

**SPRINGFIELD SCHOOL, CURZON
STREET, CALNE**

DRAINAGE STRATEGY

Wiltshire Council c/o CMS-group

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	Name	Position	Signature	Date
Prepared by:	Mark Dyer	Civil Engineering Director		February 2026
Approved by:	Tafari Lewis	Associate		February 2026

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1. INTRODUCTION

Introduction

- 1.1. SDS Consulting has been commissioned by the client to provide a Drainage Strategy report to support a planning application for the Installation of two number temporary modular units to provide four additional classrooms with toilet facilities at Springfield School, Curzon Street, Calne. This report has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF), the associated Planning Policy Guidelines (PPG) and local policy requirements.
- 1.2. This report is intended to support a planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

Objectives & Scope

- 1.3. The objective of this report is:
- Provide suitable information relating to surface water drainage for planning
- 1.4. The scope of this report is to support a planning application and respond to the request for additional information.

Limitations

- 1.5. The general limitations of this report are that:
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2. SITE CONTEXT

Development Proposals

- 2.1. The development proposals, in which this report is written for, comprise the Installation of two number temporary modular units to provide four additional classrooms with toilet facilities at Springfield School, Curzon Street, Calne SN11 0DS.

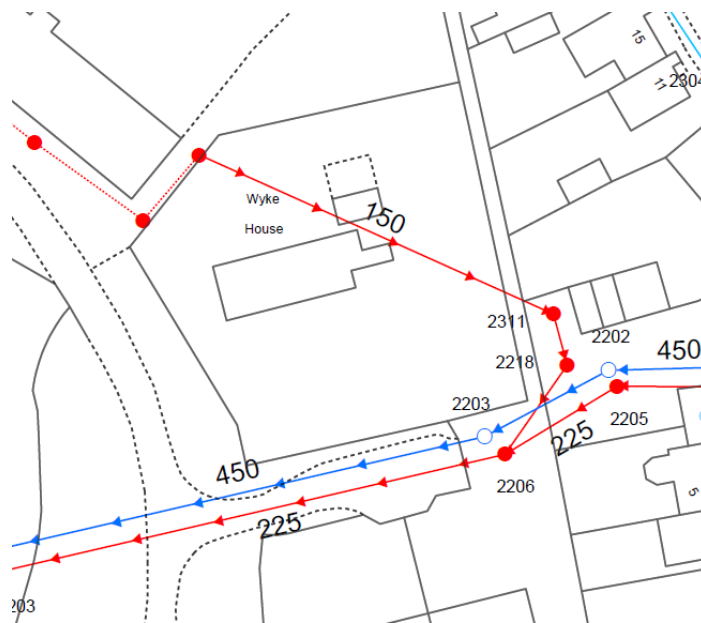
Topography

- 2.2. The site is generally flat with a general fall to the south.
- 2.3. The existing ground in the location of the proposed works mainly comprise of grassed area, outbuildings and paving.

Existing Drainage

- 2.4. The site is a brownfield site with existing surface water drainage discharging via soakaways and foul drainage discharging to the Wessex Water foul sewer.
- 2.5. **Figure 1** identifies the Wessex Water assets in the locality of the site.

Figure 1: Wessex Water asset map extract



Geology

- 2.6. British Geological Survey mapping identifies bedrock of the Stanford formation limestone and that there are no superficial deposits.
- 2.7. Infiltration testing, refer to **Appendix A**, has been undertaken within the site and identifies that there is infiltration capacity to support infiltration SuDS. No groundwater was encountered in the investigation and the Wiltshire Council SFRA identifies potential of groundwater levels being 0.025m to 0.5m below ground.
- 2.8. A review of historic borehole records at the nearby Sainsbury store development (located to the south west of the site and approximately 12m lower than Springfield School) identifies groundwater at a depth of 3.2m.

3. SURFACE WATER MANAGEMENT

Design Principles

- 3.1. Key design principles in the following guidance documents steer the approach to managing surface water runoff at sites:
- Building Regulations hierarchy of drainage (H3);
 - Interim Code of Practice for SuDS; and
 - CIRIA best practice guidance, including the use of the 'SuDS management train'.
- 3.2. Building Regulations hierarchy of drainage outlines the preferred methods for the disposal of surface water with infiltration methods being the preferred option. If this is not possible the next favoured option is to drain to an existing watercourse. If neither of these options are feasible, the regulations state that rainwater discharge should be directed to a sewer.
- 3.3. The Interim Code of Practice for SuDS provides guidance about the hydraulic design criteria for Sustainable drainage systems. This in general refers to both peak rate of runoff and the volume of runoff, post development. Prior to mitigation measures such as the use of SuDS attenuation features, both the volume and peak rate of runoff may increase post development.
- 3.4. The design principles for surface water management extend beyond simple hydraulic criteria. CIRIA guidance promotes the use of the SuDS management train, a concept where SuDS techniques are used to treat, convey and store surface water runoff. This approach is considered as part of the SuDS selection methodology.

National Standards for Sustainable Drainage Systems (SuDS)

- 3.5. The new 2025 SuDS standards replace the narrower, hydraulics-focused 2015 guidance with a broader, multifunctional framework. The updated approach introduces seven national standards that give greater weight to water quality, amenity, biodiversity, and long-term maintenance, reflecting SuDS' wider role in shaping sustainable, resilient places.
- 3.6. The seven new National SuDS Standards are summarised as –

1. Runoff destinations

Discharge must follow the discharge hierarchy:

- Priority 1. *Collected for non-potable use.*
- Priority 2. *Infiltrated to ground.*
- Priority 3. *Discharged to an above ground surface water body.*
- Priority 4. *Discharged to a surface water sewer, or another piped surface water drainage system.*
- Priority 5. *Discharged to a combined sewer.*

Evidence is required to justify use of lower priority discharge locations.

2. Management of everyday rainfall (interception)

Apply a 'SuDS approach' so that at least the first 5mm of rainfall for the majority of rainfall events does not result in runoff from the site to surface waters or piped drainage systems.

3. Management of extreme rainfall and flooding

A 'SuDS approach' shall be adopted to address the management of development runoff during extreme rainfall, including allowances for climate change and urban creep to:

- *protect people and property on the development from flooding of the surface water drainage system*
- *mitigate any increased flood risk to people and property adjacent to or downstream of the development*
- *protect the receiving water body from morphological damage or minimise the impact on sewer capacity*

4. Water quality

Apply a 'SuDS approach' that protects surface waters, groundwater and coastal waters by managing the quality of the surface water runoff to adequately address water quality risks from the development.

5. Amenity

A 'SuDS approach' shall be adopted that maximises benefits for amenity through the creation of multi-functional places and landscapes.

6. Biodiversity

A 'SuDS approach' shall be adopted to ensure the surface water drainage system maximises biodiversity benefits throughout the development lifecycle.

7. Design of drainage for construction, operation, maintenance, decommissioning and structural integrity

A 'SuDS approach' shall be adopted to ensure that surface water drainage systems are designed so they can be easily and safely constructed, operated and maintained taking account of the need to minimise negative impacts on natural resources and the environment.

Wiltshire Council Betterment Strategy (2024)

- 3.7. Section 2.1 of the Wiltshire Council Betterment Strategy (June 2024) identifies the requirements for greenfield sites and states –

- *For brownfield sites, the peak runoff rate from the development to any drain, sewer or surface water body for all return period between the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event.*
- *At all stages of the planning process, when developing a brownfield site and once it has been proven that discharging to the Greenfield rate (or matched rates) or as close as feasibly possible is not possible, discharge rates should be restricted to provide a minimum 30% betterment over existing discharge rates for the brownfield site.*

National Standards for SuDS

Standard 1 - Runoff destinations

- 3.8. In accordance with the National Standards for SuDS, the following priority discharge hierarchy is to be reviewed -

- Priority 1. Collected for non-potable use.
- Priority 2. Infiltrated to ground.
- Priority 3. Discharged to an above ground surface water body.
- Priority 4. Discharged to a surface water sewer, or another piped surface water drainage system

- Priority 5. Discharged to a combined sewer.

Collected for non potable use

- 3.9. The classrooms are temporary and as such the inclusion of rainwater harvesting is not deemed viable in respects to costing, building form and longevity. The use of rainwater harvesting for irrigation is not applicable as no specific planting is provided / expected.

Infiltrated to ground

- 3.10. The site has sufficient ground conditions to accommodate infiltration SuDS which will be proposed for the disposal of surface water drainage.

Discharges to an above ground surface water body

- 3.11. Not considered

Discharged to a surface water sewer, or another piped surface water drainage system

- 3.12. Not considered

Discharged to a combined sewer

- 3.13. Not considered

Standard 2 -Management of everyday rainfall (interception)

- 3.14. Guidance requires that the first 5mm of rainfall does not result in discharge from the site. Guidance advises the use of rainwater harvesting or infiltration and the retention of water in SuDS which is to be 'lost to soils or the atmosphere'.
- 3.15. For developments that infiltrate entirely to ground so no runoff leaves the development for storm events with a 1 in 1 or greater chance of occurring each month, the surface water drainage system is deemed compliant with standard 2.

Standard 3 - Management of extreme rainfall and flooding

- 3.16. The following text reviews the requirement of the design to meet standard 3.

Climate Change

- 3.17. The NPPF requires development to take account of the impacts of climate change. The allowances to be made for climate change effects when assessing flood risk are related to the lifetime of the development.
- 3.18. The peak rainfall intensity allowances to be used when designing urban drainage systems have been obtained from the environment agencies web-based resource tool 'Climate change allowances for peak rainfall' by searching the development management catchment for the surrounding area.
- 3.19. The site is located in the Avon Bristol and North Somerset Streams Management Catchment, the catchment allowances have reproduced in **Table A**. Both the central and upper end allowances need to be assessed to understand the range of impact.

Table A: Peak rainfall intensity allowance

Avon Bristol and North Somerset Streams Management Catchment peak rainfall allowances	3.3% Annual exceedance		1% Annual exceedance	
	'2050s' (up to 2060)	'2070s' (2061 to 2125)	'2050s' (up to 2060)	'2070s' (2061 to 2125)
Central	20%	25%	25%	25%
Upper End	35%	40%	40%	45%

- 3.20. Surface water drainage design will allow for 40% climate change within the 30-year return period storms and 45% for the 100 year return period storms.

Surface Water catchment area and flows

Catchment Areas

- 3.21. The existing impermeable area in the vicinity of the proposed works measures approximately 100m², the redeveloped sites impermeable area measures approximately 430m².

Pre Development Peak Runoff Rate

- 3.22. Where assessing the redeveloped sites peak runoff rate, including allowance for climate change and changes in impermeable areas, the unattenuated peak runoff rate is as presented in **Table B** - calculated utilising the Modified Rational Method:

$$Q=2.78CiA$$

Where

Q= flow (l/s), I = rainfall intensity (mm/hr), A = Impermeable Area (ha), C = runoff coefficient

Table B: Post development site Modified Rational Method impermeable runoff.

Return Period	C	I	A	Flow (l/s)
1:1 year	0.95	28.809	0.043	3.272
1:30 year (+30%cc)	0.95	77.748	0.043	8.829
1:100 year (+40%cc)	0.95	132.593	0.043	15.058

- 3.23. If the site were to discharge at unattenuated rates, the post development site increase flows in all storm events

Surface Water Drainage Strategy

- 3.24. In view of the requirements of the NPPF, PPG, and design parameters and constraints associated with redeveloping this site, a surface water drainage strategy design has been devised and hydraulically modelled to demonstrate that the scheme can be suitably implemented without increasing the level of flood risk, when the surface water drainage system experiences a 1:100-year rainfall event (including 45% allowance for climate change).

- 3.25. The surface water drainage scheme has been designed to ensure:

- Sustainable Urban Drainage systems are wholly incorporated within the scheme.

- Consideration is given for the improvement of water quality within the design.
- The designed drainage scheme can satisfactorily retain a critical 1 in 100 Year storm event with climate change.

- 3.26. Surface water drainage from the site is to discharge to infiltration SuDS in the form of a cellular soakaway located to the south of the site.
- 3.27. Refer to drawing 7061-C-100 entitled 'Drainage Layout' in **Appendix B** for the layout of the surface water network.
- 3.28. The hydraulic assessment provides various scenarios up to and included the critical 1 in 100 Year storm event with additional 45% allowance for climate change. The simulations confirm that the storm can be managed and maintained within the site without flooding. The hydraulic models of the proposed surface water network and SuDS devices can be found in **Appendix C**.

Standard 4 - Water quality

- 3.29. In terms of water quality, the proposed surface water system offers a suitable level of mitigation in accordance with Environment Agency, DEFRA and CIRIA guidance.
- 3.30. The CIRIA SuDS Manual C753, 2015 details an approach for establishing the hazard posed by the intended land use activities and the extent to which the proposed SuDS components can reduce and mitigate the contamination risk to the receiving waterbody. Referring to Table 26.2 – 'Pollution hazard indices for different land use classifications' (CIRIA C753, 2015) the proposed development and land use results in a low pollution hazard, therefore a 'simple index' method can be used to make a qualitative assessment of the proposed SuDS management.
- 3.31. To ensure that there is adequate treatment, all SuDS components utilised should have a pollution mitigation index that equals or exceeds the pollution hazard index. In reference to Table 26.2, the pollution hazard index for the roof areas is -

TSS = 0.2,

Metals = 0.2,

Hydrocarbons = 0.05.

Figure 2: CIRIA C753, 2015. Table 26.2 – ‘Pollution hazard indices for different land use classifications’

TABLE 26.2 Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

Notes

- 1 Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).
- 2 These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (Table 4.3). When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help determine the most appropriate approach to the development of a design solution.

- 3.32. In reference to Table 26.4 – ‘Indicative SuDS mitigation indices for discharges to groundwater’ (CIRIA C753, 2015) the inclusion of a soakaway with 300mm minimum depth of soils with good contamination attenuation potential provide the following mitigation:

$$TSS = 0.4$$

$$Metals = 0.3$$

$$Hydrocarbons = 0.3$$

- 3.33. The underlying soils must provide good contaminant attenuation potential (e.g. as recommended in Sniffer 2008 (a) and (b) / Scott Wilson (2010) or other appropriate guidance). Alternative depth and soil combinations must provide equivalent protection to the underlying groundwater.

Figure 3: CIRIA C753, 2015. Table 26.4 – ‘Indicative SuDS mitigation indices for discharges to groundwater’

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater			
Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates¹	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.6 ⁴	0.5	0.6
A soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.8 ⁴	0.8	0.8
Proprietary treatment systems ^{5, 6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.		

Notes

- 1 All designs must include a minimum of 1 m unsaturated depth of aquifer material between the infiltration surface and the maximum likely groundwater level (as required in infiltration design – **Chapter 25**).
- 2 For example as recommended in Sniffer (2008a and 2008b), Scott Wilson (2010) or other appropriate guidance.
- 3 Alternative depths may be considered where it can be demonstrated that the combination of the proposed depth and soil characteristics will provide equivalent protection to the underlying groundwater – see note 1.
- 4 If significant volumes of sediment are allowed to enter an infiltration system, there will be a high risk of rapid clogging and subsequent system failure.
- 5 See **Chapter 14** for approaches to demonstrate product performance. Note: a British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: www.britishwater.co.uk/Publications/codes-of-practise.aspx
- 6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution, where there is a requirement to retrofit treatment. WAT-RM-08 (SEPA, 2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

- 3.34. Proprietary devices in the form of catchpits will be installed within the surface water network to trap and contain sediment, pollutants and contaminants. Furthermore, the soakaway will be wrapped in a geotextile to prevent discharge of contaminants through to the underlying ground.

Standard 5 – Amenity

Soakaway

- 3.35. Soakaways and buried structures do not inherently have amenity benefits. The use of an underground structure does provide opportunity for landscaped amenity ground / open spaces above.

Standard 6 – Biodiversity

Soakaway

- 3.36. Cellular (geocellular) soakaways offer very little direct biodiversity value because they are installed underground and water is not meant to appear on the surface. Unlike above-ground Sustainable Drainage Systems (SuDS) components such as swales, ponds, and wetlands, they do not provide an accessible habitat for plants and wildlife.
- 3.37. However, they contribute to overall environmental health and can support local biodiversity indirectly via:

Groundwater Recharge: They increase the soil moisture content and help to recharge local groundwater sources. This process can help prevent nearby natural water sources and surrounding soils from drying out, which in turn protects existing groundwater-dependent terrestrial ecosystems and associated biodiversity.

Water Quality: As surface water filters through the surrounding soil and granular backfill, sediments and some pollutants are removed. This helps protect the quality of groundwater and connected surface water bodies, which is crucial for aquatic ecosystems.

Flood Mitigation: By storing and slowing down the rate of surface water runoff, they help reduce flood risk, preventing unnatural surges in local watercourses that could harm sensitive habitats.

Standard 7 - Design of drainage for construction, operation, maintenance, decommissioning and structural integrity

Construction

- 3.38. The scale of works is small and the drainage can be installed at the early or later stages of the programme. There is no phasing of installation required.

Management & Maintenance

- 3.39. Maintenance refers to the inspections required to identify performance issues and plan maintenance as required, operation and maintenance of the drainage system, landscape management and waste management associated with contaminated silt and other waste materials resulting from maintenance.
- 3.40. CIRIA C753 The SuDS Manual provides information in Chapter 32 for the operation and maintenance of SuDS. The maintenance activities are broadly defined as regular, occasional and remedial maintenance. It is noted that some scenarios may require one-off maintenance activities. The SuDS Manual defines maintenance as –
1. Regular Maintenance: consists of basic tasks carried out to a frequent and predictable schedule, including inspections/monitoring, silt or oil removal if required more frequently than once a year, vegetation management, sweeping or surfaces and litter / debris removal.
 2. Occasional maintenance: comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the regular tasks.
 3. Remedial maintenance: describes the intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised with good design, constructions and regular maintenance activities.
- 3.41. Maintenance regimes are to be reviewed on an annual basis to ensure that the approach adopted is meeting its objectives.
- 3.42. All those responsible for the maintenance operations should adhere to the relevant health and safety legislation for the activities listed within this report (including lone working, if relevant). Method statements and risk assessments should always be completed prior to the undertaking of any works.

Indicative Maintenance & Management Plan

Gravity Drains & Catchpits

- 3.43. Maintenance will usually be carried out manually, although a suction tanker can be used for sediment/debris removal. If maintenance is not undertaken for long periods, deposits can become hard-packed and require more effort to remove.

Soakaways & Cellular soakaways

- 3.44. Soakaways are excavations that are filled with a void-forming material that allows the temporary storage of water before it soaks into the ground.
- 3.45. Regular inspection and maintenance is important for the effective operation of permeable pavements, they should be inspected regularly, preferably during and after heavy rainfall to check effective operation and to identify any areas of ponding.
- 3.46. The design of the soakaway should include monitoring points where water levels can be viewed or measured. The life and effective operation of an infiltration component is related to the frequency of maintenance and the risk of sediment being introduced into the system.
- 3.47. Replacement of geocellular units will be necessary if the system becomes blocked with silt.
- 3.48. Table 13.1 & 21.3 of the CIRIA SuDS manual, reproduced in **Figure 4 & 5** below, provide the operation and management requirements of cellular soakaways.

Figure 4: CIRIA C753, 2015. Table 13.1

TABLE 13.1 Operation and maintenance requirements for soakaways		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

Figure 5: CIRIA C753, 2015. Table 21.3

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Blockages & Spillages

Blockage

- 3.49. In the event of a blockage within the drainage network, the key risk is that of flooding to the surrounding area. The extent and location of flooding is dependent upon the location of the blockage and the associated storm event.
- 3.50. In the event of a blockage within the network, the network is to be drained down by use of suction equipment and the blockage removed.
- 3.51. If a blockage does occur and results in flooding, the exceedance flow routes are anticipated to flow in a westerly direction.

Spillages

- 3.52. Due to the nature of the development, the likelihood of a spillage is minimal.
- 3.53. Most spillages on development sites are of compounds that do not pose a serious risk to the environment if they enter the drainage in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore, small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommended by the Environment Agency with residual spillage allowed to bio-remediate in the drainage system.
- 3.54. In the event of a serious spillage, either by volume or of unknown or toxic compounds, then isolate the spillage with soil, turf or fabric and block outlet pipes from chamber(s) downstream of the spillage with a bung. Contact the Environment Agency immediately.

Responsibility

- 3.55. The definition of responsibility is determined by adoptions, private responsibility and shared responsibility typically determined within a management company. The extent of the responsibilities is defined by the layout and the areas offered for adoption.
- 3.56. All drainage will be the responsibility of the school and Wiltshire Council.

4. CONCLUSIONS

- 4.1. The development proposals, in which this Drainage Strategy is written for, comprises Installation of two number temporary modular units to provide four additional classrooms with toilet facilities at Springfield School, Curzon Street, Calne. The key conclusions are:
1. The ground conditions support infiltration SuDS
 2. Surface water discharge is to be via a cellular soakaway
 3. SuDS are implemented to the site in accordance with the national standards for SuDS and the site specific conditions. A cellular soakaway is proposed to serve the site and provide amenity, biodiversity, water quality and attenuation requirements.
 4. This report provides sufficient information to prove a viable means of surface water management. Surface water drainage has been developed in line with local and national policy requirements.
- 4.2. The overall conclusions drawn from this report is that the development would be appropriately safe for its lifetime taking account of the flood risk vulnerability of the site and its users and the development would not increase flood risk elsewhere through the implementation of an effectivity drainage strategy.

APPENDICES

APPENDIX A

	Job Title :	Springfield School	Job No.	7061	
			Made by	MTD	
			Date	Aug-25	
	Subject :	Infiltration test TEST 1	Sheet No	2 of 6	
			Rev.		
			Rev Date		

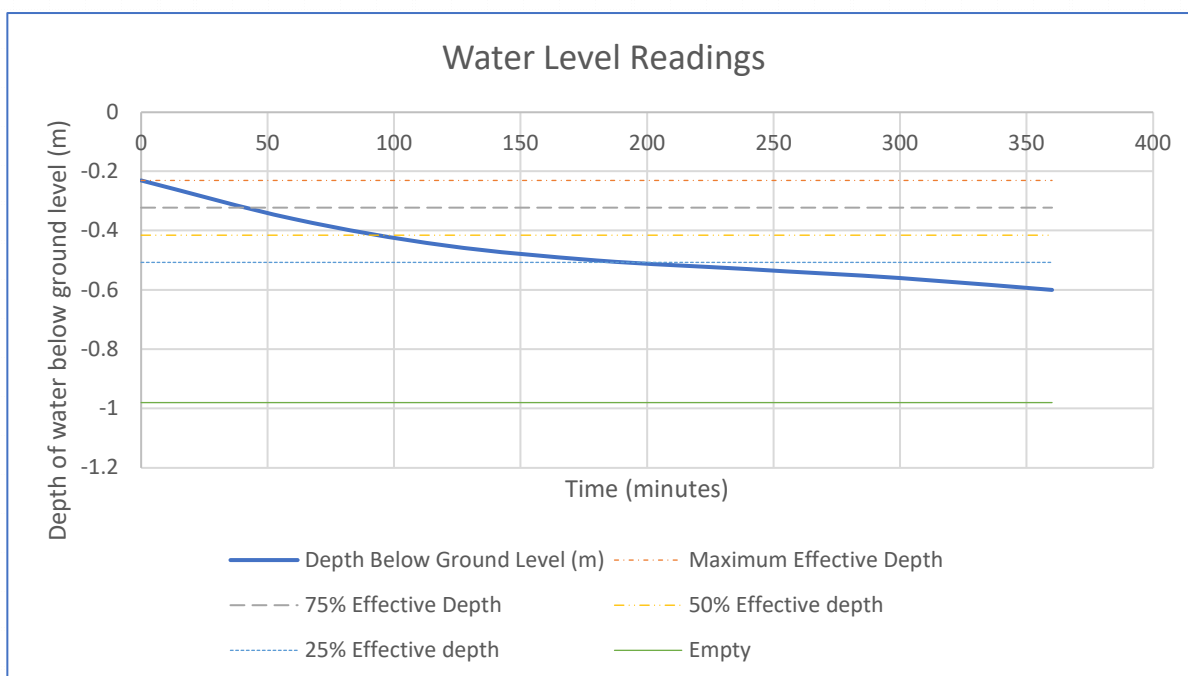
Calculation

Test hole volume between 75% and 25% effective depth -

$$V_{(p75-25)} = 0.1887 \text{ m}^3$$

Mean surface area through which outflow occurs, taken to be the whole sides at 50% effective depth, including the base of the pit:

$$a_{(p50)} = 1.871 \text{ m}^2$$



The time taken for water to drain from 75% to 25% full $t_{(p75-25)}$

$t_{(p75-25)}$

Time at which water is at 75% effective depth, from graph (mins)

Time at which water is at 25% effective depth, from graph (mins)

43
195
152 mins

Soil Infiltration Rate

$$f = \frac{V_{(p75-25)}}{a_{(p50)} \times t_{(p75-25)}} = 1.1059\text{E-}05$$

	Job Title :	Springfield School	Job No.	7061	
			Made by	MTD	
			Date	Aug-25	
	Subject :	Infiltration test TEST 2	Sheet No	4 of 6	
			Rev.		
			Rev Date		

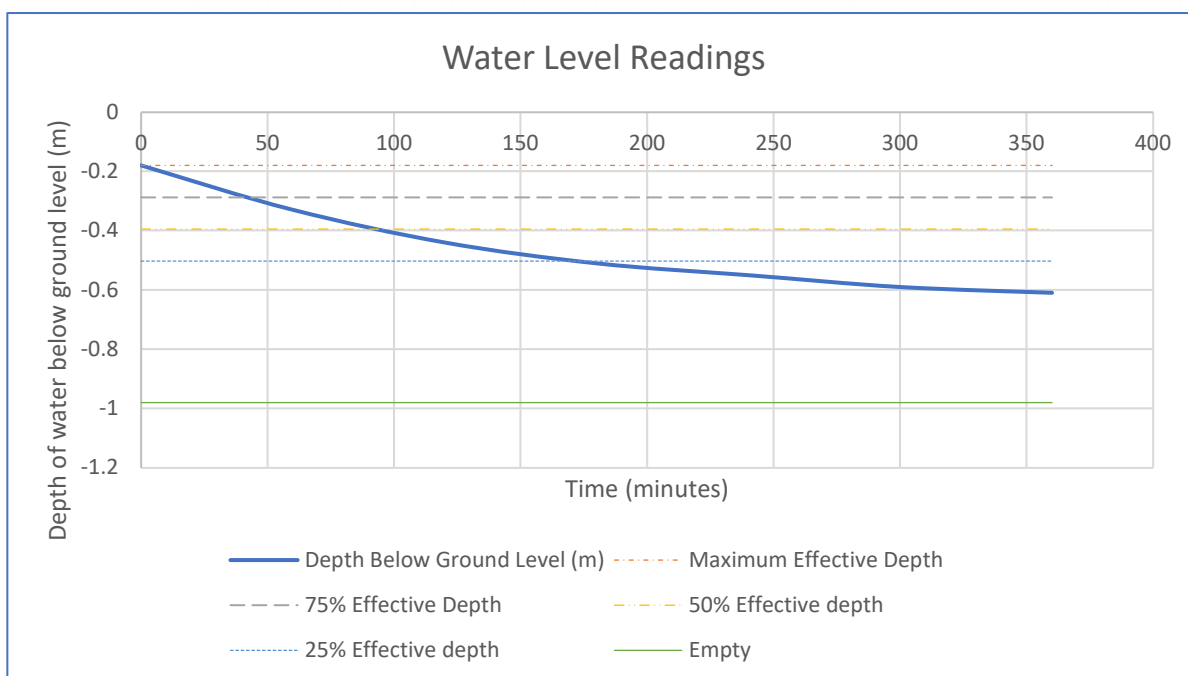
Calculation

Test hole volume between 75% and 25% effective depth -

$$V_{(p75-25)} = 0.2193 \text{ m}^3$$

Mean surface area through which outflow occurs, taken to be the whole sides at 50% effective depth, including the base of the pit:

$$a_{(p50)} = 2.009 \text{ m}^2$$



The time taken for water to drain from 75% to 25% full $t_{(p75-25)}$

$t_{(p75-25)}$

Time at which water is at 75% effective depth, from graph (mins)

Time at which water is at 25% effective depth, from graph (mins)

43
174
131 mins

Soil Infiltration Rate

$$f = \frac{V_{(p75-25)}}{a_{(p50)} \times t_{(p75-25)}} = 1.3888\text{E-}05$$

	Job Title :	Springfield School	Job No.	7061	
			Made by	MTD	
			Date	Aug-25	
	Subject :	Infiltration test TEST 3	Sheet No	6 of 6	
			Rev.		
			Rev Date		

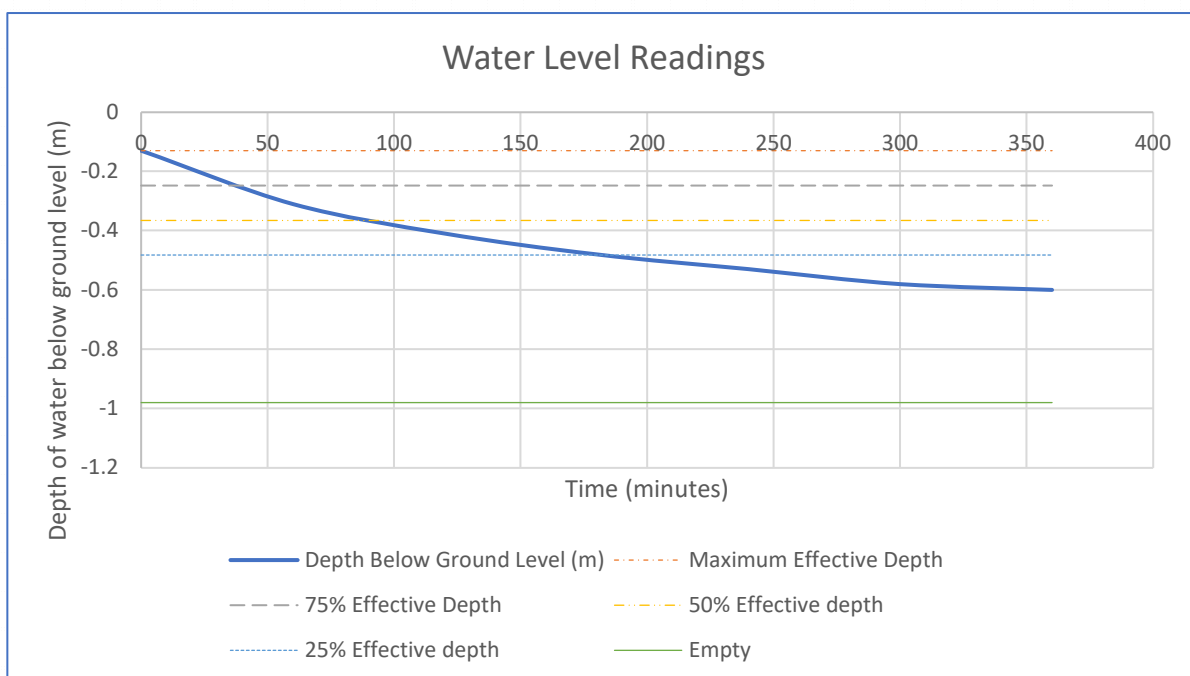
Calculation

Test hole volume between 75% and 25% effective depth -

$$V_{(p75-25)} = 0.2397 \text{ m}^3$$

Mean surface area through which outflow occurs, taken to be the whole sides at 50% effective depth, including the base of the pit:

$$a_{(p50)} = 2.101 \text{ m}^2$$



The time taken for water to drain from 75% to 25% full $t_{(p75-25)}$

$t_{(p75-25)}$

Time at which water is at 75% effective depth, from graph (mins)

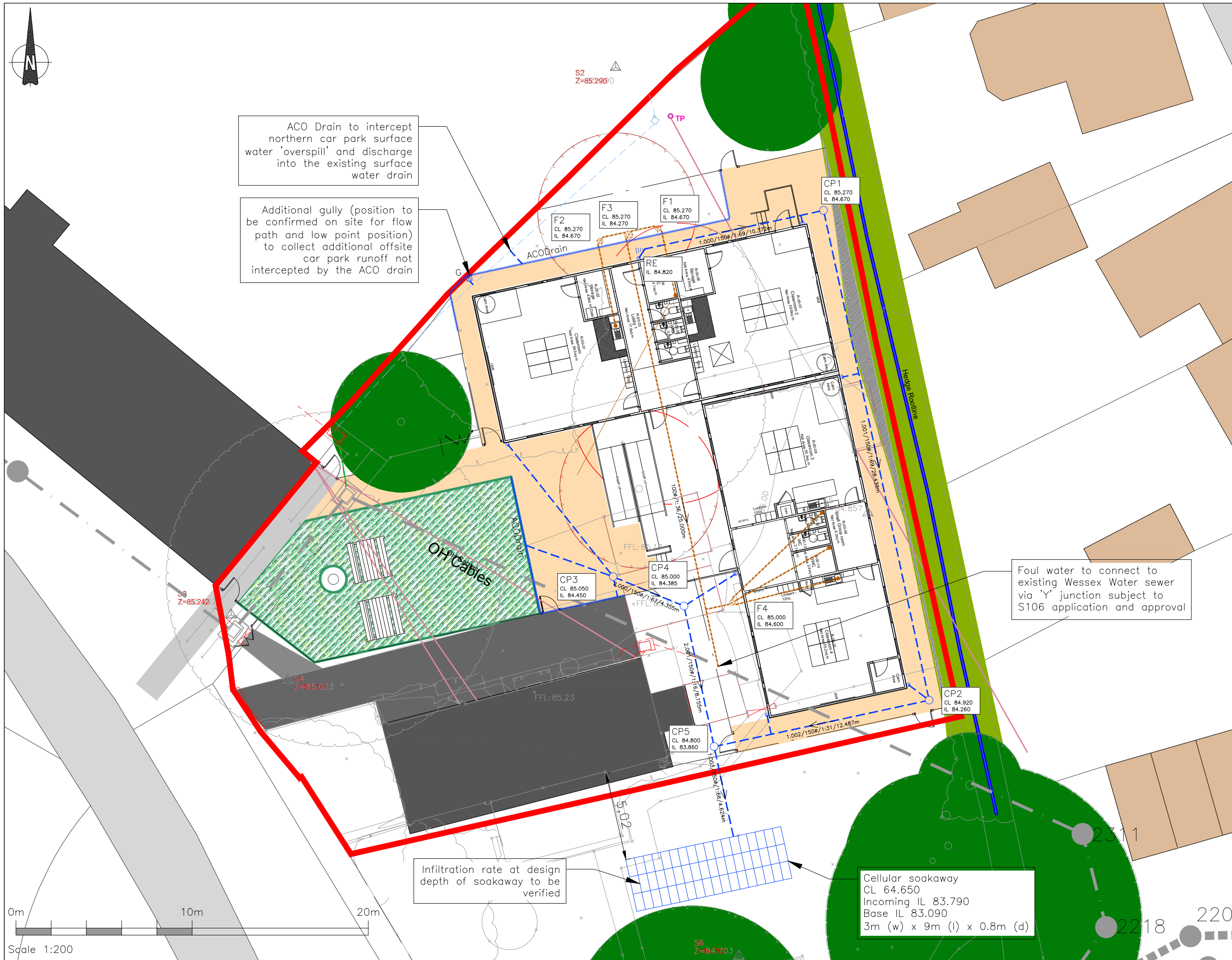
Time at which water is at 25% effective depth, from graph (mins)

39
183
144 mins

Soil Infiltration Rate

$$f = \frac{V_{(p75-25)}}{a_{(p50)} \times t_{(p75-25)}} = 1.3205E-05$$

APPENDIX B



NOTES:

1. All dimensions, levels and survey grid co-ordinates are to be checked on site and the engineer notified immediately of any discrepancies prior to commencement of the works.
2. The works shown on this drawing could affect Statutory Undertakers apparatus and the Contractor is required to verify the location and depth of all apparatus prior to commencement of works and take relevant precautions when working in the vicinity of such apparatus.
3. Sewers and drains of different diameters should be laid soffit to soffit unless specified otherwise.
4. The invert levels of any existing manholes and pipes constructed by others are to be verified on site prior to commencement of drainage work.
5. All dimensions shown in millimeters (mm) unless otherwise stated, and all levels relate to Ordnance Datum.
6. The backfilling of drainage trenches which are in close proximity to foundations must be in accordance with any special requirements set out by the Structural Engineer.
7. Pipes built into manholes should have a flexible joint as close as feasible to the external face of the structure and the length of the next rocker pipe should be:

KEY:

- Wessex Water Foul Sewer
- Wessex Water Surface Sewer
- Existing Foul Water Drain
- Existing Surface Water Drain
- Foul Water Drain
- Surface Water Drain
- ACO Drain

Rev	Date	Description	Initials	Check
A	11/08/25	ACO drain extended to north - gully added	MTD	TL

SDS consulting
civil & structural engineers
E: enquiries@sds-consulting.co.uk W: www.sds-consulting.co.uk

CLIENT:
WILTSHIRE COUNCIL

PROJECT:
**SPRINGFIELD SCHOOL
CALNE**

DRAWING:
DRAINAGE LAYOUT

Drawing No. **7061-C-100** REV A

Status **Preliminary for Comment**
Not for Construction

Job Number	7061	Date	AUG 2025
Scale	1:200 @ A3		
Drawn By	MTD	Checked By	TL

APPENDIX C

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	30	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)	1.200
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)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
RE	0.008	5.00	85.050		399224.249	171336.852	0.450
CP1			85.050	600	399234.394	171339.012	0.600
CP2	0.015	5.00	84.920	600	399240.388	171311.211	0.880
CP3	0.014	5.00	85.050	600	399222.453	171318.222	0.600
CP4			85.000	600	399226.475	171316.553	0.615
CP5			84.800	600	399228.182	171308.579	0.940
SOAKAWAY			84.650	1200	399229.151	171304.057	0.860
DUMMY			84.600		399232.819	171301.117	0.811

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	RE	CP1	10.372	0.600	84.600	84.450	0.150	69.1	150	5.14	50.0
1.001	CP1	CP2	28.439	0.600	84.450	84.040	0.410	69.4	150	5.53	50.0
1.002	CP2	CP5	12.487	0.600	84.040	83.860	0.180	69.4	150	5.71	50.0
2.000	CP3	CP4	4.355	0.600	84.450	84.385	0.065	67.0	150	5.06	50.0
2.001	CP4	CP5	8.155	0.600	84.385	83.860	0.525	15.5	150	5.11	50.0
1.003	CP5	SOAKAWAY	4.624	0.600	83.860	83.790	0.070	66.1	150	5.77	50.0
1.004	SOAKAWAY	DUMMY	4.701	0.600	83.790	83.789	0.001	4701.0	150	6.34	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.211	21.4	1.1	0.300	0.450	0.008	0.0
1.001	1.209	21.4	1.1	0.450	0.730	0.008	0.0
1.002	1.209	21.4	3.1	0.730	0.790	0.023	0.0
2.000	1.230	21.7	1.9	0.450	0.465	0.014	0.0
2.001	2.568	45.4	1.9	0.465	0.790	0.014	0.0
1.003	1.239	21.9	5.0	0.790	0.710	0.037	0.0
1.004	0.138	2.4	5.0	0.710	0.661	0.037	0.0

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
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	40	0	0
100	45	0	0

Node SOAKAWAY Online Weir Control

Flap Valve	x	Invert Level (m)	84.649	Discharge Coefficient	0.544
Replaces Downstream Link	x	Width (m)	1.200		

Node SOAKAWAY Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03982	Safety Factor	2.0	Invert Level (m)	83.090
Side Inf Coefficient (m/hr)	0.03982	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	27.0	27.0	0.800	27.0	43.6	0.801	0.0	43.6

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE	10	84.623	0.023	1.1	0.0084	0.0000	OK
15 minute winter	CP1	11	84.473	0.023	1.1	0.0065	0.0000	OK
15 minute winter	CP2	11	84.079	0.039	3.2	0.0242	0.0000	OK
15 minute winter	CP3	10	84.484	0.034	2.0	0.0251	0.0000	OK
15 minute winter	CP4	10	84.406	0.021	2.0	0.0060	0.0000	OK
15 minute winter	CP5	11	83.914	0.054	5.1	0.0152	0.0000	OK
360 minute winter	SOAKAWAY	336	83.272	-0.518	0.8	4.6720	0.0000	OK
15 minute summer	DUMMY	1	83.789	0.000	0.0	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	RE	1.000	CP1	1.1	0.650	0.052	0.0179	
15 minute winter	CP1	1.001	CP2	1.1	0.420	0.051	0.0755	
15 minute winter	CP2	1.002	CP5	3.1	0.680	0.146	0.0578	
15 minute winter	CP3	2.000	CP4	2.0	0.901	0.091	0.0097	
15 minute winter	CP4	2.001	CP5	2.0	0.588	0.043	0.0293	
15 minute winter	CP5	1.003	SOAKAWAY	5.1	0.953	0.232	0.0247	
360 minute winter	SOAKAWAY	1.004	DUMMY	0.0	0.000	0.000	0.0000	0.0
360 minute winter	SOAKAWAY	Infiltration		0.2				

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE	10	84.644	0.044	3.9	0.0157	0.0000	OK
15 minute winter	CP1	11	84.492	0.042	3.9	0.0120	0.0000	OK
15 minute winter	CP2	10	84.119	0.079	11.0	0.0491	0.0000	OK
15 minute winter	CP3	10	84.514	0.064	6.8	0.0483	0.0000	OK
15 minute winter	CP4	10	84.424	0.039	6.8	0.0111	0.0000	OK
15 minute winter	CP5	11	83.979	0.119	17.5	0.0338	0.0000	OK
720 minute winter	SOAKAWAY	675	83.783	-0.007	1.4	17.7735	0.0000	OK
15 minute summer	DUMMY	1	83.789	0.000	0.0	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	RE	1.000	CP1	3.9	0.916	0.180	0.0436	
15 minute winter	CP1	1.001	CP2	3.7	0.570	0.175	0.1912	
15 minute winter	CP2	1.002	CP5	10.8	0.884	0.506	0.1511	
15 minute winter	CP3	2.000	CP4	6.8	1.254	0.311	0.0237	
15 minute winter	CP4	2.001	CP5	6.7	0.744	0.148	0.0757	
15 minute winter	CP5	1.003	SOAKAWAY	17.5	1.261	0.798	0.0639	
720 minute winter	SOAKAWAY	1.004	DUMMY	0.0	0.000	0.000	0.0000	0.0
720 minute winter	SOAKAWAY	Infiltration		0.2				

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE	10	84.651	0.051	5.2	0.0183	0.0000	OK
480 minute winter	CP1	472	84.610	0.160	0.6	0.0454	0.0000	SURCHARGED
480 minute winter	CP2	472	84.611	0.571	1.7	0.3560	0.0000	SURCHARGED
480 minute winter	CP3	472	84.611	0.161	1.0	0.1203	0.0000	SURCHARGED
480 minute winter	CP4	472	84.611	0.226	1.0	0.0638	0.0000	SURCHARGED
480 minute winter	CP5	472	84.611	0.751	2.7	0.2124	0.0000	FLOOD RISK
480 minute winter	SOAKAWAY	472	84.611	0.821	2.7	21.4614	0.0000	FLOOD RISK
15 minute summer	DUMMY	1	83.789	0.000	0.0	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	RE	1.000	CP1	5.2	0.990	0.241	0.0540	
480 minute winter	CP1	1.001	CP2	0.6	0.353	0.028	0.5007	
480 minute winter	CP2	1.002	CP5	1.7	0.586	0.080	0.2198	
480 minute winter	CP3	2.000	CP4	1.0	0.741	0.046	0.0767	
480 minute winter	CP4	2.001	CP5	1.0	0.491	0.022	0.1436	
480 minute winter	CP5	1.003	SOAKAWAY	2.7	0.808	0.123	0.0814	
480 minute winter	SOAKAWAY	1.004	DUMMY	0.0	0.000	0.000	0.0000	0.0
480 minute winter	SOAKAWAY	Infiltration		0.2				