Consulting Civil Engineers

Foul and Surface Water Drainage Strategy Report

Menzies Wood Farm, Okehurst Lane, Billingshurst, West Sussex RH14 9HR

For

Mark Betts

Rev - **P**

Reference **C3130**

Date **31st July 2024**

Revision	Date of Issue	Comments	Prepared By	Checked By
P	31.07.2024	Initial Issue	LH	CS

Richard Cobden House, Lion Street, Chichester, West Sussex, PO19 1LW
Tel: 01243 933253 E: mail@cgscivils.co.uk W: www.cgscivils.co.uk

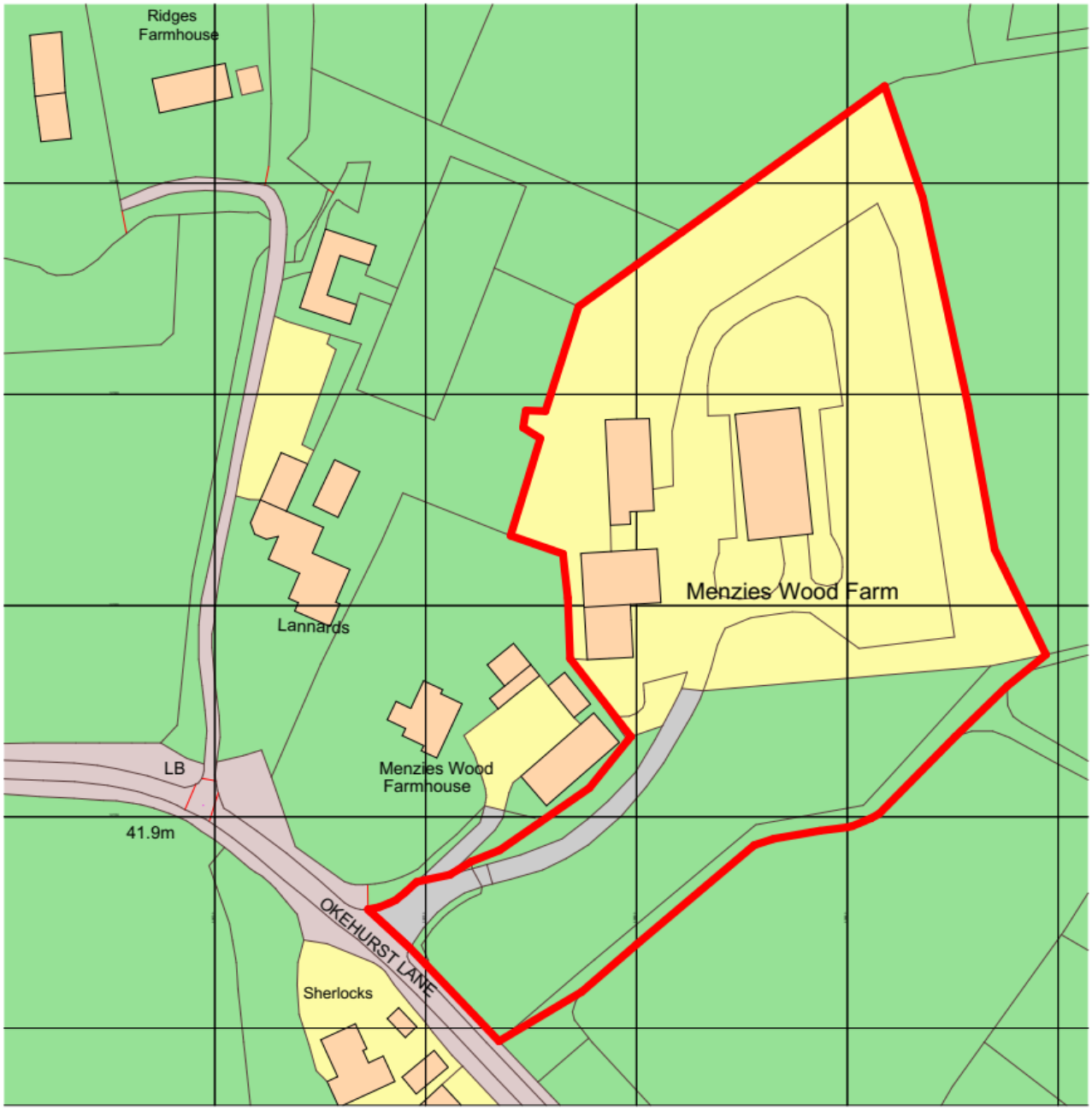
Contents

1 Introduction

1.1.1 CGS Civils Ltd has been appointed to undertake a drainage strategy report for a proposed development at Menzies Wood Farm in Billinghurst.

1.1.2 The purpose of this drainage strategy is to demonstrate how the development area can be satisfactorily drained without increasing flood risk onsite and elsewhere. The proposed development will consist of demolition of an existing barn, office and workshop followed by the erection of a new barn/workshop that is to match size with the existing barn. There is also to be the construction of a new office unit. The external areas are to be reduced following the demolition of the existing buildings on site. The proposed development is located as OS Grid Reference TQ 08841 27827 and has the post code RH14 9HR.

Fig 1. Site Location



2 Executive Summary:

2.1.1 The Surface Water will discharge to a culverted watercourse via a connection in an existing drainage network on site. The surface water discharge is to be restricted to 2.0l/s and the network will make use of a geocellular attenuation tank in order to cater for the 1 in 100-year +45% storm.

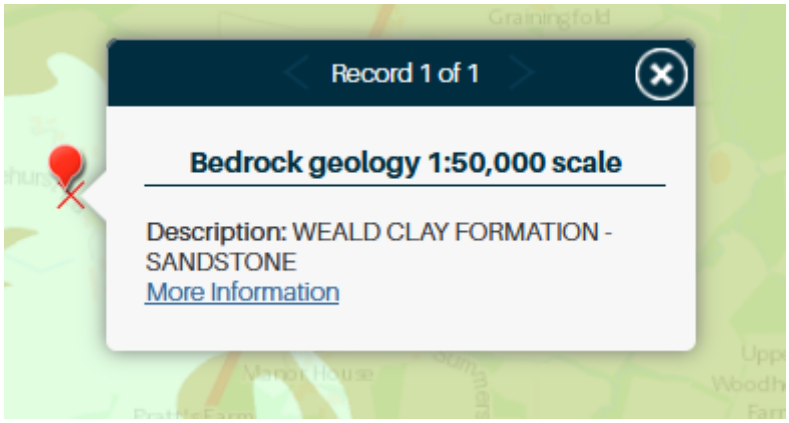
2.1.2 The Foul water is to be treated on site prior to discharging into the culverted watercourse via a new connection into an existing drainage system on site.

3 Site Geology

3.1 British Geological Survey information

3.1.1 The British Geological Survey confirms the bedrock geology to be made up Weald Clay Formation. At the time of writing the British Geological Survey website does not have any recorded information of the Superficial deposits on site.

Fig 2. British Geological Survey



3.2 Geological Assessment

3.2.1 An infiltration test to BRE365 was carried out on site by CGS Civils Ltd. A trial pit was excavated to a depth of 0.9mbgl and rapidly filled with water. It was recorded that after an hour and 40 minutes, the water level failed to drain and therefore the test was considered a failure.

Fig 3. Soakaway test photographs

4 Existing Drainage

4.1.1 A CCTV Drainage survey was undertaken on site which recorded the existing drainage arrangements on site. This survey confirmed that the foul water is treated on site via a treatment plant prior to discharging to an existing culvert on the adjacent side of Okehurst Lane alongside the surface water runoff. It is noted that the existing drainage has sufficient capacity to cater for the proposed buildings.

5 Proposed Drainage Strategy

5.1 SuDS Hierarchy

5.1.1 All options for the destination of run-off generated on site have been assessed in line with the SuDS hierarchy as set out in Building Regulations Part H document and DEFRA's Draft National Standards for SuDS.

Table 1. SuDS Hierarchy

Discharge Destination	
Rainwater Harvesting	Yes – Rainwater harvesting will be utilised within the proposed office block.
Discharge to Ground	No - Discharge to ground via infiltration is not viable on site.
Discharge to Watercourse	Yes – The surface water will be discharged into the existing drainage network on site which discharges into a culverted watercourse. The discharge rate is to be restricted to 2.0l/s.
Discharge to Surface Water Sewer	N/A due to above
Discharge to Other Sewer	N/A due to above

5.2 Proposed Hydraulic Calculation Specifications:

Table 2. SuDS Hierarchy

Hydraulic Calculations Settings:	
Rainfall Methodology	**FSR**
Volumetric Run-off Coefficient Cv	**0.75**
CV Winter and Summer	**0.75 / 0.84**
Additional Storage (m^3 / ha)	**0.0**
Flow Control	**1.71m Head @ 2l/s discharge**
Attenuation Tank Design	Factor of Safety: **2**
	Porosity: **95%**
	Time to Half Empty (mins): **222**

5.3 Surface Water Drainage

5.3.1 In order to follow the SuDS hierarchy, an infiltration test to BRE365 was conducted on site which resulted in a failure. It is therefore determined that an alternative means of disposal should be sought. It was recorded during the CCTV drainage survey that the existing drainage network on site discharges into a culverted watercourse on the adjacent side of Okehurst Lane.

5.3.2 It is proposed that all surface water runoff from the proposed roof areas is to be discharged into the existing drainage network at a restricted rate of 2.0l/s. The proposed network is to make use of a geocellular attenuation tank in order to cater for the 1 in 100-year +45% storm. The proposed development will only result in the reduction of hard paved areas on site, therefore, it is proposed that the hard paved areas are to drain as per existing.

5.3.3 Hydraulic calculations have been carried out which can be found at Appendix C.

5.4 Foul water drainage

5.4.1 The foul water is to be treated on site via a new package treatment plant. The treated effluent runoff from the treatment plant is to be discharged into the existing combined water sewer system on site which ultimately discharges into the culverted watercourse. The proposed discharge is to be less than $5m^3$ a day and therefore does not require EA approval.

6 Summary and Conclusions

6.1.1 CGS Civils has been instructed to produce a Drainage statement under National Planning Policy Framework (NPPF) to support the Planning Application for the proposed development which will consist of demolition of an existing barn, office and workshop followed by the erection of a new barn/workshop that is to match size with the existing barn. There is also to be the construction of a new office unit. The external areas are to be reduced following the demolition of the existing buildings on site.

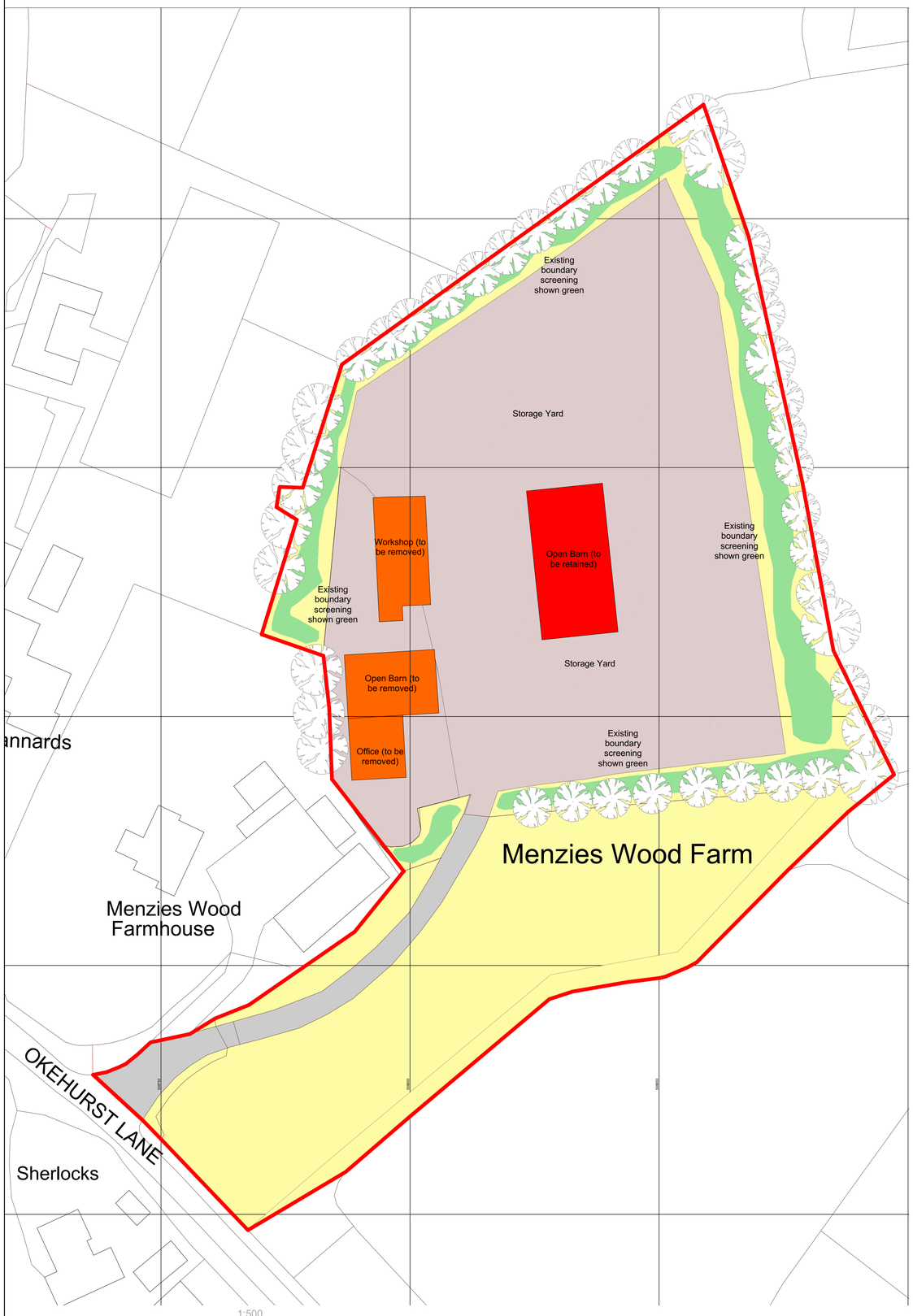
6.1.2 The Surface Water will discharge to a culverted watercourse via a connection in an existing drainage network on site. The surface water discharge is to be restricted to 2.0l/s and the network will make use of a geocellular attenuation tank in order to cater for the 1 in 100-year +45% storm.

6.1.3 The Foul water is to be treated on site prior to discharging into the culverted watercourse via a new connection into an existing drainage system on site.

6.1.4 The report has demonstrated that the proposed drainage measures ensure that suitable means of surface water and foul drainage can be achieved for the proposed development.

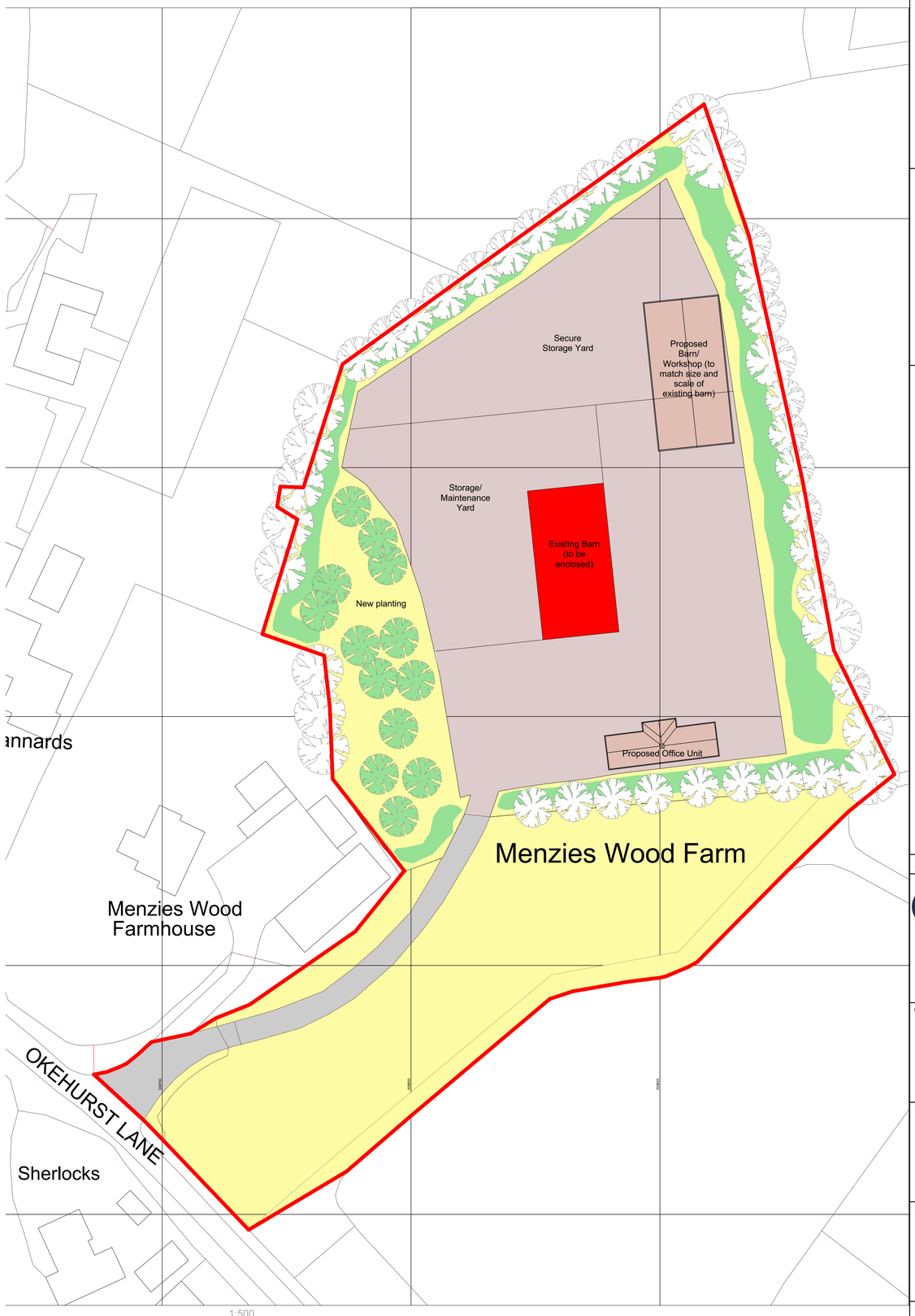
7 Appendices

7.1 Appendix A – Site Plan



1:500
Existing Block Plan

0 20 40 60



1:500
Proposed Block Plan

THIS DRAWING IS INDICATIVE ONLY AND MUST NOT BE RELIED UPON FOR CONSTRUCTION - UNLESS THE DRAWING IS NAMED AS 'CONSTRUCTION'.

ALL DIMENSIONS TO BE CHECKED AND VERIFIED WITH ANY DISCREPANCIES REPORTED TO PHILIPS SURVEYORS LLP.

THIS DRAWING REMAINS THE PROPERTY OF PHILIPS SURVEYORS AND MUST NOT BE COPIED OR REPRODUCED WITHOUT PRIOR WRITTEN PERMISSION.

THE CLIENT MUST FAMILIARISE THEMSELVES WITH;
·THEIR DUTIES CONCERNING HEALTH & SAFETY UNDER CDM2015 REGULATIONS AND
·THE APPOINTMENT OF PRINCIPAL DESIGNER AND PRINCIPAL CONTRACTOR.

IF YOU NEED ANY FURTHER INFORMATION OR INDEPENDENT ADVICE ON UNDERTAKING YOUR CDM REGULATIONS DUTIES, PLEASE CONTACT: THE ASSOCIATION FOR PROJECT SAFETY, 5 NEW MART PLACE, EDINBURGH EH141RW TEL: 08456 121 290 EMAIL: INFO@APS.ORG.UK YOU CAN VISIT THE HSE AND APS WEBSITES FOR MUCH MORE INFORMATION AT: WWW.HSE.GOV.UK AND WWW.APS.ORG.UK RESPECTIVELY.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARDS AND RISKS NORMALLY ASSOCIATED WITH THE TYPE OF CONSTRUCTION WORK DETAILED ON THIS DRAWING, PLEASE NOTE THE FOLLOWING SIGNIFICANT RISKS AND INFORMATION;

- INDICATES - WARNING
- INDICATES - COMPULSORY INSTRUCTION
- INDICATES - FOR INFORMATION
- INDICATES - PROHIBITIVE INSTRUCTION

FOR INFORMATION RELATING TO END USE, MAINTENANCE, DEMOLITION ETC. - PLEASE REFER TO THE HEALTH & SAFETY FILE.

IT SHOULD BE ASSUMED THAT ALL WORKS ARE TO BE CARRIED OUT BY A COMPETENT CONTRACTOR AND, WHERE APPLICABLE, TO AN APPROVED METHOD STATEMENT.

N

Ordnance Survey, (c) Crown Copyright 2023.
All rights reserved. Licence number 100022432

Rev.	Amendments	Date	Drw.
A	NEW BARN LOCATION	15.03.24	GRM

PHILIPS SURVEYORS
BUILDING SURVEYORS, DESIGNERS & CONSULTANTS
PHILIPS SURVEYORS LLP, THE OLD COACH HOUSE, 78 LOWER STREET, PULBOROUGH, WEST SUSSEX, RH20 2AA
TEL **01798 873222** FAX **01798 873444**
EMAIL **INFO@PHILIPS-SURVEYORS.CO.UK**
WWW.PHILIPSCHARTEREDSURVEYORS.CO.UK
RICS

CLIENT:
Mr M. Betts
Oakhurst Properties, Menzies Wood Farm, Okehurst Lane, Billingshurst, West Sussex, RH14 9HR

PROJECT:
Proposed Barns, Workshop, Offices and Open Storage Area
Menzies Wood Farm, Okehurst Lane, Billingshurst, West Sussex, RH14 9HR

DRAWING TITLE:
Existing
Existing and Proposed Block Plans

DRAWN:	JOB NO:	SCALE @ A1:
THR	2576	As Shown
CHECKED: PGA	DRAWING NO: BP-01	REV: A
DATE: Sept 23		

© PHILIPS SURVEYORS LLP.

Z:\PCS Current PGA\1. PGA Current\257623 Menzies Wood Farm [GRM]\5. DRAWINGS\2576 Menzies Wood Farm_PR RevA 15.03.2024.pln2576 Menzies Wood Farm_PR RevA 15.03.2024.pln

7.2 Appendix B – Drainage Layout

DESIGN SUBJECT TO THE CONFIRMATION OF:
EXTERNAL LEVELS DESIGN
ORDINARY WATERCOURSE APPROVAL
LOCATION AND DEPTH OF EXISTING UTILITIES
ROOT PROTECTION AREAS

DESIGN SUBJECT TO THE APPROVAL OF:
PLANNING AUTHORITY
BUILDING CONTROL

DRAINAGE LEGEND

EXISTING FEATURES

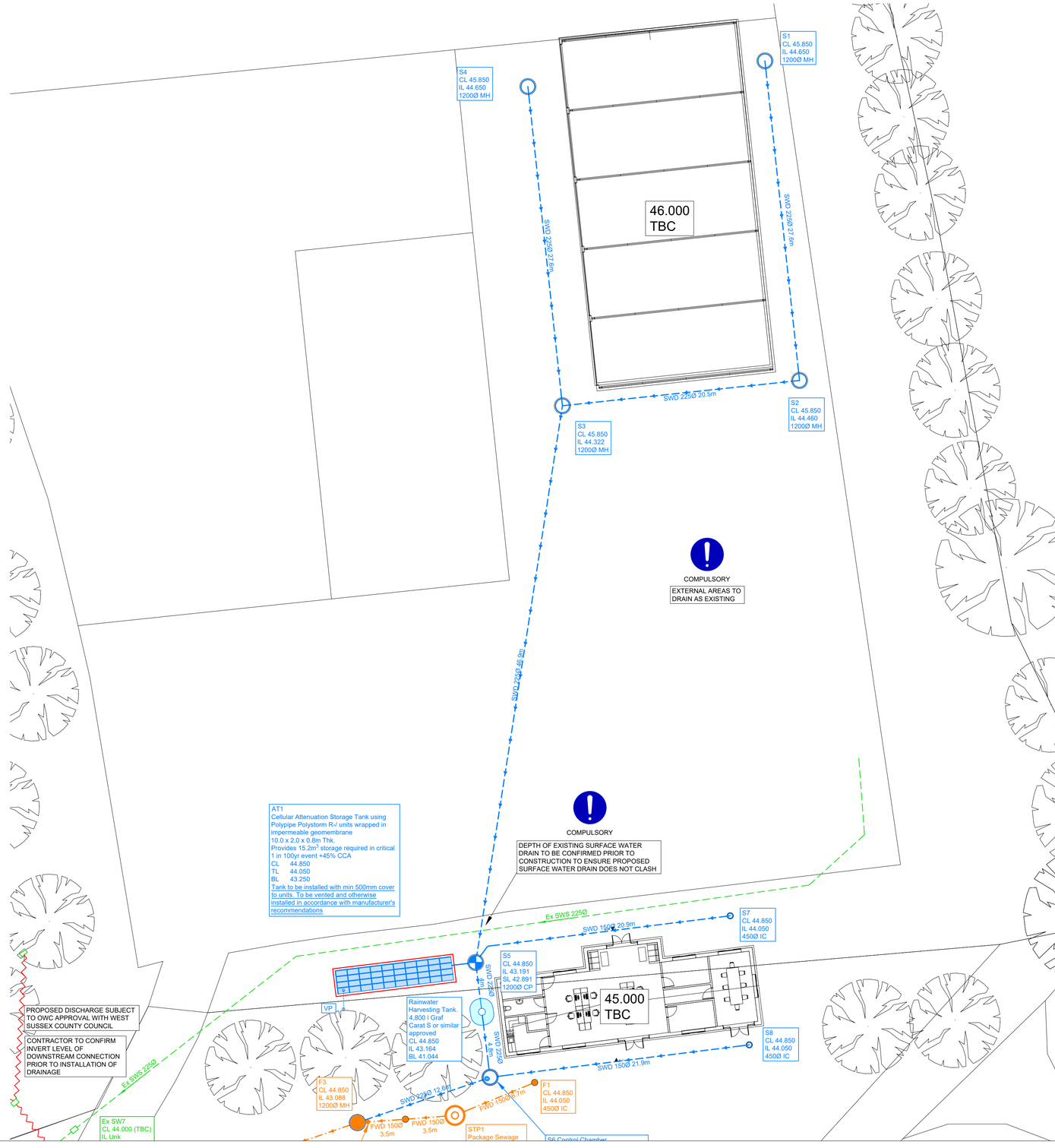
- Ex CWS — Existing combined water sewer/drain and manhole
- Ex SWD — Existing surface water sewer/drain and manhole
- Existing foul/surface water sewer/drain and manhole to be abandoned

PROPOSED FEATURES

- FWD — Foul Drainage
- SWD — Surface Water Drainage
- Storm water inspection chamber (450Ø)
- Storm water manhole (1200Ø)
- Storm water catchpit (1200Ø)
- Storm water vortex flow control chamber
- Foul water inspection chamber (450Ø)
- Foul water manhole (1200Ø)
- 00.000 — Finished floor level
- 100Ø 4.5m 1:100 Z BED — Pipe info - diameter, length, gradient, bedding type

ABBREVIATIONS

MH	- MANHOLE
IC	- INSPECTION CHAMBER
AC	- ACCESS CHAMBER
CP	- CATCHPIT
BC	- BRAKE CHAMBER
RE	- RODDING EYE
IL	- INVERT LEVEL
SL	- SUMP LEVEL
RA	- RESTRICTED ACCESS COVER
CL	- COVER LEVEL
TL	- TOP OF CELLULAR SA
BL	- BASE OF CELLULAR SA
FL	- FORMATION LEVEL



Site Specific Notes

1. The proposed scheme will consist of the demolition of an existing barn, office and workshop. Following the demolition, a new barn/workshop and office unit is to be constructed on site. There are also alterations to the external hard paved areas on site.
2. An infiltration test to BRE365 was carried out on site by CGS Civils Ltd. The test consisted of the excavation of a trial pit to a depth of 0.9mbgl followed by the rapid introduction of water. Over the course of an hour and 40 minutes, the water level failed to change and therefore the test was considered a failure.
3. A CCTV drainage survey was conducted on site by Eyes on Drainage Solutions Ltd on behalf of CGS Civils Ltd. The CCTV survey recorded the existing drainage arrangment on site and it is noted that the existing site discharges both surface and foul water into an existing culverted watercourse located on the opposing side of Okehurst Lane.
4. It is proposed that all surface water runoff from roof areas is to be discharged into the existing drainage network on site at a restricted rate of 2.0l/s. The proposed surface water network will make use of a geocellular attenuation tank in order to cater for the 1 in 100-year +45% storm.
5. The foul water is to be treated on site via a new package treatment plant. All treated effluent runoff is to then be discharged into the culverted watercourse via a new connection into the existing drainage network.

STANDARD DRAINAGE NOTES

1. DO NOT SCALE FROM THIS DRAWING, REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
2. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
4. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
5. BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SPURS TO WHICH CONNECTIONS ARE PROPOSED. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
6. ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT, THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
7. COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
8. ALL UN-REFERENCED PIPES ARE TO BE 100mm DIA
9. ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 295 AND BS65 (SWS ONLY), OR CONCRETE PIPES TO BE EN 1916 AND BS5911:PART 1.
10. ROAD GULLY OUTLET PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS. ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.
11. ALL ADOPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATION LAID DOWN DOWN IN 'SEWERS FOR ADOPTION' 6th EDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.
12. ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
13. THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
14. STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
15. IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. SUB SOIL DRAINS ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER.
16. NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.
17. ALL EXISTING MANHOLE COVER'S, GULLIES, ETC, ARE TO BE RAISED/LOWERED TO SUIT NEW LEVELS.
18. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES AND UTILITIES THAT MAY BE PRESENT
19. UPON COMPLETION BUT PRIOR TO HANDOVER, CONTRACTOR TO CARRY OUT FULL CCTV SURVEY OF DRAINAGE SYSTEM WHICH IS TO BE REVIEWED BY ENGINEER TO ENSURE SATISFACTORY INSTALLATION
20. MANHOLE AND CHAMBER COVER GRADES:

- 'A15' IN ALL LANDSCAPED AREAS AND ON FOOTPATHS
- 'B125' IN ALL DRIVEWAYS
- 'C250' IN PRIVATE PARKING AREAS
- 'D400' IN CARRIAGEWAY/ACCESS ROAD

Prefixed to drawing numbers shall signify the following:-

PL = PLANNING	**Shall not be used for contract or construction purposes**
P = PRELIMINARY	**Shall not be used for contract or construction purposes**
T = TENDER	**Shall not be used for construction purposes**
C = CONSTRUCTION	These are the only drawings that shall be used for construction purposes
R = RECORD	Record of actual completed work

REV	DATE	DESCRIPTION	BY	CHK	APP
P-	31.07.24	PRELIMINARY ISSUE	LH	CS	CS

cgs civils
Consulting Civil Engineers

CLIENT: MARK BETTS

ARCHITECT: PHILIPS SURVEYORS

JOB TITLE: MENZIES WOOD FARM BILLINGSHURST

DRAWING TITLE: DRAINAGE STRATEGY SHEET 1 OF 2

DRAWN	ENGINEER	CHECKED	APPROVED
LH	C SLADE	CS	CS

DATE	SCALE @ A1
JULY 2024	1:200

JOB No.	STATUS	DRAWING No.	REV.
C3130	PL	101	PL-

FOR PLANNING ONLY

DRAINAGE LEGEND

EXISTING FEATURES

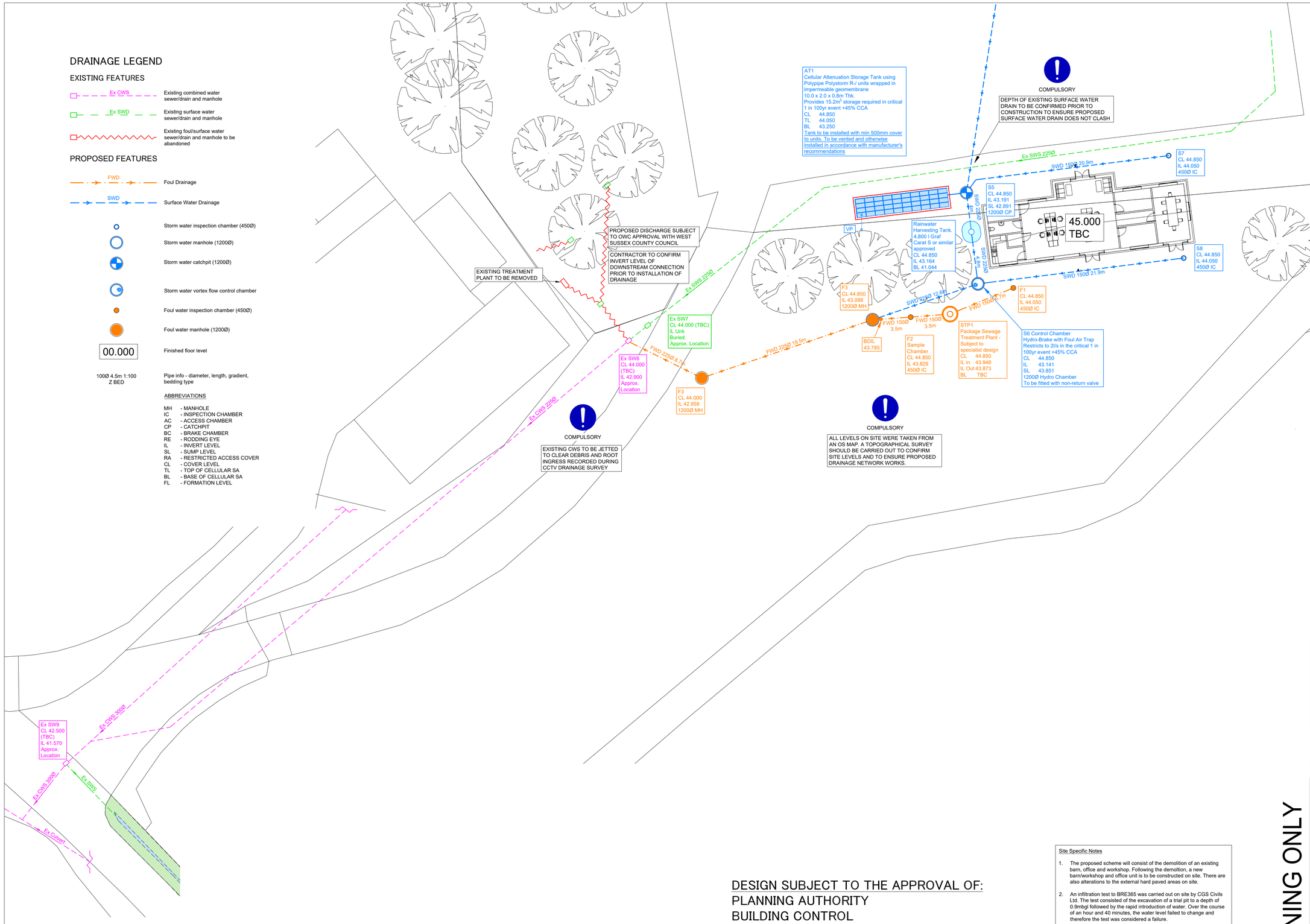
- Ex CWS — Existing combined water sewer/drain and manhole
- Ex SWD — Existing surface water sewer/drain and manhole
- Existing foul/surface water sewer/drain and manhole to be abandoned

PROPOSED FEATURES

- FWD — Foul Drainage
- SWD — Surface Water Drainage
- Storm water inspection chamber (450Ø)
- Storm water manhole (1200Ø)
- Storm water catchpit (1200Ø)
- Storm water vortex flow control chamber
- Foul water inspection chamber (450Ø)
- Foul water manhole (1200Ø)
- 00.000 — Finished floor level
- 100Ø 4.5m 1:100 Z BED — Pipe info - diameter, length, gradient, bedding type

ABBREVIATIONS

MH	- MANHOLE
IC	- INSPECTION CHAMBER
AC	- ACCESS CHAMBER
CP	- CATCHPIT
BC	- BRAKE CHAMBER
RE	- RODDING EYE
IL	- INVERT LEVEL
SL	- SUMP LEVEL
RA	- RESTRICTED ACCESS COVER
CL	- COVER LEVEL
TL	- TOP OF CELLULAR SA
BL	- BASE OF CELLULAR SA
FL	- FORMATION LEVEL



STANDARD DRAINAGE NOTES

1. DO NOT SCALE FROM THIS DRAWING, REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
2. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
4. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
5. BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SPURS TO WHICH CONNECTIONS ARE PROPOSED. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
6. ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT, THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
7. COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
8. ALL UN-REFERENCED PIPES ARE TO BE 100mm DIA
9. ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 295 AND BS65 (SWS ONLY), OR CONCRETE PIPES TO BE EN 1916 AND BS5911:PART 1.
10. ROAD GULLY OUTLET PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS. ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.
11. ALL ADOPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATION LAID DOWN DOWN IN 'SEWERS FOR ADOPTION' 6th EDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.
12. ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
13. THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
14. STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
15. IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. SUB SOIL DRAINS ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER.
16. NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.
17. ALL EXISTING MANHOLE COVER'S, GULLIES, ETC, ARE TO BE RAISED/LOWERED TO SUIT NEW LEVELS.
18. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES AND UTILITIES THAT MAY BE PRESENT
19. UPON COMPLETION BUT PRIOR TO HANDOVER, CONTRACTOR TO CARRY OUT FULL CCTV SURVEY OF DRAINAGE SYSTEM WHICH IS TO BE REVIEWED BY ENGINEER TO ENSURE SATISFACTORY INSTALLATION
20. MANHOLE AND CHAMBER COVER GRADES:

- 'A15' IN ALL LANDSCAPED AREAS AND ON FOOTPATHS
- 'B125' IN ALL DRIVEWAYS
- 'C250' IN PRIVATE PARKING AREAS
- 'D400' IN CARRIAGEWAY/ACCESS ROAD

DESIGN SUBJECT TO THE APPROVAL OF:
PLANNING AUTHORITY
BUILDING CONTROL

DESIGN SUBJECT TO THE CONFIRMATION OF:
EXTERNAL LEVELS DESIGN
ORDINARY WATERCOURSE APPROVAL
LOCATION AND DEPTH OF EXISTING UTILITIES
ROOT PROTECTION AREAS

Site Specific Notes

1. The proposed scheme will consist of the demolition of an existing barn, office and workshop. Following the demolition, a new barn/workshop and office unit is to be constructed on site. There are also alterations to the external hard paved areas on site.
2. An infiltration test to BRE365 was carried out on site by CGS Civils Ltd. The test consisted of the excavation of a trial pit to a depth of 0.9mbgl followed by the rapid introduction of water. Over the course of an hour and 40 minutes, the water level failed to change and therefore the test was considered a failure.
3. A CCTV drainage survey was conducted on site by Eyes on Drainage Solutions Ltd on behalf of CGS Civils Ltd. The CCTV survey recorded the existing drainage arrangment on site and it is noted that the existing site discharges both surface and foul water into an existing culverted watercourse located on the opposing side of Okehurst Lane.
4. It is proposed that all surface water runoff from roof areas is to be discharged into the existing drainage network on site at a restricted rate of 2.0l/s. The proposed surface water network will make use of a geocellular attenuation tank in order to cater for the 1 in 100-year +45% storm.
5. The foul water is to be treated on site via a new package treatment plant. All treated effluent runoff is to then be discharged into the culverted watercourse via a new connection into the existing drainage network.

Prefixed to drawing numbers shall signify the following:-

PL = PLANNING	**Shall not be used for contract or construction purposes**
P = PRELIMINARY	**Shall not be used for contract or construction purposes**
T = TENDER	**Shall not be used for construction purposes**
C = CONSTRUCTION	These are the only drawings that shall be used for construction purposes
R = RECORD	Record of actual completed work

REV	DATE	DESCRIPTION	BY	CHK	APP
P-	31.07.24	PRELIMINARY ISSUE	LH	CS	CS

cgs civils
Consulting Civil Engineers

CLIENT: MARK BETTS

ARCHITECT: PHILIPS SURVEYORS

JOB TITLE: MENZIES WOOD FARM BILLINGSHURST

DRAWING TITLE: DRAINAGE STRATEGY SHEET 2 OF 2

DRAWN	ENGINEER	CHECKED	APPROVED
LH	C SLADE	CS	CS

DATE	SCALE @ A1
JULY 2024	1:200

JOB No.	STATUS	DRAWING No.	REV.
C3130	PL	102	PL-

FOR PLANNING ONLY

7.3 Appendix C – Surface Water Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.350
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.011	5.00	45.850	Manhole	Adoptable	1200	3232.284	289.335	1.200
S2	0.012	5.00	45.850	Manhole	Adoptable	1200	3235.241	262.033	1.390
S3	0.012	5.00	45.850	Manhole	Adoptable	1200	3214.875	259.701	1.528
S4	0.011	5.00	45.850	Manhole	Adoptable	1200	3211.904	287.128	1.200
S5	0.004	5.00	44.850	Manhole	Adoptable	1200	3207.261	213.111	1.659
S6	0.004	5.00	44.850	Manhole	Adoptable	1200	3208.655	201.991	1.709
S7	0.004	5.00	44.850	Manhole	Adoptable	450	3229.299	215.874	0.800
S8	0.004	5.00	44.850	Manhole	Adoptable	450	3230.933	204.785	0.800
F3			44.700	Manhole	Adoptable	1200	3197.250	198.106	1.612

Links (Input)

Name	US Node	DS Node	Length (m)	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.000	S1	S2	27.462	44.650	44.460	0.190	144.5	225
1.001	S2	S3	20.499	44.460	44.322	0.138	148.5	225
1.002	S3	S5	47.208	44.322	43.191	1.131	41.7	225
1.003	S4	S3	27.587	44.650	44.322	0.328	84.1	225
1.004	S5	S6	11.207	43.191	43.141	0.050	224.1	225
2.000	S7	S5	22.211	44.050	43.266	0.784	28.3	150
2.001	S8	S6	22.453	44.050	43.216	0.834	26.9	150
3.000	S6	F3	12.049	43.141	43.088	0.053	227.3	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Flow+ v10.7 Copyright © 1988-2024 Causeway Technologies Ltd

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
10	0	0	0
30	0	0	0
100	45	0	0

Node S6 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	43.141	Product Number	CTL-SHE-0059-2000-1709-2000
Design Depth (m)	1.709	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node S5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	43.250
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	222

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	20.0	0.0	0.800	20.0	0.0	0.801	0.0	0.0

Flow+ v10.7 Copyright © 1988-2024 Causeway Technologies Ltd

Results for 1 year Critical Storm Duration. Lowest mass balance: 98.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	44.679	0.029	1.6	0.0381	0.0000	OK
15 minute winter	S2	11	44.502	0.042	3.2	0.0549	0.0000	OK
15 minute winter	S3	11	44.364	0.042	6.3	0.0545	0.0000	OK
15 minute winter	S4	10	44.676	0.026	1.6	0.0336	0.0000	OK
30 minute winter	S5	30	43.336	0.145	5.7	1.8199	0.0000	OK
30 minute winter	S6	31	43.336	0.195	2.2	0.2299	0.0000	OK
15 minute winter	S7	10	44.063	0.013	0.6	0.0035	0.0000	OK
15 minute winter	S8	10	44.063	0.013	0.6	0.0035	0.0000	OK
15 minute summer	F3	1	43.088	0.000	1.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	1.5	0.389	0.036	0.1110	
15 minute winter	S2	1.001	S3	3.2	0.619	0.075	0.1054	
15 minute winter	S3	1.002	S5	6.3	0.750	0.078	0.6206	
15 minute winter	S4	1.003	S3	1.5	0.426	0.027	0.1051	
30 minute winter	S5	1.004	S6	1.7	0.213	0.049	0.3568	
30 minute winter	S6	Hydro-Brake®	F3	1.4				5.3
15 minute winter	S7	2.000	S5	0.5	0.705	0.016	0.0711	
15 minute winter	S8	2.001	S6	0.6	0.553	0.016	0.1545	

Flow+ v10.7 Copyright © 1988-2024 Causeway Technologies Ltd

Results for 10 year Critical Storm Duration. Lowest mass balance: 98.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	44.689	0.039	3.0	0.0518	0.0000	OK
15 minute winter	S2	11	44.519	0.059	6.2	0.0764	0.0000	OK
15 minute winter	S3	11	44.381	0.059	12.2	0.0757	0.0000	OK
15 minute winter	S4	10	44.685	0.035	3.0	0.0455	0.0000	OK
60 minute winter	S5	60	43.517	0.326	7.2	5.4572	0.0000	SURCHARGED
60 minute winter	S6	60	43.516	0.375	2.4	0.4423	0.0000	SURCHARGED
15 minute winter	S7	10	44.068	0.018	1.1	0.0048	0.0000	OK
15 minute winter	S8	10	44.068	0.018	1.1	0.0047	0.0000	OK
15 minute summer	F3	1	43.088	0.000	1.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	2.9	0.459	0.067	0.1758	
15 minute winter	S2	1.001	S3	6.1	0.743	0.143	0.1684	
15 minute winter	S3	1.002	S5	12.2	0.854	0.151	1.0678	
15 minute winter	S4	1.003	S3	2.9	0.502	0.052	0.1657	
60 minute winter	S5	1.004	S6	1.4	0.230	0.042	0.4457	
60 minute winter	S6	Hydro-Brake®	F3	1.4				12.6
15 minute winter	S7	2.000	S5	1.1	0.775	0.032	0.2021	
15 minute winter	S8	2.001	S6	1.1	0.612	0.031	0.2099	

Flow+ v10.7 Copyright © 1988-2024 Causeway Technologies Ltd

Results for 30 year Critical Storm Duration. Lowest mass balance: 98.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	44.694	0.044	3.8	0.0584	0.0000	OK
15 minute winter	S2	10	44.526	0.066	7.9	0.0867	0.0000	OK
15 minute winter	S3	11	44.388	0.066	15.6	0.0855	0.0000	OK
15 minute winter	S4	10	44.689	0.039	3.8	0.0513	0.0000	OK
60 minute winter	S5	62	43.650	0.459	9.4	8.1471	0.0000	SURCHARGED
60 minute winter	S6	62	43.650	0.509	2.4	0.5992	0.0000	SURCHARGED
15 minute winter	S7	10	44.071	0.021	1.4	0.0054	0.0000	OK
15 minute winter	S8	10	44.071	0.021	1.4	0.0053	0.0000	OK
15 minute summer	F3	1	43.088	0.000	1.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	3.7	0.490	0.086	0.2102	
15 minute winter	S2	1.001	S3	7.8	0.793	0.182	0.2004	
15 minute winter	S3	1.002	S5	15.5	0.900	0.192	1.1544	
15 minute winter	S4	1.003	S3	3.7	0.539	0.066	0.1970	
60 minute winter	S5	1.004	S6	1.5	0.235	0.043	0.4457	
60 minute winter	S6	Hydro-Brake®	F3	1.4				16.0
15 minute winter	S7	2.000	S5	1.4	0.835	0.041	0.2098	
15 minute winter	S8	2.001	S6	1.4	0.581	0.040	0.2134	

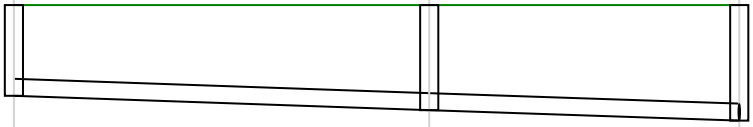
Flow+ v10.7 Copyright © 1988-2024 Causeway Technologies Ltd

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.97%

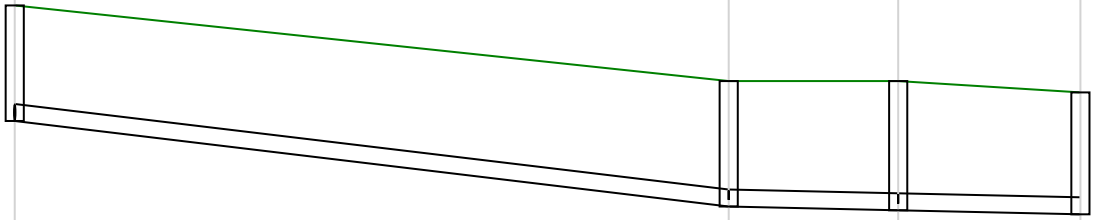
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	44.711	0.061	7.2	0.0804	0.0000	OK
15 minute winter	S2	10	44.554	0.094	14.8	0.1231	0.0000	OK
120 minute winter	S3	116	44.473	0.151	9.6	0.1940	0.0000	OK
15 minute winter	S4	10	44.703	0.053	7.2	0.0702	0.0000	OK
120 minute winter	S5	118	44.472	1.281	11.2	16.7294	0.0000	SURCHARGED
120 minute winter	S6	118	44.472	1.331	3.6	1.5678	0.0000	SURCHARGED
120 minute winter	S7	118	44.472	0.422	1.7	0.1094	0.0000	SURCHARGED
120 minute winter	S8	118	44.472	0.422	1.7	0.1093	0.0000	SURCHARGED
15 minute summer	F3	1	43.088	0.000	1.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	7.0	0.580	0.163	0.3363	
15 minute winter	S2	1.001	S3	14.6	0.936	0.342	0.3191	
120 minute winter	S3	1.002	S5	9.6	0.551	0.119	1.6056	
15 minute winter	S4	1.003	S3	7.1	0.638	0.125	0.3098	
120 minute winter	S5	1.004	S6	3.1	0.230	0.089	0.4457	
120 minute winter	S6	Hydro-Brake®	F3	1.8				30.3
120 minute winter	S7	2.000	S5	-1.2	0.517	-0.037	0.3910	
120 minute winter	S8	2.001	S6	-1.2	0.432	-0.034	0.3953	

Flow+ v10.7 Copyright © 1988-2024 Causeway Technologies Ltd

Node Name	S1		S2		S3
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 35.000					
Link Name		1.000		1.001	
Section Type		225mm		225mm	
Slope (1:X)		144.5		148.5	
Cover Level (m)	45.850		45.850		45.850
Invert Level (m)	44.650	44.460	44.460	44.322	
Length (m)		27.462		20.499	

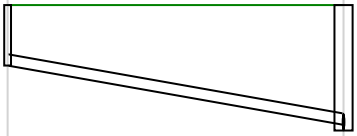
Flow+ v10.7 Copyright © 1988-2024 Causeway Technologies Ltd

Node Name	S3		S5		S6		F3
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 34.000							
Link Name		1.002		1.004		3.000	
Section Type		225mm		225mm		225mm	
Slope (1:X)		41.7		224.1		227.3	
Cover Level (m)	45.850		44.850		44.850		44.700
Invert Level (m)	44.322	43.191	43.191	43.141	43.141	43.088	
Length (m)		47.208		11.207		12.049	

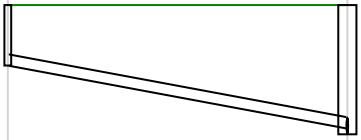
Flow+ v10.7 Copyright © 1988-2024 Causeway Technologies Ltd

Node Name	S4	S3
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 35.000		
Link Name	1.003	
Section Type	225mm	
Slope (1:X)	84.1	
Cover Level (m)	45.850	45.850
Invert Level (m)	44.650	44.322
Length (m)	27.587	

Flow+ v10.7 Copyright © 1988-2024 Causeway Technologies Ltd

Node Name	S7	S5
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 34.000		
Link Name	2.000	
Section Type	150mm	
Slope (1:X)	28.3	
Cover Level (m)	44.850	44.850
Invert Level (m)	44.050	43.266
Length (m)	22.211	

Flow+ v10.7 Copyright © 1988-2024 Causeway Technologies Ltd

Node Name	S8	S6
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 34.000		
Link Name	2.001	
Section Type	150mm	
Slope (1:X)	26.9	
Cover Level (m)	44.850	44.850
Invert Level (m)	44.050	43.216
Length (m)	22.453	

Flow+ v10.7 Copyright © 1988-2024 Causeway Technologies Ltd

Flow+ v10.7 Copyright © 1988-2024 Causeway Technologies Ltd