	C/B
CONCRETE PANEL FENCE	C/P
CORRUGATED IRON FENCE	C/I
CHAIN LINK FENCE	C/L
CHESTNUT PALING	CNP
IRON RAILINGS	I/R
LARCH LAP FENCE	L/L
POST AND RAIL FENCE	P/R
POST AND WIRE FENCE	P/W
WIRE MESH FENCE	W/M

Sheet Layout: (Not to Scale)



Revision	Description	Surv. by	Check by	Appr. by	Date
1	M4 Information and Watercourse Added	ML	TS	TS	September 2021

0m 5 10 15 20 25 30 35 40 45 50 55

Topographical Survey

Client:

A PLOUGEN GROUP MIRA

Southern Fields
Horiba MIRA
Watling Street
Nuneaton
CV10 0TU

Scale:	Sheet Size:	Sheet Number:	Date:
1:500	A0	3	August 2021

Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
30080	1	ML/MB/BP	TS	TS

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M13	Nail	436683.538	294989.033	92.569
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M15	Nail	436606.762	294924.180	90.805
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TOPOGRAPHICAL KEY

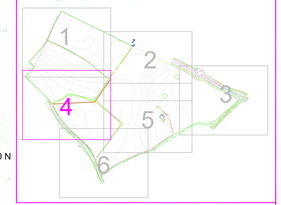
GENERAL ABBREVIATIONS

SURVEY STATION	5	AIR CONDITIONING UNIT	ACU
		AIR VALVE	AV
		AVERAGE	Av.
BANKING	TOP / BOTTOM	BACK OF KERB	BK
		BASE LEVEL	BL
		BELISHA BEACON	BB
		BOLLARD	BO
		BOLLARD LIGHT	BOL
HEDGE SPREADS		BUILDING	BS
		BUS STOP	BS
		CABLE RISER	CR
WOODLAND CANOPY		CABLE TV COVER	CATV
		CABLES TO GROUND	CTG
ARROW ON STEPS / RAMPS INDICATES DIRECTION UPWARDS		CATCH PIT	CP
		CONTROL BOX	CB
		CONVEX MIRROR	CX
TREES	SPREAD DIAMETER SHOWN TO SCALE	CROSSING CONTROL BUTTON	CCB
		DAMP PROOF COURSE	DPC
		DRAINAGE CHANNEL	DCH
		DROP KERB	DK
		EARTH ELECTRICITY POLE	EP
		EARTH ROD	ER
GATE		FIRE HYDRANT	FH
		FLOOR LEVEL	FL
KERB CHANNEL		FOOTPATH	FP
		FOUL WATER	FW
ROAD UNKERBED		GAS RISER	GR
		GAS VALVE	GV
FOOTPATH		GULLY	GY
		HARD BED	HB
CHANGE IN SURFACE		INSPECTION COVER	IC
		INVERT LEVEL	IL
FENCE		LAMP OUTLET	LO
		LIGHT	LP
WALL		MANHOLE	MH
		MARKER POST	MK
OVERHEAD ELECTRIC		METER	MT
		OUTLET PIPE	OP
OVERHEAD TELECOM		ORDNANCE SURVEY BENCH MARK	OSBM
		PEDESTRIAN	PED
FOUL SEWER		POST	PO
		POST BOX	P.BOX
SURFACE SEWER		RODDING EYE	RE
		ROAD SIGN	RS
P-TRAP		RAIN WATER PIPE	RWP
		RETAINING WALL	RW
BACK DROP (EXTERNAL)		SEWER	SE
		STOP COCK	SC
BACK DROP (INTERNAL)		STREET NAME PLATE	SNP
		STOP VALVE	SV
BUILDING		SOIL PIPE	SP
		SURFACE WATER PIPE	SWP
OPEN SIDED BUILDING		SURFACE WATER	SW
		TACTILE PAVING	TAC
OVERHANG / CANOPY		TELECOM POLE	TP
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GLASSHOUSE		TELEPHONE CALL BOX	TCB
		TICKET MACHINE	TM
		TRAFFIC LIGHT	TLRW
		TRAFFIC LIGHT	TL
		TRAFFIC LIGHT COVER	TLC
CONTOUR	79.97	THRESHOLD LEVEL	THL
		UNABLE TO LOCATE	UTL
SPOT LEVEL	+ 127.13	UNABLE TO RAISE	UTR
SONAR LEVEL	⊙ 127.13	UNABLE TO SURVEY	UTS
		VENT PIPE	VP
BORE HOLE	BH	WATER LEVEL	WL
		WATER METER	WM
TRIAL HOLE	TH	WASH OUT	WO
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FENCE ABBREVIATIONS

BARBED WIRE FENCE	B/W	IRON RAILINGS	I/R
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CONCRETE POST FENCE	CPF	POST AND RAIL FENCE	P/R
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CHAIN LINK FENCE	C/L	WIRE MESH FENCE	W/M
CHESTNUT PALING	CNP		

Sheet Layout: (Not to Scale)



Revision	Description	Surv. by	Check by	Appr. by	Date
1	M4 Information and Watercourse Added	ML	TS	TS	September 2021

0m 5 10 15 20 25 30 35 40 45 50 55

Topographical Survey

Client:

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Nuneaton
CV10 0TU

Scale:	Sheet Size:	Sheet Number:	Date:
1:500	A0	4	August 2021

Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
30080	1	ML/MB/BP	TS	TS

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TOPOGRAPHICAL KEY

SURVEY STATION
BANKING
HEDGE SPREADS
WOODLAND CANOPY
ARROW ON STEPS / RAMPS INDICATES DIRECTION UPWARDS
TREES
GATE
KERB CHANNEL
ROAD UNKERBED
FOOTPATH
CHANGE IN SURFACE
FENCE
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OVERHEAD ELECTRIC
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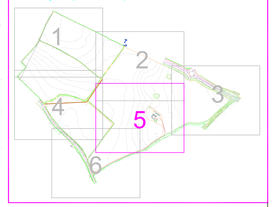
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BOLLARD	BO
BOLLARD LIGHT	BOL
BUSH	BS
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CABLE RISER	CR
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FLOOR LEVEL	FL
FOOTPATH	FP
FOUL WATER	FW
GAS RISER	GR
GAS VALVE	GV
GULLY	GY
HARD BED	HB
INSPECTION COVER	IC
INVERT LEVEL	IL
LAMP OUTLET	LO
LIGHT	LP
MANHOLE	MH
MARKER POST	MK
METER	MT
OUTLET PIPE	OP
ORDNANCE SURVEY BENCH MARK	OSBM
PUMP	PU
POST	PO
POST BOX	P.BOX
RODDING EYE	RE
ROAD SIGN	RS
RAIN WATER PIPE	RWP
RETAINING WALL	RW
SOIL VENT	SV
STOP COCK	SC
STREET NAME PLATE	SNP
STOP VALVE	SV
SOIL PIPE	SP
SURFACE PIPE	SWP
SURFACE WATER	SW
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0m 5 10 15 20 25 30 35 40 45 50 55

Topographical Survey

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A HORIBA GROUP MIRA

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Scale:	Sheet Size:	Sheet Number:	Date:
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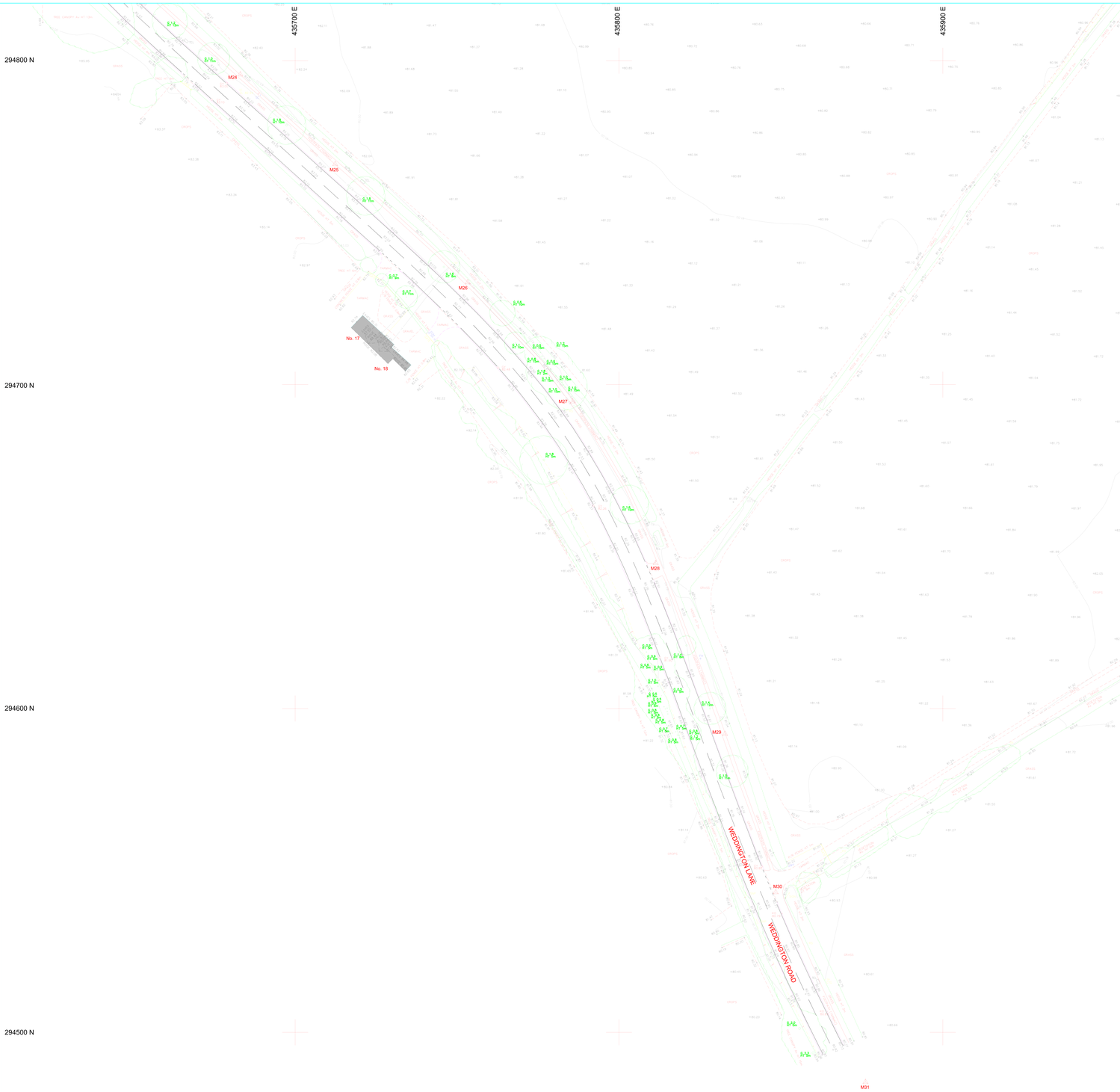
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30080	1	ML/MB/BP	TS	TS

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294800 N | 294700 N | 294600 N | 294500 N



Notes:

1. GRID AND LEVELS BASED ON ORDNANCE DATUM, DERIVED FROM THE NATIONAL GNSS NETWORK. LOCAL SCALE FACTOR OF 0.999961 APPLIED.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES /CONNECTIVITY OBTAINED USING ACOUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

Coordinate Table

Station	Description	Easting	Northing	Level
M1	Nail	436238.011	295237.042	86.753
M2	Nail	436284.982	295214.974	88.083
M3	Nail	436331.113	295192.885	89.566
M4	Nail	436373.785	295171.201	90.525
M5	Nail	436412.468	295152.111	90.333
M6	Nail	436457.193	295129.607	90.744
M7	Nail	436494.185	295107.202	91.603
M8	Nail	436533.396	295082.679	92.670
M9	Nail	436576.872	295048.434	93.505
M10	Nail	436624.719	295028.104	95.305
M11	Nail	436700.170	295000.882	97.441
M12	Nail	436710.660	295015.561	92.893
M13	Nail	436683.538	294989.033	92.569
M14	Nail	436651.596	294961.870	91.186
M15	Nail	436606.762	294924.180	90.805
M16	Nail	436551.228	294863.367	90.516
M17	Nail	436511.741	294822.917	90.255
M18	Nail	436482.782	294792.099	90.142
M19	Nail	435519.661	295009.979	78.685
M20	Nail	435562.895	294951.753	79.290
M21	Nail	435586.343	294912.928	79.704
M22	Nail	435608.967	294873.234	80.637
M23	Nail	435635.630	294838.364	81.336
M24	Nail	435683.052	294795.769	82.861
M25	Nail	435712.364	294768.079	82.695
M26	Nail	435753.309	294731.557	82.014
M27	Nail	435785.724	294694.789	81.926
M28	Nail	435811.330	294644.902	82.283
M29	Nail	435832.762	294592.169	81.270
M30	Nail	435848.401	294543.225	80.866
M31	Nail	435876.128	294484.658	80.724

TOPOGRAPHICAL KEY

SURVEY STATION | BANKING | HEDGE SPREADS | WOODLAND CANOPY | ARROW ON STEPS / RAMPS INDICATES DIRECTION UP/AWARDS | TREES | GATE | KERB CHANNEL | ROAD UNKERBED | FOOTPATH | CHANGE IN SURFACE | FENCE | WALL | OVERHEAD ELECTRIC | OVERHEAD TELECOM | FOUL SEWER | SURFACE SEWER | P-TRAP | BACK DROP (EXTERNAL) | BACK DROP (INTERNAL) | BUILDING | OPEN SIDED BUILDING | OVERHANG / CANOPY | GLASSHOUSE | CONTOUR | SPOT LEVEL | SONAR LEVEL | BORE HOLE | TRIAL HOLE

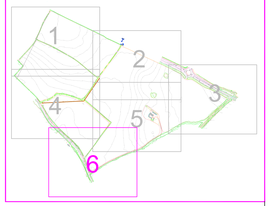
GENERAL ABBREVIATIONS

AIR CONDITIONING UNIT	ACU	CONTROL BOX	CB
AIR VALVE	AV	CROSSING CONTROL BUTTON	CCB
AVERAGE	Av.	DAMP PROOF COURSE	DPC
BACK OF KERB	BK	DRAINAGE CHANNEL	DCH
BASE LEVEL	BL	DROP KERB	DK
BELISHA BEACON	BB	ELECTRICITY POLE	EP
BOLLARD	BO	EARTH ROD	ER
BOLLARD LIGHT	BOL	FIRE HYDRANT	FH
BUS STOP	BS	FLOOR LEVEL	FL
CABLE RISER	CR	FOOTPATH	FP
CABLE TV COVER	CATV	FOUL WATER	FW
CABLES TO GROUND	CTG	GAS RISER	GR
CATCH PIT	CP	GAS VALVE	GV
		GULLY	GY
		HARD BED	HB
		INSPECTION COVER	IC
		INVERT LEVEL	IL
		LAMP OUTLET	LO
		UP	UP
		MANHOLE	MH
		MARKER POST	MK
		METER	MT
		OUTLET PIPE	OP
		ORDNANCE SURVEY BENCH MARK	OSBM
		PUMP	PU
		POST	PO
		POST BOX	P.BOX
		RODDING EYE	RE
		ROAD SIGN	RS
		RAIN WATER PIPE	RWP
		RETAINING WALL	RW
		SOIL PIPE	SP
		STOP COCK	SC
		STREET NAME PLATE	SNP
		STOP VALVE	SV
		SOIL PIPE	SP
		SURFACE PIPE	SWP
		SURFACE WATER	SW
		TACTILE PAVING	TAC
		TELECOM POLE	TP
		TELECOM INSPECTION COVER	TEL
		TELEPHONE CALL BOX	TCB
		TICKET MACHINE	TM
		TOP OF WALL	TOW
		TRAFFIC LIGHT	TL
		TRAFFIC LIGHT COVER	TLC
		THRESHOLD LEVEL	THL
		UNABLE TO LOCATE	UTL
		UNABLE TO RAISE	UTR
		UNABLE TO SURVEY	UTS
		VENT	V
		WATER LEVEL	WL
		WATER METER	WM
		WASH OUT	WO
		WATER RISER	WR
		WATER TAP	WT

FENCE ABBREVIATIONS

BARBED WIRE FENCE	B/W	IRON RAILINGS	I/R
CLOSE BOARDED FENCE	C/B	LARCH LAP FENCE	L/L
CONCRETE POST FENCE	C/P	POST AND RAIL FENCE	P/R
CORRUGATED IRON FENCE	C/I	POST AND WIRE FENCE	P/W
CHAIN LINK FENCE	C/L	WIRE MESH FENCE	W/M
CHESTNUT PALING	CNP		

Sheet Layout: (Not to Scale)



Revision	Description	Surv. by	Check by	Appr. by	Date
1.	MH Information and Watercourse Added	ML	TS	TS	September 2021

0m 5 10 15 20 25 30 35 40 45 50 55

Topographical Survey

Client:

Southern Fields
Horiba MIRA
Watling Street
Nuneaton
CV10 0TU

Scale:	Sheet Size:	Sheet Number:	Date:
1:500	A0	6	August 2021

Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
30080	1	ML/MB/BP	TS	TS

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www.mksurveys.com www.surveys4bim.co.uk
Head Office: Milton Keynes t: 01908 565561 e: mail@mksurveys.co.uk

APPENDIX C

Company:	WIE	Office:	London
Sheet No:	1 of 1	Project No:	EED13833
By	Ryan Davies	Date	14/11/2022
Checked:	Sean Whelan	Date	22/11/2022

CALCULATIONS

Project Title **MIRA**

Calculations Title **Channel Capacity Assessment**

LOCATION	CALCULATIONS	OPTIONS

Channel capacity has been assessed using Mannings equation for open channel flow and channel dimensions extracted from existing topographic survey and LiDAR information. Typical values have been assumed for channel roughness. Hydraulic radius and slope have been calculated along the watercourse to identify maximum, minimum, and average values.

Channel capacity Assessment

Mannings Equation $$v = \frac{1}{n}.R_h^{2/3}.S^{1/2}$$

v = average velocity through section (m/s)

n = Manning's roughness = 0.04 assumed to be a clean winding channel

R_h = hydraulic radius (m^2/m) = A/p = Area/Wetted perimeter of cross-section

S = slope (m/m)

$$q = v.A$$

q = flow (m^3/s)

A = cross-sectional area (m^2)

x-sec	n	A (m^2)	p (m)	R_h (m^2/m)	IL (mAOD)	dist. (m)	chain (m)
1	0.04	3.28	5.64	0.58	82.20	0.00	0.00
2	0.04	2.76	4.80	0.58	82.11	32.50	32.50
3	0.04	1.84	4.01	0.46	82.16	32.56	65.06
4	0.04	2.29	4.15	0.55	81.76	75.96	141.02
5	0.04	2.62	4.62	0.57	81.31	78.85	219.87
6	0.04	3	4.84	0.62	80.44	85.63	305.50
7	0.04	3.69	5.73	0.64	79.16	95.33	400.83
8	0.04	4.3	6.38	0.67	78.63	73.77	474.60
9	0.04	4.6	7.28	0.63	78.34	79.62	554.22
10	0.04	4.75	6.82	0.70	77.78	77.04	631.26
11	0.04	4.23	7.44	0.57	77.57	57.07	688.33

reach	n	A (m^2)	R_h (m^2/m)	fall (m)	S (1:X)	v (m/s)	q (m^3/s)
1-2	0.04	3.02	0.58	0.09	361	0.91	2.76
3-4	0.04	2.07	0.51	0.40	190	1.15	2.38
4-5	0.04	2.46	0.56	0.45	175	1.28	3.15
5-6	0.04	2.81	0.59	0.87	98	1.78	5.00
6-7	0.04	3.35	0.63	1.28	74	2.13	7.14
7-8	0.04	4.00	0.66	0.53	139	1.60	6.41
8-9	0.04	4.45	0.65	0.29	275	1.14	5.05
9-10	0.04	4.68	0.66	0.56	138	1.62	7.59
10-11	0.04	4.49	0.63	0.21	272	1.12	5.02

APPENDIX D

Print | Close Report

HR Wallingford
Working with water

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by: Sean Whelan

Site name:

Site location:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	52.55206° N
Longitude:	1.47097° W
Reference:	3464598155
Date:	Nov 22 2022 12:36

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 1

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics	Default	Edited
SAAR (mm):	644	636
Hydrological region:	4	4
Growth curve factor 1 year:	0.83	0.83
Growth curve factor 30 years:	2	2
Growth curve factor 100 years:	2.57	2.57
Growth curve factor 200 years:	3.04	3.04

Notes

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

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

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

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

(3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	4.38	4.32
1 in 1 year (l/s):	3.63	3.58
1 in 30 years (l/s):	8.76	8.63
1 in 100 year (l/s):	11.25	11.09
1 in 200 years (l/s):	13.31	13.12

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.