FLOOD RISK ASSESSMENTS & DRAINAGE STRATEGIES

Land North Of Milton Road, Adderbury-Phase 2

Reference: 0202 - DD- 001

Nov-21

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SURFACE WATER DRAINAGE SCHEME

Purpose of this report

1.1 The purpose of this statement is to accompany the technical drawings and details showing the proposed Sustainable Drainage System and to address each point relating to drainage as required by planning condition 9 and 10, and parts of conditions 4, 6, and 17 of planning permission Ref: 19/02796/F and subsequent amendments-21/00104/F.

Existing and Proposed Site

2.1 The estimated lifetime of this development is: 100 years

2.2 The distribution of catchment areas for existing and proposed site is as per table 1 below. See appendix A for details.

Table 1 : Existing and Proposed catchment areas in hectares

Description	Existing Site	Proposed Site
Permeable Surface	0.960	0.905
Impermeable Surface	0.000	0.055
Total Development Area	0.960	0.960

2.3 The distribution of surfaces within the positively drained areas can be seen in appendix D.

Site Characteristics

2.4 The site background is clearly identified through answers to the questions below

TOPIC	QUESTION	ANSWER
Protected species or habitat	Is the site near to designated sites and priority habitats?	No
Flood Plain	Is the site located in the flood plain?	No
Soils and Geology	Soil permeability? - See appendix B for results	Yes
Space constraints	Space for SuDS components?	Yes
Topography	Sited on a flat site?	Yes
	Sited on a steep slope (5-15%)	No
	Sited on a very steep slope (>15%)	No
Groundwater	Is ground Water less that 3m bgl?	N/A
Runoff characteristics	Is the development in a high risk flooding area?	No

Evaluation of Discharge Point

2.5 The SuDS design takes into account Building Regulations Section H3. Rainwater from roofs and paved areas is carried away from the surface to discharge to one of the following in order of priority:

Discharge to:	**Site Assessment**
Adequate infiltration system	The site has potential for infiltration at shallow depths. See site investigation. The infiltration rate for the site is 0.57050 m.hr
a watercourse	There is a ditch running parallel to phase 1. It is not proposed to connect pahse 2 into this ditch.
a surface water sewer	There are not public drains in the proximity to the site
a combined sewer system	There are not public drains in the proximity to the site

Peak Runoff and Attenuation Volumes 3

Peak Run-off Rate

3.1 The peak runoff rate for the existing site was calculated as per table 3. Calculation results are in table 5 and appendix C.

Table 3: Peak run-off rate calculation method for existing site

Method Used	Calculation Method
✓	This is a greenfield site, as the proposed development area is less than 50ha, the Institute of Hydrology(IoH). Report124 Flood Estimation for Small Catchments method has been used to estimate the site peak flow rates
	This is a brownfield site, runoff rates are calculated in accordance with best practice simulation modelling
	This is a brownfield site where the pre-development drainage isn't known therefore the runoff rates are calculated using the Greenfield run-off model (above) but using soil type 5

3.2 The runoff flow produced by the development will be controlled as per table

Table 4: Runoff discharge rate control

Control Used	Description of runoff discharge
✓	Water will be discharged into the ground via a SuDS as described in table 6 below
	The peak discharge rate has been reduced to pre-development Qbar flow
	The limiting discharge rate requires a flow rate less than 5l/s at discharge point, therefore a rate of 5l/s is used
	The peak discharge rate has been agreed with the local water company to be 1:30 storm event flow rate

Run-off Volumes

3.3 Micro Drainage was used to calculate the size of the attenuation based on the available infiltration rate, the size of the soakaways are calculated for all events up to the 1 in 100 including an allowance for climate change of 40%. See table 5 for value and appendix C for calculations.

Table 5: Peak discharge rates and anticipated attenuation volumes for SuDS

Return Period	Peak Discharge Rate (l/s)		Infiltration
Event	Existing	Proposed	Rate (m/hr)
Qbar(1 in 2)	1.60	n/a	0.5705
1 in 30	3.70	n/a	0.5705
1 in 100	5.20	n/a	0.5705
1 in 100 + CC	[redacted]	n/a	0.5705

Drainage Hierarchy Evaluation

4.1 The drainage hierarchy evaluation is set up within the NPPF and the local SuDS documents of the Lead Local Flood Authority. The following drainage strategy is proposed by this development.

Table 6: Drainage Hierarchy Evaluation

	Hierarchy	Feasible	Proposed
1	Store rainwater for later use	✓	✗
2	Use infiltration techniques, such as porous surfaces	✓	✓
3	Attenuate rainwater in ponds or open water features for gradual release	✗	✗
4	Attenuate rainwater by storing in tanks or sealed water features for gradual release	✗	✗
5	Discharge rainwater direct to a watercourse	✗	✗
6	Discharge rainwater to a surface water sewer/drain	✗	✗
7	Discharge rainwater to the combined sewer.	✗	✗

4.2 The location and details of the SuDS can be seen drainage layouts in appendix D. Calculations are in appendix C.

4.3 The drainage calculations demonstrate:
- The post development runoff volumes have been reduced to the pre-development runoff values by infiltrating all the run-off produced by the development.
- The access road drainage desing has been agreed with Oxfordshire County Council as part of Condition 10 of 18/00220/F. See appendix D for details.
- No flooding occurs for the 1 in 30 storm events.
- Any flooding for the 1 in 100 year +40% climate change event can be safely contained on site.

4.4 The proposed drainage strategy demonstrate that the development can be sustainably drained, to comply with the requirements of the NPPF and planning conditions.

Management of Exceedance Flows

4.5 The drainage network has been designed to attenuate surface runoff for all events up to and including the 1% AEP + CC(1 in 100 years). However consideration has been given to what may happen when the design capacity of the surface water drainage network is exceeded. Surface water will flow to the lowest points within the site located to the fields. The flood risk to the buildings would therefore remain very low. See appendix D.

Maintenance and Management plan responsibility

5.1 The SuDS will be maintained by The Owner the property

Maintenance and Management plan for proposed SuDS

5.2 The maintenance and Management Plan Guidance from the SuDS Manual, CIRIA C753 (CIRIA, 2015) is to be followed for the effective maintenance of the proposed SuDS techniques outlined above. The maintenance for SuDS structures are as follow:

TABLE 13.2 Operation and maintenance requirements for infiltration basins

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter, debris and trash	Monthly
	Cut grass – for landscaped areas and access routes	Monthly (during growing season) or as required
	Cut grass – meadow grass in and around basin	Half yearly: spring (before nesting season) and autumn
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
Occasional maintenance	Reseed areas of poor vegetation growth	Annually, or as required
	Prune and trim trees and remove cuttings	As required
	Remove sediment from pre-treatment system when 50% full	As required
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realign the rip-rap	As required
	Repair or rehabilitate inlets, outlets and overflows	As required
	Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates	As required
	Relevel uneven surfaces and reinstate design levels	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and pre-treatment systems for silt accumulation; establish appropriate silt removal frequencies	Half yearly
	Inspect infiltration surfaces for compaction and ponding	Monthly

Operation and maintenance requirements for pervious pavements		
Maintenance schedule	**Required action**	**Typical frequency**
Regular maintenance	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 manufacturer's 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	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	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, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Appendix A

EXISTING SITE
NTS

PROPOSED SITE
1:1000

Drawing Scale Bar

Drawing scale	Line length	Drawing scale	Line length
1:5	= 0.25 metres	1:200	= 10.0 metres
1:10	= 0.5 metres	1:250	= 12.5 metres
1:20	= 1.0 metres	1:500	= 25.0 metres
1:25	= 1.25 metres	1:1000	= 50.0 metres
1:50	= 2.5 metres	1:1250	= 62.5 metres
1:100	= 5.0 metres	1:2500	= 125 metres

Measure length of line above for checking of scale

GENERAL NOTES

KEY

Impermeable Areas

External Permeable Areas

STUDY AREA

Rev	Details	Date	By	Ch'd

Drawing Status:
PRELIMINARY

RIDA
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Client:

Project:
Land North Of Milton Road, Adderbury

Drawing:
Existing and Proposed Areas
Permeable and Impermeable - Phase 2

Print Size:	Project No:	Drawing No:	Revision:
A1	0202	006	P1

Appendix B

Project No.	FEDS- 218132	By:	AK	Chkd:	DKP
Title	Recreation Ground, Milton Road, Adderbury, Banbury, OX15				
Sheet No.	10	Date:	October 2018		

Notes: Tests carried out on 3rd June 2018

Weather conditions: Damp

Trial Pit: Two

1. INPUTS

Trial Pit Dimensions		
Length	1.500	m
Width	0.700	m
Depth	1.000	m
Inlet Depth	0.335	m
Effective Depth	0.665	m

Soil Infiltration Rate = $\frac{Vp_{75-25}}{ap_{50} \times tp_{75-25}}$

Vp_{75-25}	the effective storage volume of water in the trial pit between 75% and 25% effective depth =		0.349 m^3	
ap_{50}	the internal surface area of the trial pit up to 50% effective depth and including the base =		2.513 m^2	
tp_{75-25}	the time for the water level to fall from 75% and 25% effective depth =	14.6 minutes	876.66 seconds	(lowest)

f = **Soil Infiltration Rate for Design** = **1.6E-04** m/s (lowest)

= **0.5705** m/hr (lowest)

2. INPUT OF PERMEABILITY TEST DATA

TEST 1

Time	Water level	Water Depth
0	383	617
10	683	317
20	896	104
30	978	22

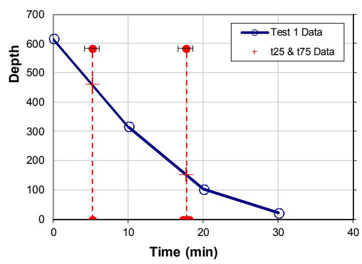
TEST 2

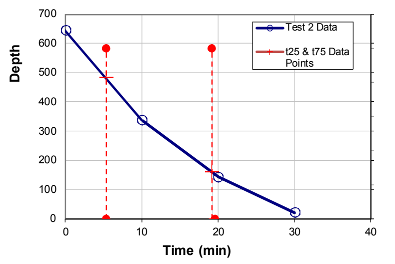
Time	Water level	Water Depth
0	355	645
10	662	338
20	856	144
30	978	22

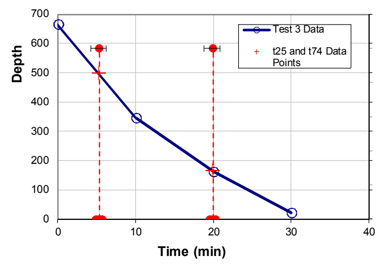
TEST 3

Time	Water level	Water Depth
0	335	665
10	654	346
20	837	163
30	978	22

3. DATA ANALYSIS







Depth at t=	617			
Depth 75%	462.75			
Depth 25%	154.25			
5.14155	462.75			
17.641	154.25			
tp75-25	12.49945	minutes	749.967	seconds
f1 =	1.85E-04 m/s			

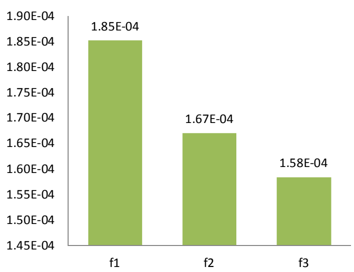
Depth at t=0	645			
Depth 75%	483.75			
Depth 25%	161.25			
5.2525	483.75			
19.111	161.25			
tp75-25	13.8585	minutes	831.51	seconds
f2 =	1.67E-04 m/s			

Depth at t=0	665			
Depth 75%	498.75			
Depth 25%	166.25			
5.2115	498.75			
19.8225	166.25			
tp75-25	14.611	minutes	876.66	seconds
f3=	1.58E-04 m/s			

4. SUMMARY

Infiltration Rate

f1	1.85E-04
f2	1.67E-04
f3	1.58E-04



Appendix C

ICP SUDS Mean Annual Flood

Input

Return Period (years)	2	Soil	0.300
Area (ha)	0.960	Urban	0.000
SAAR (mm)	654	Region Number	Region 6

Results	**l/s**
QBAR Rural	1.6
QBAR Urban	1.6
Q2 years	1.4
Q1 year	1.4
Q30 years	3.7
Q100 years	5.2

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.409	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	0.500
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.034	4-8	0.021

Total Area Contributing (ha) = 0.055

Total Pipe Volume (m³) = 0.157

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	10.000	0.171	58.5	0.055	6.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	10.000	0.171	58.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	6.17	99.500	0.055	0.0	0.0	0.0	1.01	7.9	7.4
1.001	50.00	6.33	99.329	0.055	0.0	0.0	0.0	1.01	7.9	7.4

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.001		100.000	99.158	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.409		

Online Controls for Storm

Pump Manhole: Point 2, DS/PN: 1.001, Volume (m^3): 0.2

Invert Level (m) 99.329

Depth (m)	**Flow (l/s)**
2.000	0.0000

Storage Structures for Storm

Swale Manhole: Point 1, DS/PN: 1.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.57050	Length (m)	32.0
Infiltration Coefficient Side (m/hr)	0.57050	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	0.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	99.500	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.4	Include Swale Volume	Yes

Porous Car Park Manhole: Point 2, DS/PN: 1.001

Infiltration Coefficient Base (m/hr)	0.57050	Width (m)	70.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	194.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.500	Cap Volume Depth (m)	0.400

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 2
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.409
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 10.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	Point 1	15 Winter	1	+0%	30/15 Summer				99.553
1.001	Point 2	15 Winter	1	+0%	1/15 Summer				99.503

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	Point 1	-0.047	0.000	0.54		4.0	OK	
1.001	Point 2	0.074	0.000	0.00		0.0	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.409
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	10.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	Point 1	15 Winter	30	+0%	30/15 Summer				99.633
1.001	Point 2	15 Winter	30	+0%	1/15 Summer				99.505

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	Point 1	0.033	0.000	0.86		6.4	SURCHARGED	
1.001	Point 2	0.076	0.000	0.00		0.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 2
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.409
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 10.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	Point 1	15 Winter	100	+40%	30/15 Summer				99.728
1.001	Point 2	30 Winter	100	+40%	1/15 Summer				99.507

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	Point 1	0.128	0.000	1.14		8.4	SURCHARGED	
1.001	Point 2	0.078	0.000	0.00		0.0	SURCHARGED	

Appendix D

Drawing Scale Bar

Drawing scale	Line length	Drawing scale	Line length
1:5	= 0.25 metres	1:200	= 10.0 metres
1:10	= 0.5 metres	1:250	= 12.5 metres
1:20	= 1.0 metres	1:500	= 25.0 metres
1:25	= 1.25 metres	1:1000	= 50.0 metres
1:50	= 2.5 metres	1:1250	= 62.5 metres
1:100	= 5.0 metres	1:2500	= 125 metres

Measure length of line above for checking of scale

Notes:

1. All dimensions are in millimetres and levels in m AOD unless stated otherwise.

2. Do not scale. If in any doubt, consult Engineer.

3. Read in conjunction with the architects and engineers schedule drawings.

4. Check inverts and sizes of existing pipes prior to the commencement of any work. Report any discrepancies to the engineer and await instructions.

5. The location of services is shown as indicative. This drawing should be read in conjunction with the utilities drawings. No warranty to their accuracy can be given. The contractor shall take all necessary measures to satisfy himself as to the location of the existing services and connection points. Excavation should be undertaken in compliance with HSG47.

6. Concrete structures design sulphate class and ACEC concrete class unknown.

7. Pipework to be 110mm Thermoplastics U-PVC (Polypipe or similar) installed at levels marked on this drawing. Pipe bedding should be class Z in pipes within 1.5m of the building or shallower than 700mm below ground level. For all other areas the pipe bedding should be class S.

8. Joints and fittings for gravity sewers shall comply with the relevant provisions of BS EN 1401-1, BS EN 1852 and BS EN 12666-1. Pipes shall have a limit of 6% deformation. Pipes shall be SN8 ring stiffness and stamped accordingly. Pipe sections shall not be longer than 3m.

9. Plastic chambers and rings, including demarcation chambers,shall comply with BS EN 3598-1 or BS EN 13598-2 as appropriate.

10. Inspection chamber covers and frames shall comply with the relevant provisions of BS EN 124 and should be double sealed.

11. All inspection chamber covers shall be the non-ventilating type and shall have closed keyways.

12. Testing of pipelines should be as follow:

Gravity Pipework: Air pipe testing. Pipework should withstand a pressure of 100mm water gauge and this should not fall by more than 25mm in a 5minute period. However where traps or gullies are connected they should withstand a pressure of 50mm water gauge and this should not fall by more than 12mm in a 5minute period. It is recommended that pipework installations are tested in sections rather than waiting to complete in one operation.

13. Manhole covers to be set square to the building. Covers of existing manholes to be adjusted to match final ground levels.

14. Granular Bedding for pipes shall be constructed by spreading and compacting granular bedding material over the full width of the pipe trench. After the pipes have been laid, additional granular material shall, if required, be placed and compacted equally on each side of the pipes and, where practicable, this shall be done in sequence with the removal of the trench supports.

KEY

Proposed Surface Water Sewer

Exceedance Flows

Scale 1:250

Rev	Details	Date	By	Ch'd

Drawing Status:

PRELIMINARY

RIDA

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGIES

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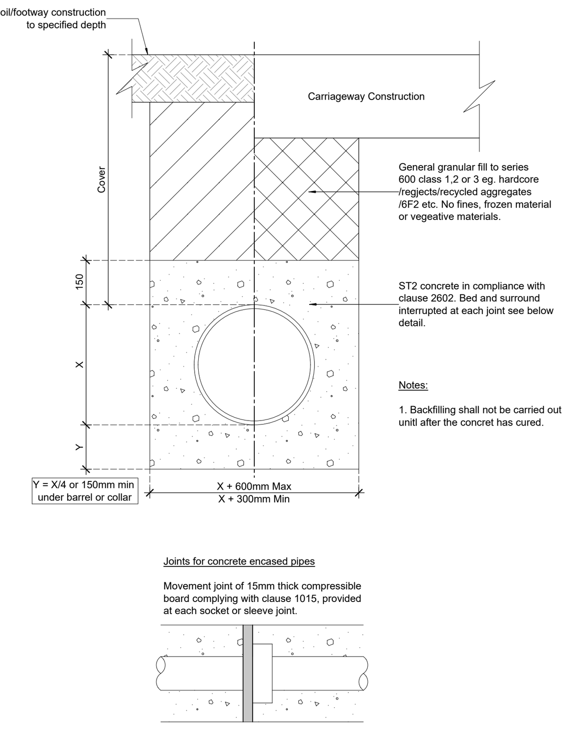
Client:

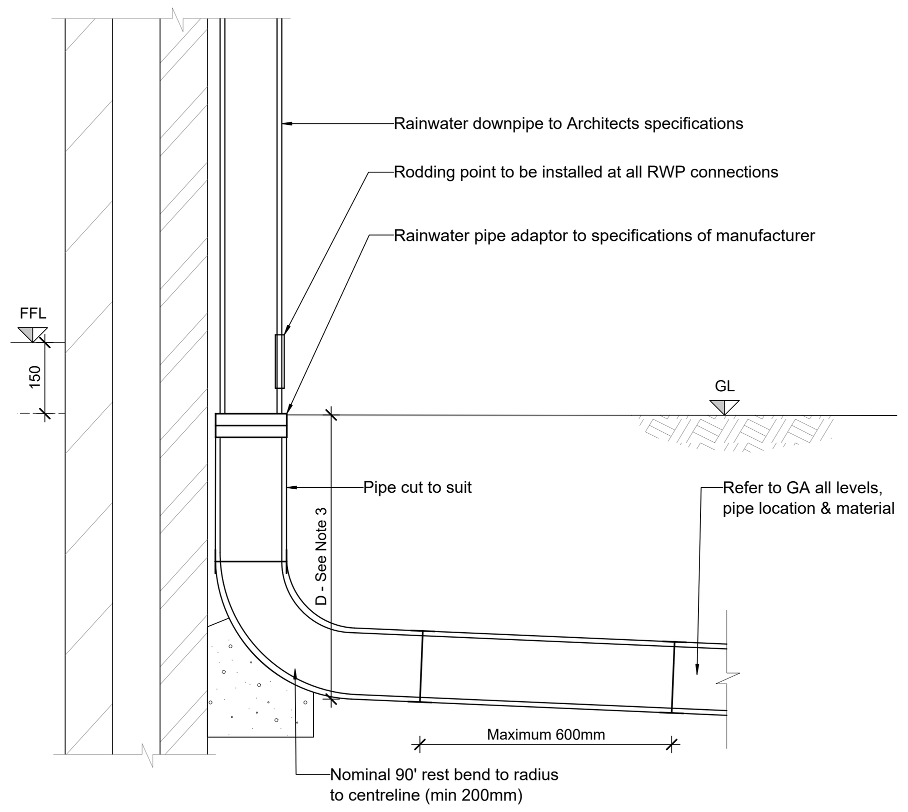
Project: Land North Of Milton Road, Adderbury

Drawing: Proposed Drainage Strategy

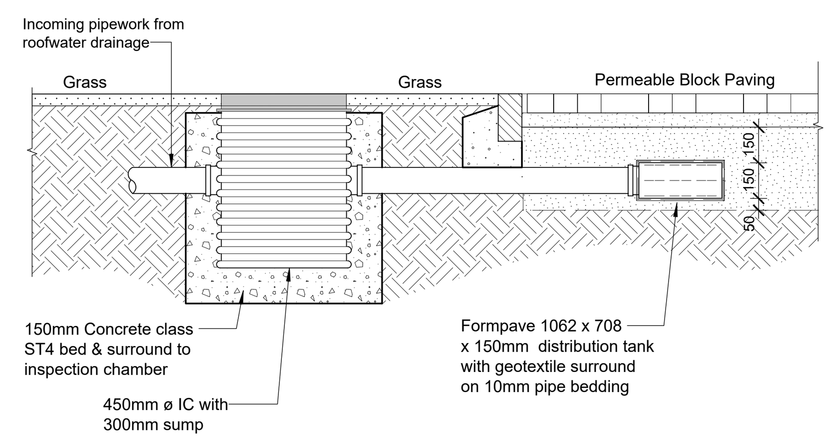
Print Size:	Project No:	Drawing No:	Revision:
A1	0202	003	P1



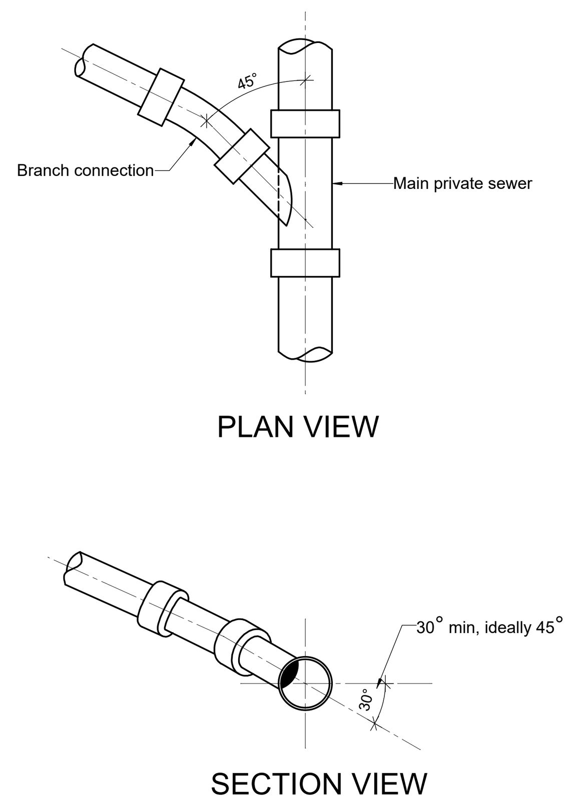
Pipe Bedding Detail Type Z



8251 - External Rainwater Pipe Connection Detail



SD064 - Sump and Dispersion Unit



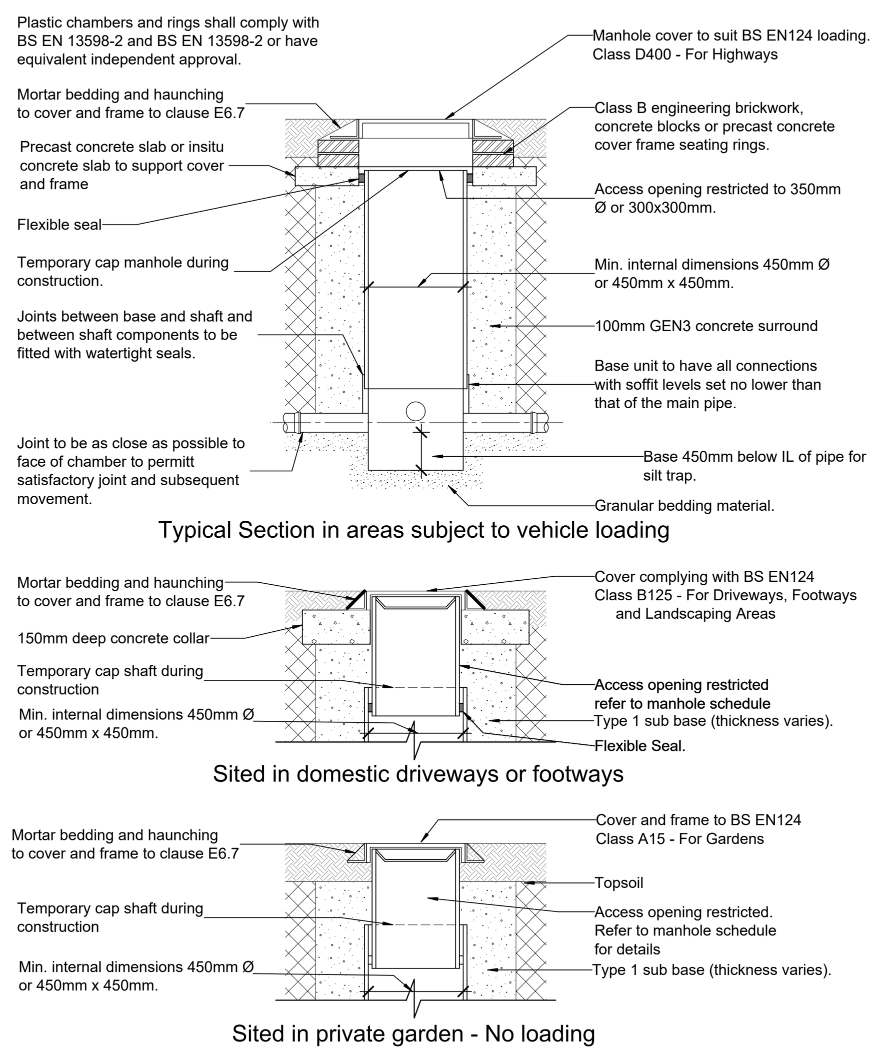
NOTES:

1. The vertical angle between the connecting pipe and the horizontal should be greater than 0° and not more than 60°.

2. Where the connection is being made to a sewer with a nominal internal diameter of 300 mm or less, connections should be made using 45° angle, or 90° angle, curved square junctions.

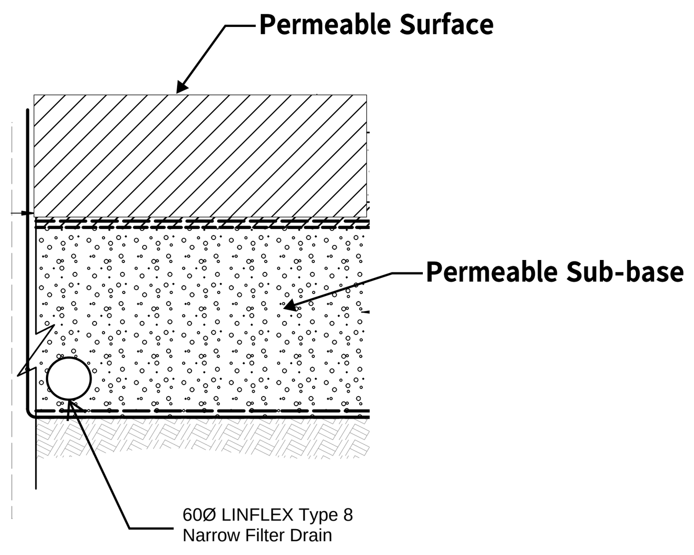
3. Connections made with junction fittings should be made by cutting the existing pipe, inserting the junction fitting and jointing with flexible repair couplings or slip couplers.

Lateral Connection to private sewer



Notes:
1. Refer to drawing 8193 for base layouts.

Silt Trap Plastic



Perforated Pipe within sub-base

Drawing Scale Bar

Drawing scale	Line length	Drawing scale	Line length
1:5	= 0.25 metres	1:200	= 10.0 metres
1:10	= 0.5 metres	1:250	= 12.5 metres
1:20	= 1.0 metres	1:500	= 25.0 metres
1:25	= 1.25 metres	1:1000	= 50.0 metres
1:50	= 2.5 metres	1:1250	= 62.5 metres
1:100	= 5.0 metres	1:2500	= 125 metres

Measure length of line above for checking of scale

GENERAL NOTES

Rev	Details	Date	By	Ch'd

Drawing Status:

PRELIMINARY

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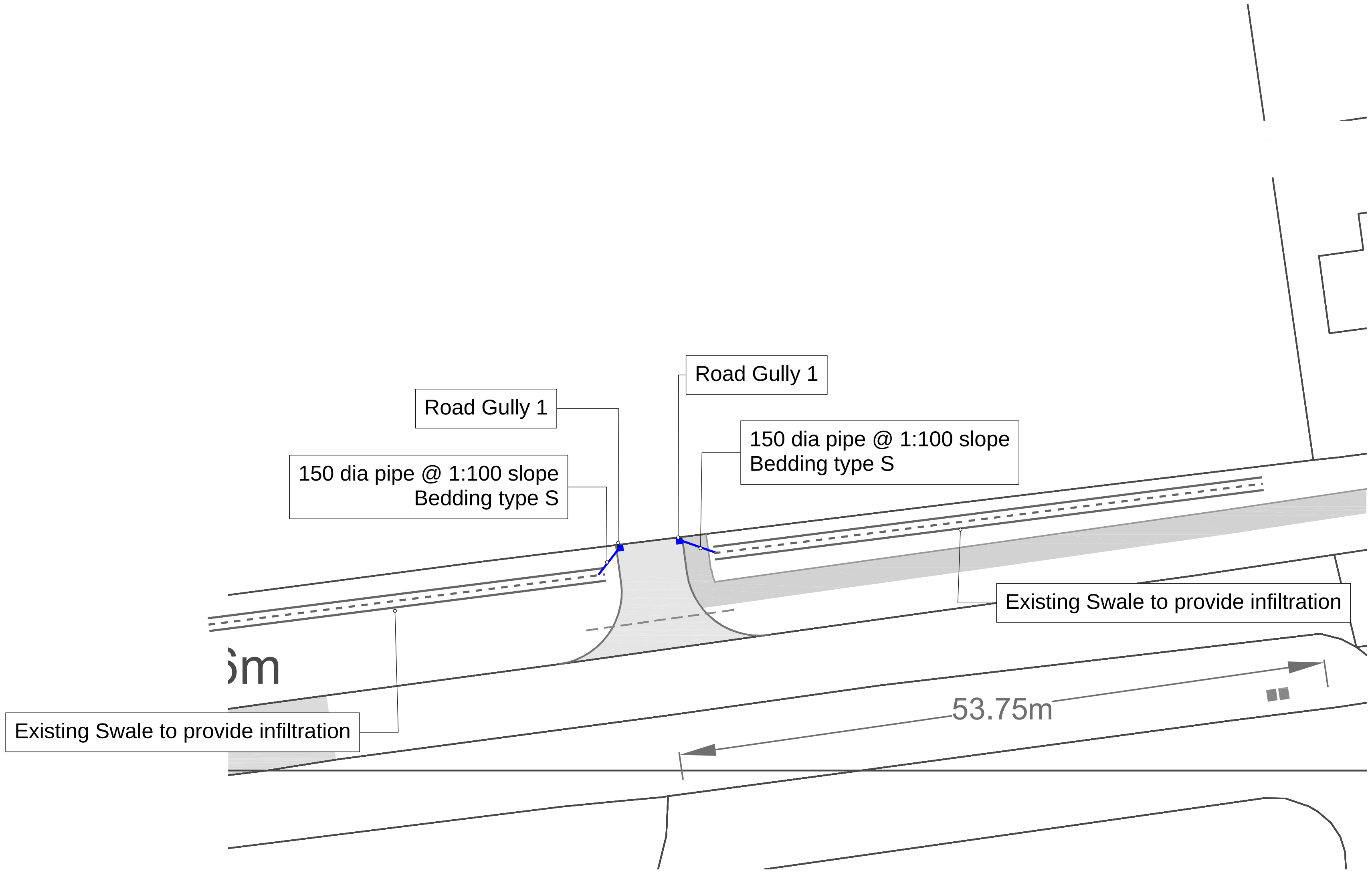
Drawing:
Standard Details

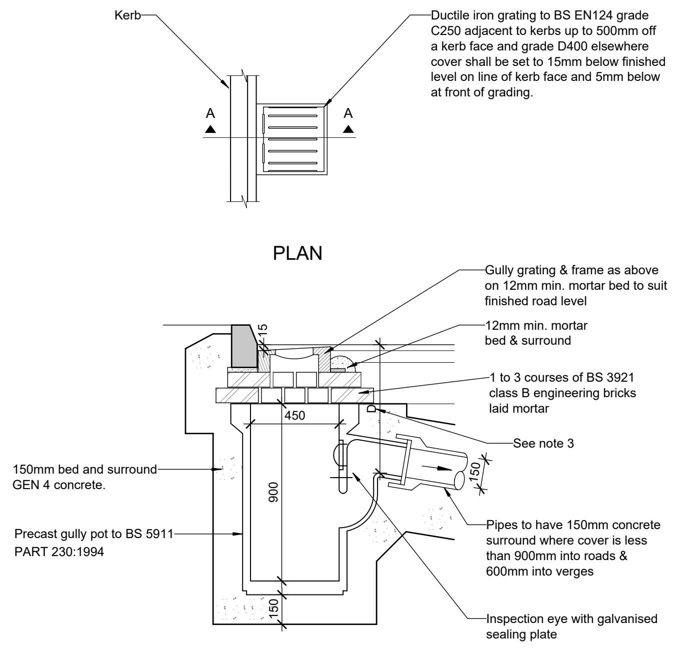
Print Size:	Project No:	Drawing No:	Revision:
A1	0202	006	P1



DRAINAGE LAYOUT ACCESS ROAD
1 IN 500 @ A3

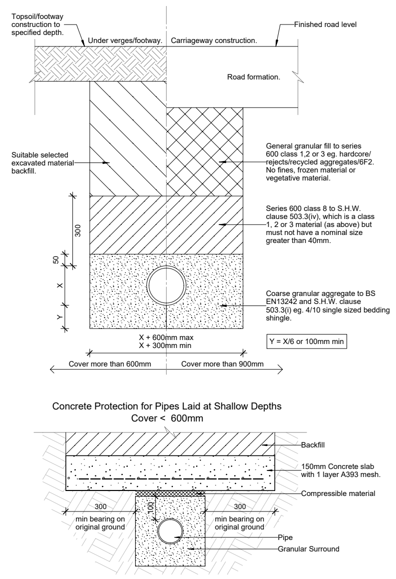
NOTE:

All work as per Oxordshire County Council highways department specification



SECTION A - A

8010 - Gully Detail - Concrete



8064 - Pipe Bedding Detail Type S

DRAINAGE LAYOUT AND DETAILS FOR
MILTON ROAD DEVELOPMENT ACCESS ROAD
1 IN 500 @ A3

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