

LAND AT NEWBARN FARM
CAPEL ROAD, RUSPER, HORSHAM, WEST SUSSEX, RH12 4PZ
Flood Risk and Drainage Assessment
May2026



eas ltd

Environmental Assessment Services Ltd

REPORT DATA SHEET

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1. BACKGROUND, EXISTING SITE & PROPOSED DEVELOPMENT

1.1 The site is currently used as a stud farm to train and house horses, comprising a central stable block with parking to the north and south of the building; to the west of the main entrance from Capel Road lies the original farmhouse and gardens (outside the redline boundary). To the east of the site lies another secondary entrance from Capel Road with an office building to the immediate west and paddocks to the east containing several vintage buses. There is a track leading from this entrance southwards to connect to the wider site, with a storage unit and existing caravan located to the east of the track and a barn to the west (to remain). To the south of the site there is a sand school and another dwelling (to remain). There are three additional detached residences to the west of the site (to remain). The site area (redline boundary) is approximately 2.5 ha. The Ordnance Survey map reference for the centre of the site is TQ 18456 37489. The site elevation for the centre of the site is approximately +103 m OD. See Appendix A Figure 1 for the site location plan and Figure 2 for the existing site layout.

1.2 It is proposed to redevelop the site, after the demolition of the existing buildings, for residential accommodation comprising ten dwellings: three five-bedroom houses to the south, three two-bedroom chalets in the centre of the site, a four-bedroom detached house and two two-bedroom semi-detached houses towards the northern section of the site and a four-bedroom detached house adjacent to the northern redline boundary, all with associated gardens and parking. In the paddocks to the east of the site there is to be a new stable block, sand school and horse practice area.

1.3 There is also to be a three-bedroom detached house adjacent to the eastern track, and a new office building is to replace the existing one in the same footprint (these buildings are to be addressed by separated planning applications). Access to the site is via the two existing entrances from Capel Road to the north. See Figure 3 in Appendix A for the proposed site layout.

2.1 GEOLOGY & HYDROGEOLOGICAL CONSIDERATIONS

2.2 According to the British Geological Survey website the site lies on Weald Clay Formation-Limestone. Mostly clay with occasional limestone seams.

The Department for Environment, Food and Rural Affairs (Defra) online mapping (MAGIC) shows the northern boundary of the site to be lying on a Secondary A bedrock aquifer, and unproductive superficial drift. DEFRA

classify the soil type as “slightly acid but base-rich loamy and clayey soils”.

The northern section of the site lies on an area of ‘high’ groundwater vulnerability, the site does not lie in a groundwater source protection zone (SPZ).

3. FLOOD RISK ASSESSMENT

Outline Flood Risk

3.1 According to the Environment Agency’s Flood Maps for Planning, the site

3.2 lies in Flood Zone 1 (low risk of flooding from fluvial sources where defences are not considered / < 0.1% AEP of flooding in any given year). The site is

not shown to be at risk of surface water flooding in the 1 in 30-year scenario but has a small section of surface water flood risk in the western portion of the site

3.3 in the 1 in 100-year scenario; this slightly increases in size in the 1 in 1000-year scenario. Groundwater and reservoir flooding at the site is considered

3.1 unlikely at this location. See Appendix B for the flood maps for the site.
Defences

Flood defences can help reduce the chance of flooding but cannot completely prevent it. They can fail, or water could spill over the top if it is deep enough. There is one record of a main watercourse on site: Boldings Brook in the upper operational catchment of the River Arun. However, this is a significant low elevation flood risk area to be developed and the site is not considered to be at risk of flooding from fluvial sources.

4. ALTERNATIVE SOURCES OF FLOODING

An assessment of alternative sources of flooding potentially affecting the site has been made from a review of the EA online flood mapping and from the Horsham District Council Level 1 Strategic Flood Risk Assessment (SFRA 2010). The SFRA addresses alternative sources of flooding including fluvial flooding, surface water flooding, groundwater flooding and flooding from sewers and reservoirs.

Surface Water Flooding

4.1

4.1.1 Surface water runoff (or ‘pluvial’ flooding) is most likely to be caused by intense downpours e.g. thunderstorms and is exacerbated by blocked culverts and areas of non-permeable surfacing.

4.1.2 The EA flood maps for planning show that the site is not at risk of surface water flooding in the present day, 1 in 30-year scenario, but has a small area of risk of surface water flooding in the western section of the site in the 1 in 100-year scenario. This area of risk slightly increases in size in the 1 in 1000-year scenario. This area at risk lies on an existing track between the redline boundary with the main farmhouse and an existing house (to remain). The EA’s long-term flood prediction indicates that the risk of surface water flooding at the site

is 'very low' risk (<0.1 % risk per year) and is expected to remain 'very low' in the 2040-2060 prediction. See Appendix B for the long-term surface water flood risk map for the site.

4.2 Sewer Flooding

- 4.2.1 There is no foul sewer provision at the site and none in the immediate vicinity. Although there have been records of sewer flooding within the Rusper area and there are no records of sewer flooding at the site itself. See Appendix F for the Southern Water Sewer letter for a previous application on the site. Groundwater Flooding

4.3

- 4.3.1 Groundwater flooding occurs when the water table rises above the surface of the ground, normally as a result of persistent rainfall over a prolonged period. Increased levels of development in an area can increase the risk of groundwater flooding. The flood maps for planning classifies the site as unlikely to be at risk from groundwater flooding. There are no records of the site being impacted by groundwater flooding.

5 HISTORY OF FLOODING

- 5.1 According to the SFRA (2010), there are several recorded incidents of flooding within the Horsham District area. Most notably in the winter of 1993-1994, and Autumn 2000. No records of historic flood events directly affecting the site, or its immediate surroundings, have been found.
- 5.2 The design flood level is usually derived from the Environment Agency Product 4 for the site. The Environment Agency's flood risk data (Product 4) was ordered from the EA on 26 February 2026. The EA stated that there was no modelled data available for the site and its immediate surroundings. See Appendix G for the EA's Product 4 letter.

6 PLANNING STATUS WITH RESPECT TO FLOODING

- 6.1 The site is shown on the current Environment Agency (EA) flood risk mapping as being within Flood Zone 1 (<0.1 % probability of flooding in any year). The site is not at risk of flooding from surface water in the 1 in 30-year scenario (present day) but shows a small area of risk of flooding from surface water in the western section in the 1 in 100-year scenario, which increases slightly in the 1 in 1000-year scenario. See Appendix B for the Environment Agency Flood maps for planning.
- 6.2 The Sequential Test is intended to steer more vulnerable development to land in a lower Flood Zone, in this case the site lies in Flood Zone 1 and is not at risk of surface water flooding in the present-day scenario. The 1 in 100-year and 1 in 1000-year scenarios do show a small area of surface water flood risk to the west of the site on the existing track between the redline boundary with the main

farmhouse and the westernmost dwelling onsite (to remain). There is no development on top of this area of flood risk within the proposed design plans. There is no requirement for a Sequential Test and the Exception Test will not be required.

- 6.3 The site, as existing, has permeable tracks surrounding the existing buildings and sand school (road planings to the east of the site and gravel to the west), these are to remain post development. It is proposed to have permeable surfacing in the new parking areas for the proposed dwellings (SuDS measures). This will help to minimise any impact from increase in the non-permeable area of the site by reducing the runoff from the site and infiltrating and attenuating the surface water. These sustainable drainage measures will reduce the flood risk from surface water elsewhere.

7 RISK TO PROPERTY

- 7.1 The site to be developed lies in Flood Zone 1 (low risk of flooding from fluvial waters where defences are not considered) and is not at risk of flooding from surface water flooding in the present-day scenario, but with small area of risk in the 1 in 100-year scenario and above in the existing track to the west of the site only, which is to remain as existing post development. The buildings on the site are not considered to be at risk from flooding.

- 7.2 The areas of hardstanding on the site at present are partly non-permeable tarmac in the parking area to the north, and partly permeable road planings and gravel in the tracks to the east, south and west and in the area of the sand school. The tracks are to remain as existing, and the proposed residences are to have gardens and permeable parking areas. These SuDS measures will decrease the overall impermeable surface area of the site, reduce surface water runoff and make the developed site more sustainable.

8 RISK TO USERS OF THE PROPOSED DEVELOPMENT

- 8.1 The site lies in Flood Zone 1 (low risk of fluvial flooding where defences are not considered) and is not at risk of surface water flooding (present day scenario). The proposed development will increase the amount of hardstanding at the site. The inclusion of gardens and permeable hardstanding in the parking areas has helped to reduce the impact of this. The site lies in an area with a long history of residential and agricultural development and is bordered to the west by a residential dwelling with a long history. It can be considered that the future users of the site will not be at risk of flooding at the site.

9 LIKELY IMPACT ON FLOOD RISK ELSEWHERE

- 9.1 The site, as existing, is partly impermeable surfacing (the roofs of the stables building and the dwellings and barns onsite and the tarmacked parking area to the north) and partly permeable (the fields, sand school and permeable surfaced tracks to the east, west and south. The proposed development will increase the

impermeable surface area and therefore increase the surface water runoff leaving the site by the area of the roofs of the proposed dwellings, stable block and horse practice area. The use of permeable surfacing in the track and the parking area will minimise the impact of the increase in runoff from the site in line with SuDS recommendation.

10 EXISTING SITE DRAINAGE

10.1 The site was visited on the 5th and 12th of March and the 7th April 2026.

10.2 The site currently drains its surface water to attenuation storage discharging via a 2 l/s flow control device into the watercourse to the south of the site, Highams Gill. There is no public foul sewer at the site or in Capel Road and the existing foul sewage system is managed by a package sewage treatment plant with the treated effluent flowing into the abovementioned watercourse. See Appendix E for photographs of the watercourse to the south and Appendix F for the Southern Water sewer letter for a previous application at the site.

11 SURFACE WATER DRAINAGE OPTIONS

11.1 There is a general requirement that new drainage systems should be sustainable (SuDS) and that flow leaving the site should not exceed the Greenfield flow rate, including both surface water and sewage effluent.

11.2 The area of impermeable surface will be increased by the proposed redevelopment by the roof area of the proposed dwellings, and the new stable block and horse practice area to the east.

11.3 The proposed development will have an impermeable surface area of approximately 3352.26 m² comprising the roof of the proposed buildings. The use of permeable paving in the parking areas and the track to the east, south and west as well as the inclusion of gardens in the design of the dwellings which will reduce the surface area to be drained and therefore the water runoff and make the development more sustainable.

11.4 The Greenfield runoff rate for the site has been calculated using the UK SuDS tools. The results are shown in See Appendix C and summarised in Table 11.1 below:

TABLE 11.1
GREENFIELD RUNOFF RATES

Return period	Flow rates (l/s)
Qbar	14.2
1 in 1 year	12.1
1 in 2 year	12.5
1 in 10 year	23.0
1 in 30 year	32.7
1 in 100 year	45.3
1 in 200 year	53.2

- 11.5 The current non-statutory guidance indicates that the maximum discharge permitted to leave the site from the drained area post development should not exceed the 1 in 1 year return period flow rate (12.1 l/s), or as near as practicable. To reduce the impact on the local watercourses the flow is proposed to be reduced to 2 l/s. Flow controlled vortex valves or orifices exist that can control the flow to as low as 2 l/s to reduce the flow to a suitable rate so as not to overload the surface water sewer system. See Appendix C for the HR Greenfield Flow Rate tool data.
- 11.6 According to the SuDS manual, UK runoff from the development shall be discharged to the following final destinations, to the maximum extent practicable, in accordance with the below 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
- (priority 1 is the highest priority and priority 5 is the lowest.)
- 11.7 Rainwater harvesting in the form of water butts for garden waterings should be included in all dwellings and rain gardens where space allows collection for the non-potable use. This will slow the runoff from the roofs of the dwellings and filter the runoff from the sites improving the water quality. The inclusion of permeable paving in the parking areas will allow some of the surface water to infiltrate to the ground, making the development more sustainable, and the inclusion of gardens in the development plans for all the proposed dwellings will reduce the runoff from non-permeable surfaces and improve the quality of the water leaving the site.
- 11.8 Discharge to soakaway requires suitably permeable ground. The soil at the site is Weald Clay Formation (variable-poor permeability), and unsuitable for soakaway drainage, as evidenced by the use of attenuation storage for the surface water drainage from the existing buildings on site.
- 11.9 The alternative to drain to soakaway is drain to attenuation storage where excess surface water is stored on site, either in a pond, gully, swale or underground attenuation storage unit. The surface water is allowed to discharge at a maximum of the Greenfield 1 in 1-year flow rate (or as near as practicable) via a flow-control vortex valve or orifice plate into an above ground surface water body or a nearby watercourse. In this case Highams Gill to the south of the site.
- 11.10 It is proposed to drain the surface water from the developed site to underground attenuation storage crates discharging via a flow-controlled device (limiting the flow to 2 l/s) to the existing watercourse that lies to the south of the site, Highams Gill, as with the existing scenario. This is the preferred method of

disposal of surface water from the developed site in line with the SuDS hierarchy. The use of water butts on the drainpipe down pipes for use in watering the gardens and the inclusion of rain gardens in the planted areas of the gardens for the dwellings will further reduce the runoff from the site.

11.11 A suitable area to locate a sealed, underground attenuation crate for the residences would be the grassed garden area to the west of the three 5-bedroom houses that lie to the south of the site. The attenuation storage crates for the new stable and horse practice area is proposed to be located to the south of the new sand school in the eastern section of the site. Both attenuation stores will overspill into the watercourse to the south, Highams Gill. The attenuation crate would need to accept any surface water runoff from the roof of the proposed buildings discharging at a rate of 2 l/s via a flow control orifice.

11.12 The NPPF states:

“Applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control the flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible facilitating improvements in water quality and biodiversity.”

11.13 The use of permeable paving in the parking areas and the inclusion of rain gardens and water butts on the drainpipe down pipes for use in garden watering will infiltrate and slow the runoff from the site. Rain gardens are sustainable landscaping features that combine functional benefits with the structural and aesthetic advantages to the development. They will intercept, slow, and filter stormwater runoff and increase the biodiversity by improving the quality of the surface water exiting the site.

11.14 A suitable sized sealed underground attenuation crate for the residences would be 13.6 m x 13.6 m x 0.7 m deep and for the stable block 10.5 m x 11 m x 0.6 m deep, as calculated by the MasterDrain drainage network model. The surface water runoff from the roofs of the buildings will be drained into these before discharging via a flow-controlled device, limiting the flow to 2 l/s into the watercourse to the south of the site. The proposed drainage layout is shown in Figure 4 and output from the drainage design model can be seen in Appendix D.

11.15 Design Storm

The surface water drainage system has been designed for the 30-year return period event plus a 35% allowance for climate change, and tested for surcharge for the 1 in 100-year return period event (1% Annual Exceedance Probability) plus a 45% allowance for climate change. See Appendix A, Figure 4 for the proposed drainage design and Appendix D for pipe and chamber layout and sizing of the drainage field from the MasterDrain model.

11.16 Drainage Design Model

The attenuation crate is to be a sealed unit (wrapped in non-permeable membrane) and as such will not need to adhere to the 'not less than 5 m from the edge of the nearest building and 2.5 m from the nearest boundary' rule. The chosen locations are in the garden area to the west of the 5 bedroom houses and to the south of the sand school discharging to the above ground watercourse to the south. See Figure 4 in Appendix A for the suggested drainage arrangement.

The attenuation crate consists of modular, high-strength plastic structures designed for underground stormwater management. They form a robust, lightweight, interlocking grid that creates a large, high-void ratio (over 95%) underground reservoir. These crates temporarily store rainwater, releasing it slowly into a watercourse (in this case Highams Gill to the south of the site). The crates are wrapped in a non-permeable membrane to create a sealed unit. The residential attenuation crate has been sized at 13.6 m x 13.6 m x 0.7 m deep and the stables attenuation crate has been sized at 10.5 m x 11 m x 0.6 m deep.

The drainage arrangement has been designed using the MasterDrain network drainage model.

11.17 Hydrological Data

Hydrological data for the site as used in the MasterDrain model is given in Appendix D.

11.18 Extreme Event

An extreme event, which overwhelmed the drainage system, would likely result in water flowing south across the surface of the ground with the topography of the land towards the existing watercourse, Highams Gill.

12 PROPOSED FOUL DRAINAGE

- 12.1 In the absence of a mains sewer in the immediate vicinity of the site, the existing dwellings onsite drain their foul water to a package sewage treatment plant, with the treated effluent draining to the watercourse to the south, Highams Gill. It is proposed to treat the foul water from the proposed dwellings onsite via the same method. See Appendix F for the Southern Water Sewer Lettter from a previous application at the site and Figure 4 in Appendix A for the suggested drainage layout.

13. DRAINAGE DESIGN SUMMARY

- 13.1 The surface water chamber sizes, invert levels and pipe sizes from the MasterDrain model are summarised in Table 13.1 below:

TABLE 13.1
SURFACE WATER CHAMBERS

No.	Dia (mm)	Cover level (mAOD)	Invert level (mAOD)	Pipe dia (mm)
SW1	600	101.71	101.31	100
SW2	600	100.42	99.91	100
Attenuation Crate 1	-	99.81	99.42	150
SW14 (2 l/s Flow)	900	100.20	98.92	100
SW3	600	103.14	102.74	100
SW4	600	102.94	102.34	100
SW5	600	102.92	101.94	100
SW6	600	102.92	100.94	150
SW7	900	101.16	100.54	150
SW8	600	100.97	100.57	100
SW9	600	101.01	100.17	100
SW10	900	101.06	99.77	225
SW11	600	100.77	100.37	100
SW12	600	100.86	99.97	150
SW13	1200	100.89	99.37	225
Attenuation Crate 2	-	100.83	98.87	225
SW15 (2 l/s Flow)	900	95.78	95.28	100

13.2 The foul sewage chamber sizes, invert levels and pipe sizes are given in Table 13.2 below:

TABLE 13.2
FOUL SEWAGE CHAMBERS

No.	Dia (mm)	Cover level (mAOD)	Invert level (mAOD)	Pipe dia out (mm)
FW1	450	103.14	102.64	100
FW2	450	103.07	102.24	100
FW3	600	102.87	101.84	100
FW4	600	102.07	101.44	100
FW5	900	101.61	99.80	150
FW6	450	101.00	100.60	100
FW7	450	101.31	100.20	100
FW8	450	100.86	100.46	100
FW9	450	100.75	100.06	100
FW10	600	100.69	99.66	100
FW11	1200	98.34	99.40	100
Sewage Treatmen t Plant	N/A	97.84	98.90	150

14 OPERATION AND MAINTENANCE OF THE SYSTEM

14.1 The drainage system will generally require minimal operational input once construction has been completed. However, it will require some regular maintenance.

14.2 Items requiring maintenance will include:

- Chambers (including any flow control devices) will require regular removal of any debris likely to obstruct and checking for any structural damage to the chamber or cover. Cleaning requires removing sediment, silt, and obstructions, using high-pressure water jets or manual clearing. Ensure covers are secure and airtight to prevent odour, rodent, or water ingress. Maintenance should be carried out annually at the time of year after most leaf fall has occurred.
- Any gullies, pipes and channels will need regular removal of accumulated debris and silt. Annual cleaning (or 3-6 months for high- debris areas) to remove leaves, sediment, and litter, to prevent blockages, odours, and flooding. Preventative measures like silt traps or drain guards will aid maintenance.
- The permeable surfacing will require regular cleaning to prevent clogging and ensure drainage, typically involving annual inspections, brushing to remove debris, and vacuuming or pressure washing to clear joints of moss and debris and ensure the permeability is maintained.
- The attenuation crate will need annual inspections and cleaning of inlet and outlet pipes to remove accumulated silt, debris and pollutants, prevent clogging and to check for and repair any structural issues.
- The sewage treatment plant will require regular annual inspection and maintenance by a specialist company.

15. SUMMARY OF CONCLUSIONS

15.1 The site is currently used as a stud farm to train and house horses, comprising a central stable block with parking to the north and south of the building; to the west of the main entrance from Capel Road lies the original farmhouse and gardens (outside the redline boundary). To the east of the site lies another secondary entrance from Capel Road with an office building to the immediate west and paddocks to the east containing several vintage buses. There is a track leading from this entrance southwards to connect to the wider site, with a storage unit and existing caravan located to the east of the track and a barn to the west (to remain). To the south of the site there is a sand school and another dwelling (to remain) There are three additional detached residences to the west of the site (to remain).

- 15.2 It is proposed to redevelop the site after the demolition of the existing buildings, for residential accommodation comprising ten dwellings: three five-bedroom houses to the south, three two-bedroom chalets in the centre of the site, a four-bedroom detached house and two two-bedroom semi-detached houses towards the northern section of the site and a four-bedroom detached house adjacent to the northern redline boundary, all with associated gardens and parking. In the paddocks to the east of the site there is to be a new stable block, sand school and horse practice area. See Figure 3 in Appendix A for the proposed development.
- 15.3 According to the British Geological Survey website the site lies on Weald Clay Formation - Limestone. The north of the site lies on a Secondary A bedrock aquifer with undifferentiated superficial drift. The site does not lie in a groundwater SPZ.
- 15.4 According to the Environment Agency's Flood Maps for Planning, the site lies in Flood Zone 1 (Low risk of flooding from fluvial sources where defences are not considered / <0.1% AEP of flooding in any given year). The site is not shown to be at risk of surface water flooding in the 1 in 30-year scenario but has a small area of surface water flood risk in the western section of the site (along the existing track) in the 1 in 100-year scenario which increases slightly in the 1 in 1000-year. Groundwater and reservoir flooding at the site is considered unlikely at this location. See Appendix B for the flood maps for the site.
- 15.5 The proposed development includes permeable paving in the new parking areas for the dwellings and rain gardens and water butts on the drainpipe downpipes. These measures will help keep the impact of the development on flood risk elsewhere to a minimum, making the development more sustainable in line with the SuDS hierarchy.
- 15.6 The preferred method for the disposal of surface water is drainage to a sealed underground attenuation storage crate, draining via a flow-controlled device limiting the flow to 2 l/s and draining into the existing watercourse that lies to the south of the site, Highams Gill. The attenuation crate for the residences is to be located in the grassed garden area to the west of the five-bedroom dwellings and the attenuation crate for the stables is to be located to the south of the new sand school. A suitable sized attenuation crate for the residences would be 13.6 m x 13.6 m x 0.7 m deep and for the stables 10.5 m x 11 m x 0.6 m deep. These attenuation storage units will discharge into the watercourse to the south of the site as with the existing scenario. This is
- 15.7 the preferred method for the disposal of surface water in line with the SuDS hierarchy.
- The use of permeable paving for the areas of hardstanding in the communal area, and the inclusion of planted borders along the boundaries to the east and southeast and in the private ground floor terraces, will reduce the non-permeable area in the development, slowing the runoff from the site and increasing the sustainability as well as improving the quality of the water leaving the site in line with the current NPPF guidelines.
- 15.8

- 15.9 As there is no mains sewage system in close proximity to the site, the foul water from the existing dwellings on the site is currently drained into a sewage treatment plant with the treated effluent discharging into the watercourse to the south of the site, Highams Gill. It is proposed to treat the foul water from the new proposed dwellings onsite via the same method. See Figure 4 in Appendix A for the drainage design and Appendix D for the MasterDrain drainage design calculation data.

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APPENDIX A:

Figure	Site Location
1:	Site as Existing
Figure	Proposed Development
2:	Suggested Drainage Arrangement
Figure	
3:	
Figure	
4:	



1 Location Plan
1 : 1250



New Barn Farm
Capel Road, Horsham, West Sussex, RH12 4PZ

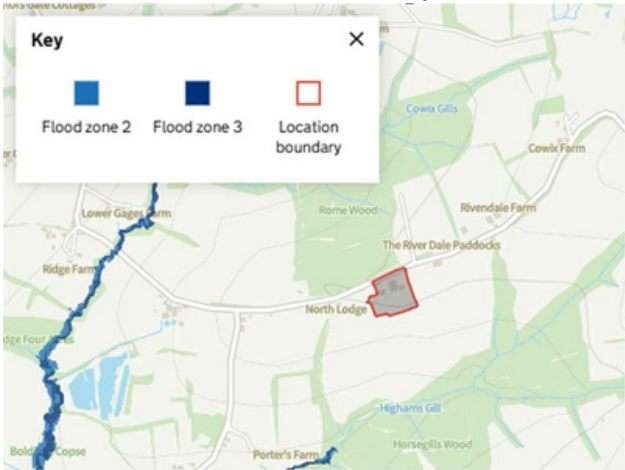
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Figure 1: Location

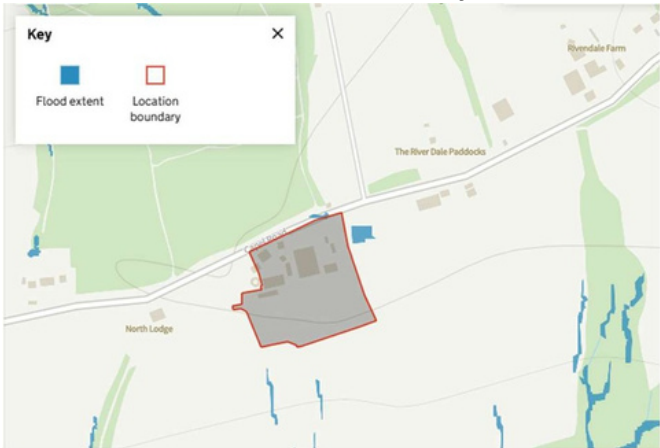
May 2026

APPENDIX B:
ENVIRONMENT AGENCY FLOOD MAPS FOR PLANNING

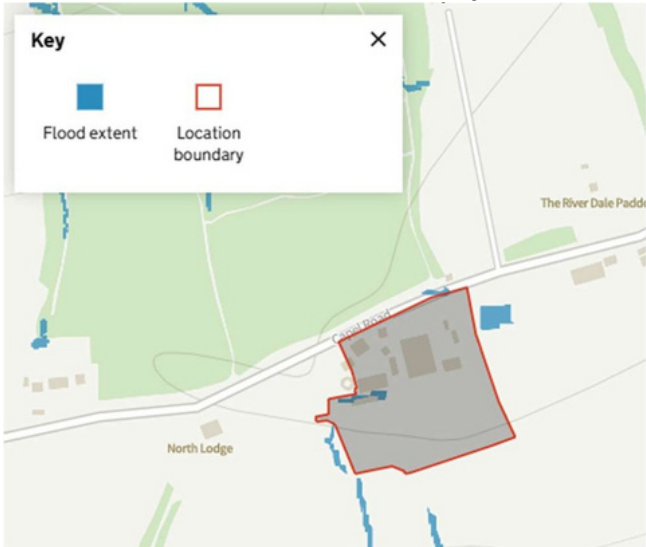
Flood Zone Map



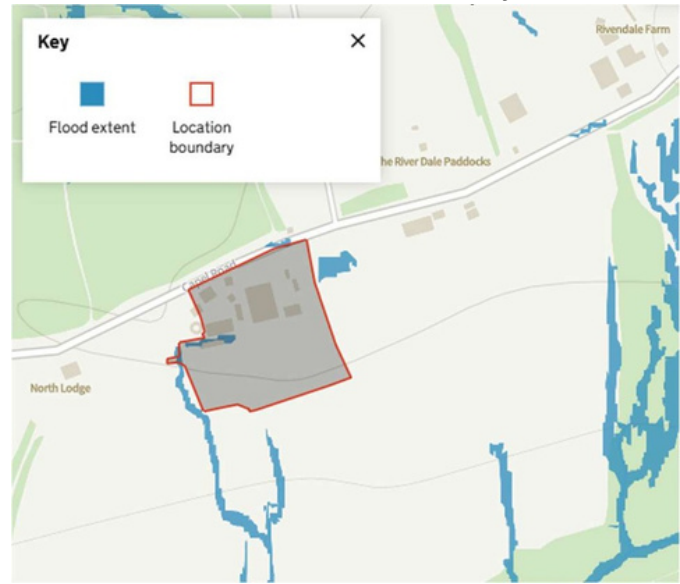
Surface water1 in 30 years



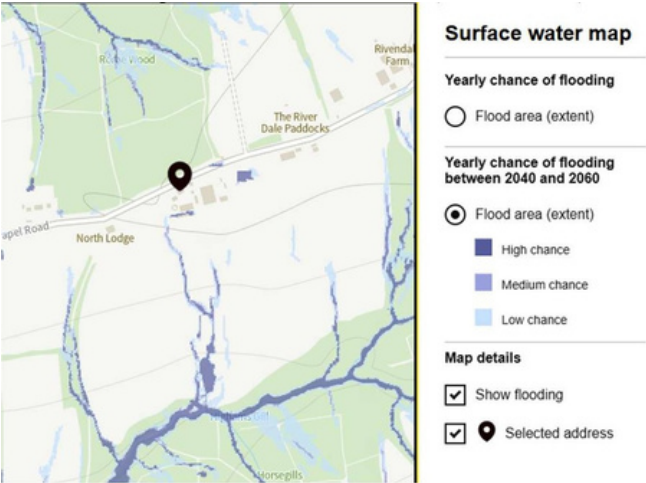
Surface water 1 in 100 years



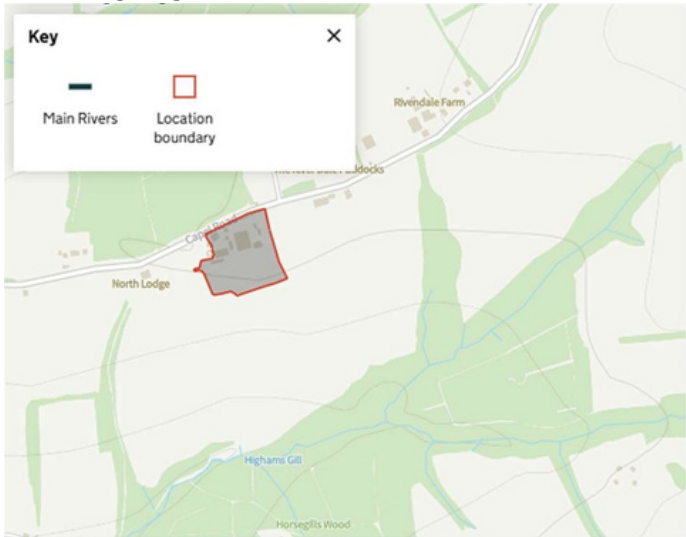
Surface water 1 in 1000 years



Long-term surface water (2040-2060)



Map showing Highams Gill watercourse to the south of the site



APPENDIX C:
HR WALLINGFORD GREENFIELD FLOW RATES

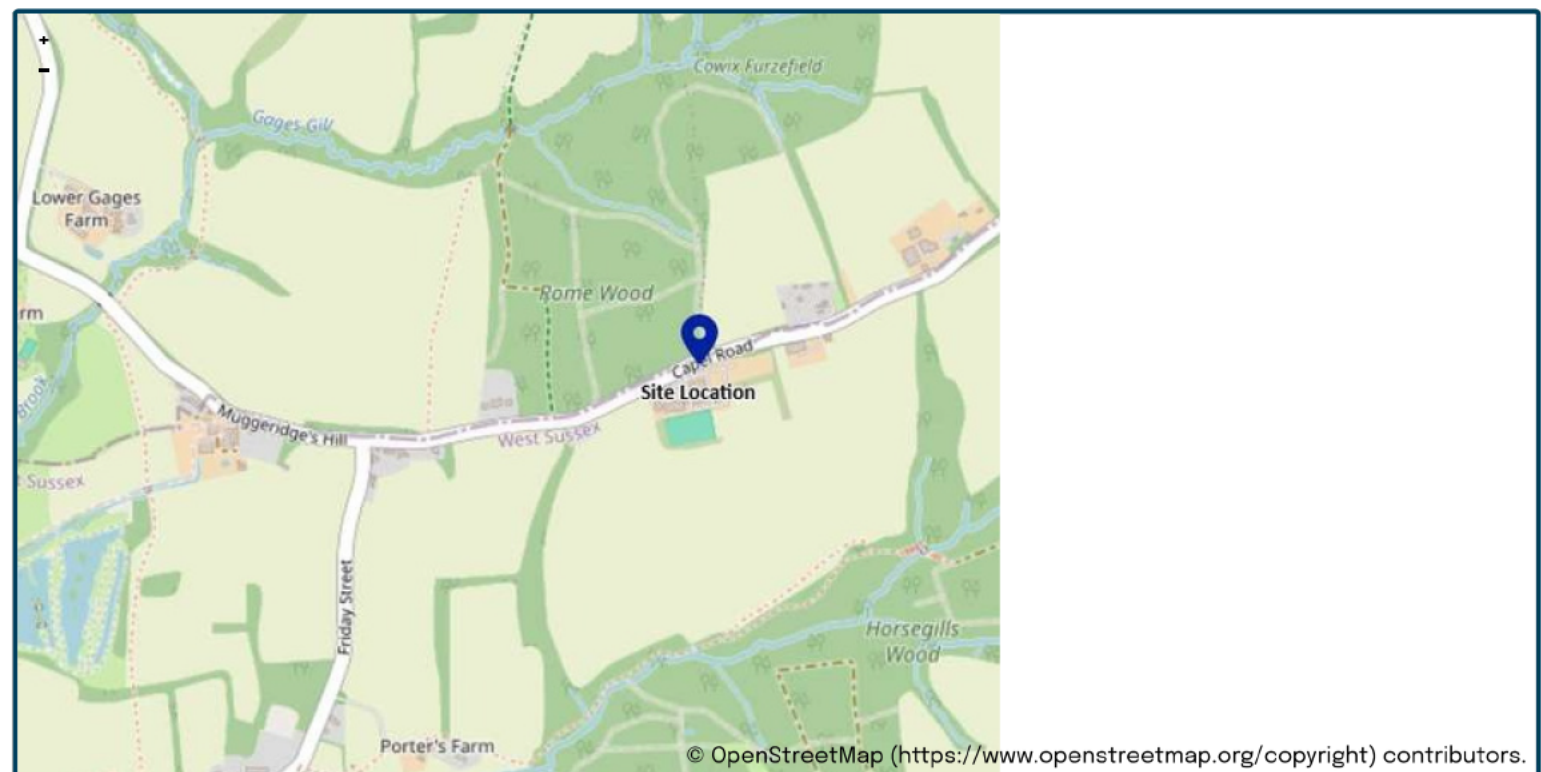
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	12/05/2026
Calculated by	EAS Ltd
Reference	891
Model version	2.2.3

Location

Site name	New Barn Farm
Site location	Rusper



Site easting (British National Grid)	519254
Site northing (British National Grid)	137591

Site details

Total site area (ha)	2.5	ha
----------------------	----------------------------------	----

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

APPENDIX D:

OUTPUT FROM DRAINAGEDESIGN SOFTWARE AND
DRAINAGE FIELD INFILTRATION CALCULATIONS



M asterDrain
SW

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Job No. 891		
Sheet no. 1		
Date 14/05/26		
By XL	Checked	Reviewed

Project **NEW BARN FARM** <http://www.easltd.co.uk>

Title **Surcharge calcs (Sized at 30 yrs storm) for NEW BARN FARM.SW CCF = 45%**

Using in-line restrictors
Return period = 100 yrs
Climate change factor = 45

PEAK hydrograph values printed
Storm duration = 15 mins
No offline storage

Mean rain intens. 133.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 521.36 mm/hr
Sample period = 7.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE : CAPACITY : l/s	RATE : FLOW : l/s	PIPE SIZE : mm	CHAMBER : DIAM/LxW : mm	INVERT : LEVEL : m	WATER : LEVEL : m	GRND : LEVEL : m	SURCHARGE : fract.	Depth	EXCESS : FLOW : l/s	FLOODED : VOL : m³	DRAINED : AREA (m²): x FACTOR :	STATUS
1	I	SW01	15.7	8.9	100	600	101.31	101.37	101.71	0.56	0.06	0.00	0.000	141	OK
2	I	SW02	22.8	34.5	150	600	99.91	100.37	100.42	1.52	0.46	11.73	0.000	550	Warnin
3	I	1.03NUATION 1	28.5	34.5	150	1200	99.42	99.61	99.81	1.21	0.19	5.96	0.000	550	g
4	I	1.04 SW14 ‡	24.9	2.0	100	900	98.92	98.93	100.20	0.08	0.01	0.00	0.000	550	Warnin
5	B	2.01 SW3	10.9	10.1	100	600	102.74	102.83	103.14	0.92	0.09	0.00	0.000	160	g OK
6	B	2.02 SW4	12.4	15.5	100	600	102.34	102.52	102.94	1.25	0.18	3.08	0.000	247	OK
7	B	2.03 SW5	18.4	20.9	100	600	101.94	102.11	102.92	1.14	0.17	2.55	0.000	334	Surch.
8	B	2.04 SW6	21.5	28.2	150	600	100.94	101.27	102.92	1.31	0.33	6.64	0.000	449	Surch.
9	B	2.05 SW7	34.3	28.2	150	900	100.54	100.65	101.16	0.82	0.11	0.00	0.000	449	Surch.
10	S1	3.01 SW8	7.9	5.9	100	600	100.57	100.64	100.97	0.75	0.07	0.00	0.000	95	OK
11	S1	3.02 SW9	8.1	11.9	100	600	100.17	100.37	101.01	1.47	0.20	3.80	0.000	189	OK
12	B	2.06 SW10	72.9	46.0	225	900	99.77	99.91	101.06	0.63	0.14	0.00	0.000	734	Surch.
13	S1	4.01 SW11	8.5	10.5	100	600	100.37	100.52	100.77	1.24	0.15	2.02	0.000	167	OK
14	S1	4.02 SW12	30.6	21.0	150	600	99.97	100.07	100.86	0.69	0.10	0.00	0.000	335	Warnin
15	B	2.07 SW13	100.4	77.5	225	1200	99.37	99.53	100.89	0.77	0.16	0.00	0.000	1236	g OK
16	B	2.08TENUATION	174.4	77.5	225	1200	98.87	98.97	100.83	0.44	0.10	0.00	0.000	1236	OK
17	B	2.09 SW15 ‡	2.0	2.0	100	900	95.28	95.29	95.78	1.00	0.01	0.00	0.000	1236	OK



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Job No. 891		
Sheet no. 2		
Date 14/05/26		
By XL	Checked	Reviewed

Project NEW BARN FARM	http://www.easLtd.co.uk
Title Surcharge calcs (Sized at 30 yrs storm) for NEW BARN FARM.SW CCF = 45%	

Notes

Printout headings

- | | | |
|---|---|--|
| 1) Entry no - position in file | 2) Section no - pipe identifier | 3) Manhole ref - Manhole identifier |
| 4) Pipe cap - full bore capacity of that pipe | 5) Rate of flow - calculated flow rate (l/s) ± = flow restrictor. | 6) Pipe diam - outlet pipe diameter (mm) |
| 7) Chamber diam - chamber diam. at base of MH | 8) Invert level - invert level of manhole | 9) Water level - calculated peak water level. |
| 10) Grnd level - ground / cover level | 11) Surch. fract - calc.flow/pipe capacity | 12) Surch. depth - surcharge level above soffit |
| 13) Overflow - surcharged flow rate (l/s) | 14) Flooded vol - volume of water above cover | 15) Upstrm Vol - upstream pipe vol to previous manhole(s) |
| 16) Status - OK - outlet not surcharged | 17) Status - Surcharged - outlet surcharged | 18) Status - Warning - water level within 299mm of cover level |
| 19) Status - Flooded - cover over-topped | 20) § against diameter indicates throttle pipe used. | |

Title box

Hydrograph data

- | | | |
|---|--------------------------------------|--|
| 1) Ret. period - that used to calculate profile | 2) Duration - length of storm (mins) | 3) Profile - either Winter (75%) or Summer (50%) |
|---|--------------------------------------|--|

Flow restrictors

- | | |
|--------------------------|-----------------------------|
| Manhole reference - SW14 | Restrictor flowrate - 2 l/s |
| Manhole reference - SW15 | Restrictor flowrate - 2 l/s |

Flood volumes

Check that the upstream storage of the manhole is adequate to take the flood volume - see Upstrm Vol above.



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Job No.	891	
Sheet no.	3	
Date	14/05/26	
By	XL	Checked
		Reviewed

Project	NEW BARN FARM	http://www.easitd.co.uk
Title	Surcharge calcs (Sized at 30 yrs storm) for NEW BARN FARM.SW CCF = 45%	

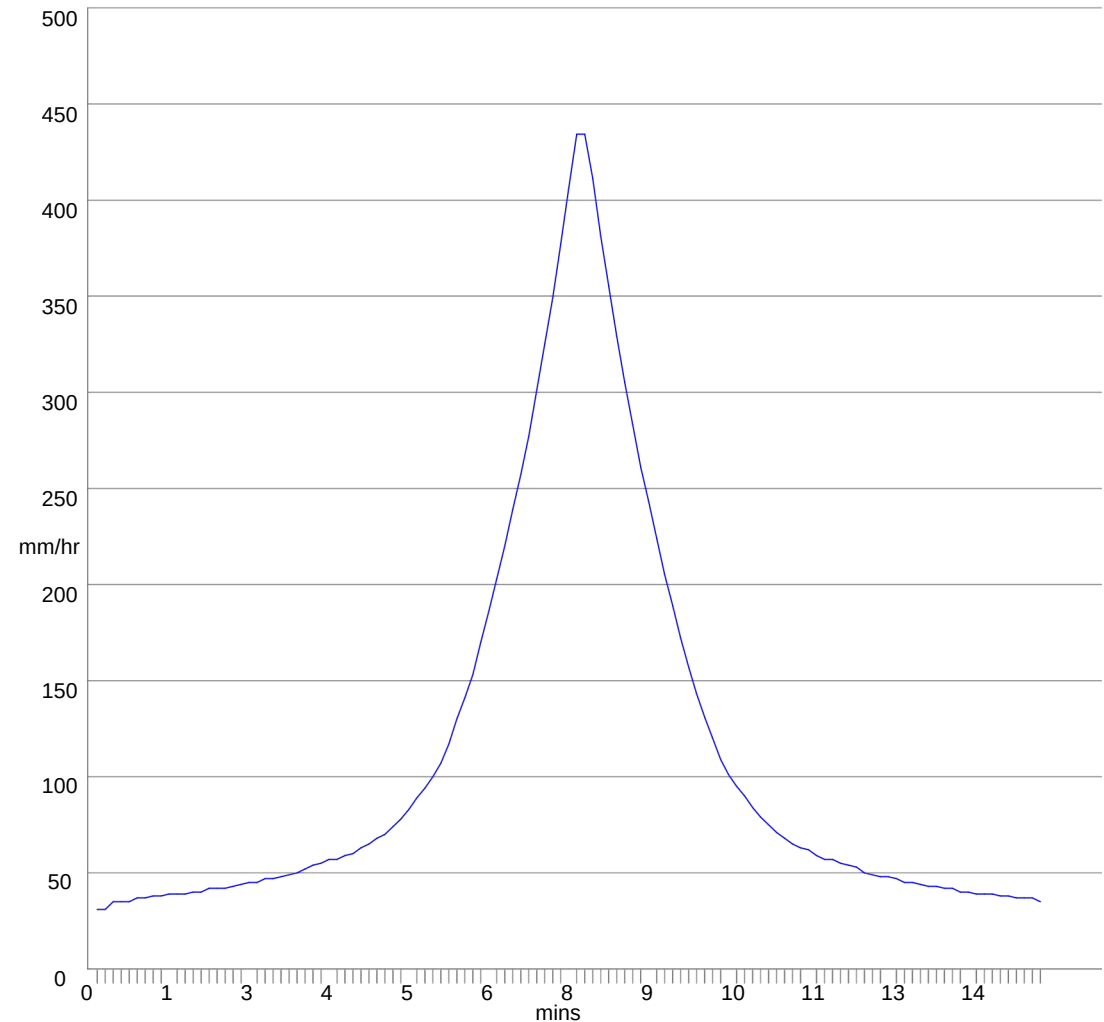
Time min	Rain mm/hr	Time min	Rain mm/hr	Time min	Rain mm/hr
0:08	31.02	5:08	88.64	10:08	95.29
0:15	31.02	5:15	94.18	10:15	89.75
0:22	35.46	5:22	99.72	10:22	84.21
0:30	35.46	5:30	107.47	10:30	78.67
0:38	35.46	5:38	117.45	10:38	75.34
0:45	36.56	5:45	129.63	10:45	70.91
0:52	36.56	5:52	140.71	10:52	67.59
1:00	37.67	6:00	152.90	11:00	65.37
1:08	37.67	6:08	169.52	11:08	63.16
1:15	38.78	6:15	186.14	11:15	62.05
1:22	38.78	6:22	202.76	11:22	58.72
1:30	38.78	6:30	220.49	11:30	56.51
1:38	39.89	6:38	239.32	11:38	56.51
1:45	39.89	6:45	257.05	11:45	55.40
1:52	42.10	6:52	277.00	11:52	54.29
2:00	42.10	7:00	301.37	12:00	53.18
2:08	42.10	7:08	324.64	12:08	49.86
2:15	43.21	7:15	349.02	12:15	48.75
2:22	44.32	7:22	376.71	12:22	47.64
2:30	45.43	7:30	405.52	12:30	47.64
2:38	45.43	7:38	434.33	12:38	46.54
2:45	46.54	7:45	434.33	12:45	45.43
2:52	46.54	7:52	411.06	12:52	45.43
3:00	47.64	8:00	381.15	13:00	44.32
3:08	48.75	8:08	354.56	13:08	43.21
3:15	49.86	8:15	329.07	13:15	43.21
3:22	52.08	8:22	304.70	13:22	42.10
3:30	54.29	8:30	282.54	13:30	42.10
3:38	55.40	8:38	261.48	13:38	39.89
3:45	56.51	8:45	242.65	13:45	39.89
3:52	56.51	8:52	223.81	13:52	38.78
4:00	58.72	9:00	204.98	14:00	38.78
4:08	59.83	9:08	189.47	14:08	38.78
4:15	63.16	9:15	171.74	14:15	37.67
4:22	65.37	9:22	157.33	14:22	37.67
4:30	67.59	9:30	142.93	14:30	36.56
4:38	69.80	9:38	130.74	14:38	36.56
4:45	74.23	9:45	119.66	14:45	36.56
4:52	77.56	9:52	108.58	14:52	35.46
5:00	83.10	10:00	100.83	15:00	35.46

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs

Duration= 15 mins

Profile - summer





MasterDrain
SW

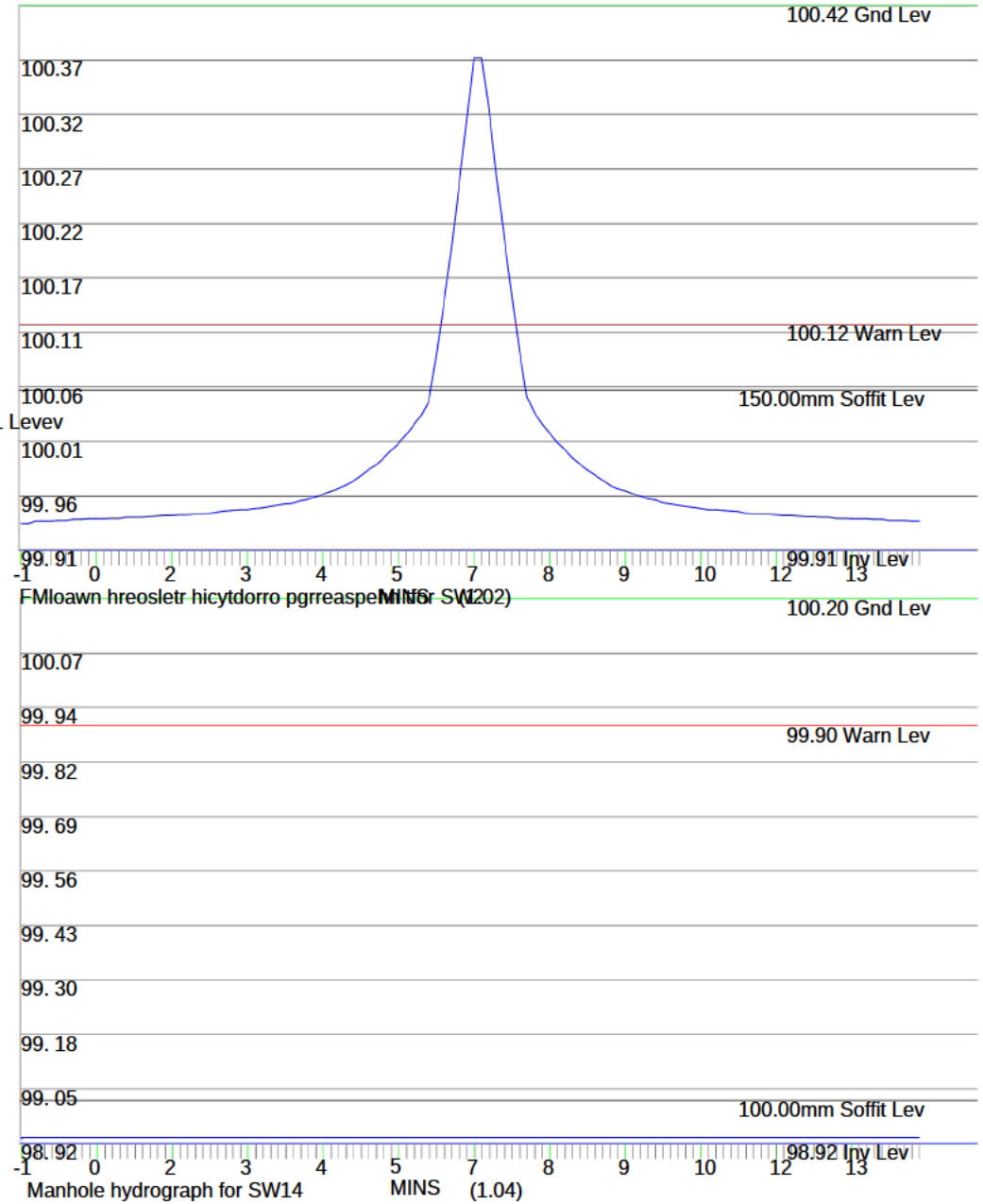
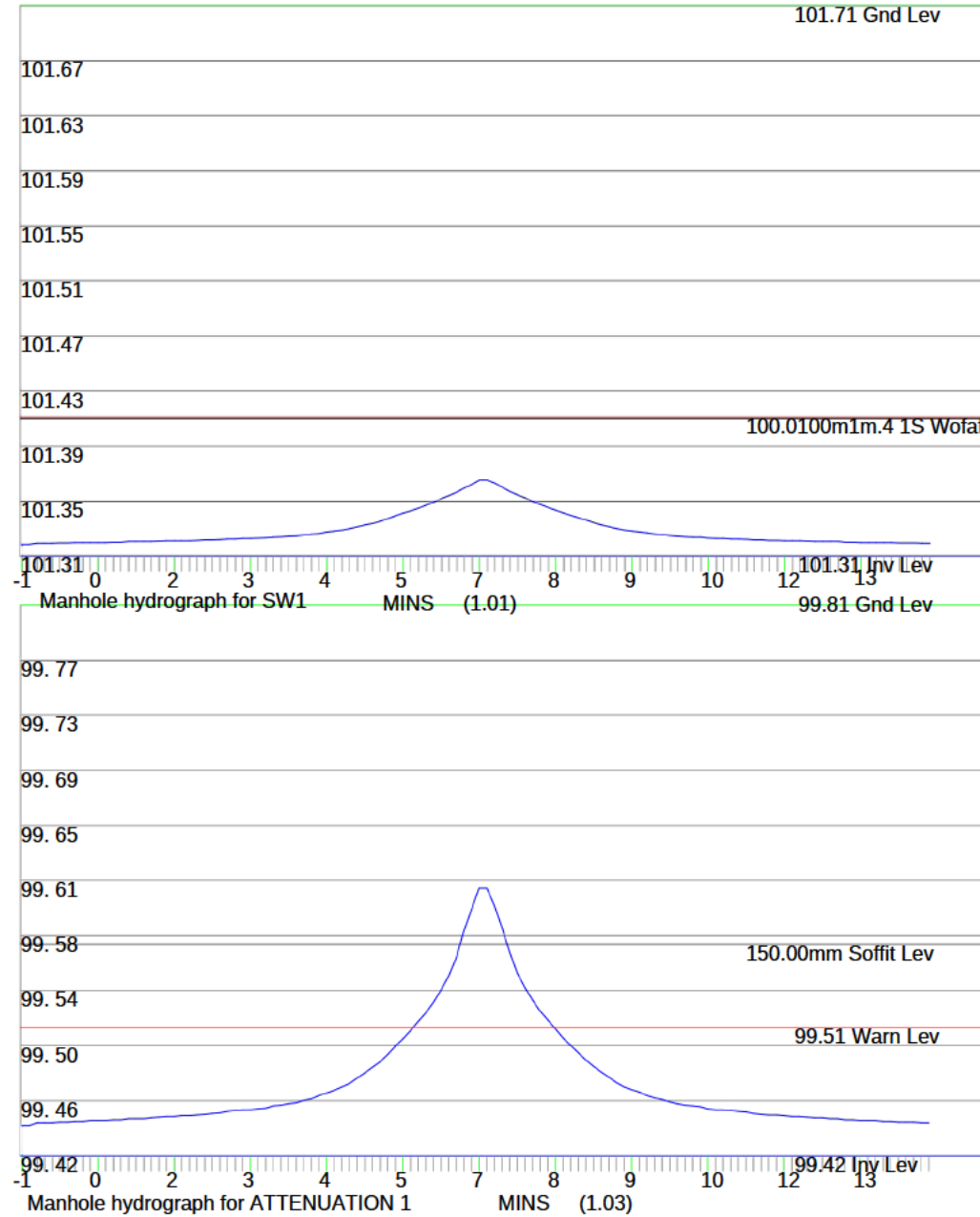
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Job No.	891	
Sheet no.	4	
Date	14/05/26	
By	XL	Checked
		Reviewed

Project NEW BARN FARM <http://www.easitd.co.uk>

Title Surcharge calcs (Sized at 30 yrs storm) for NEW BARN FARM.SW CCF = 45%





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SW

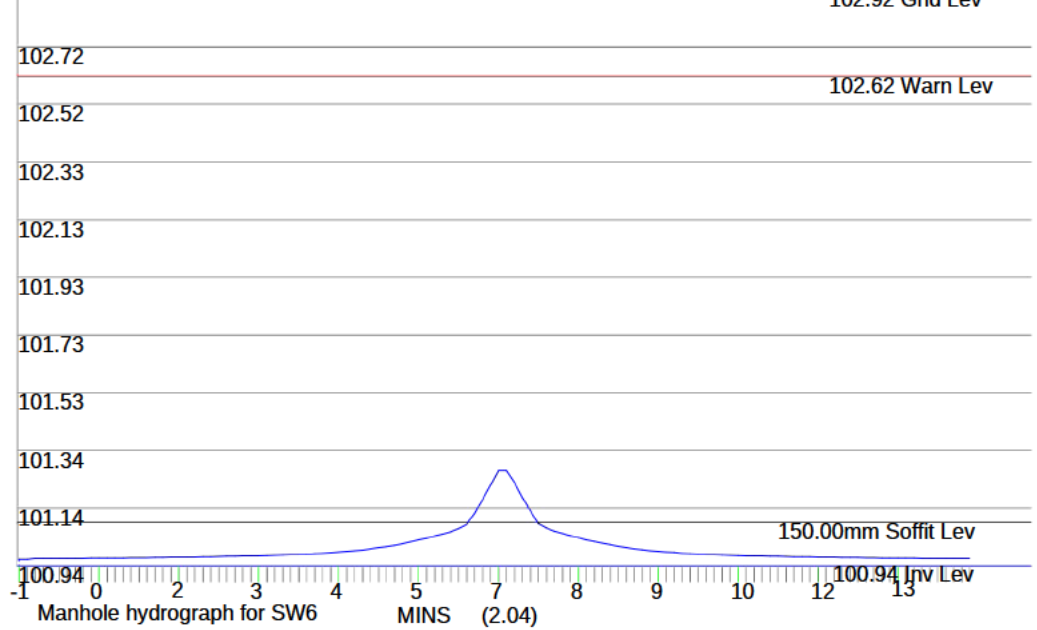
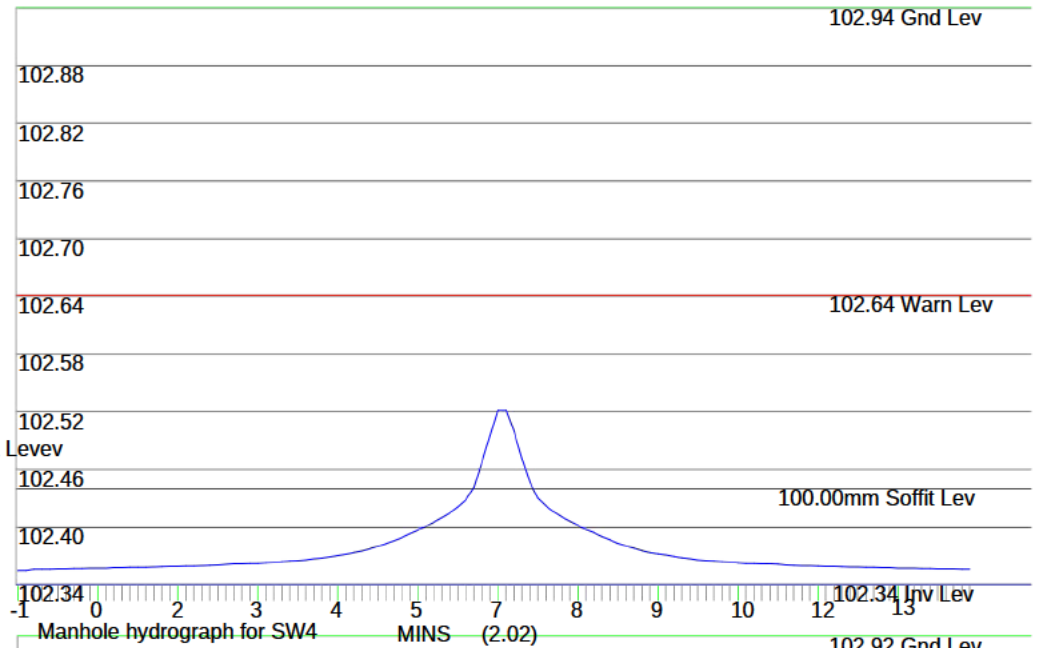
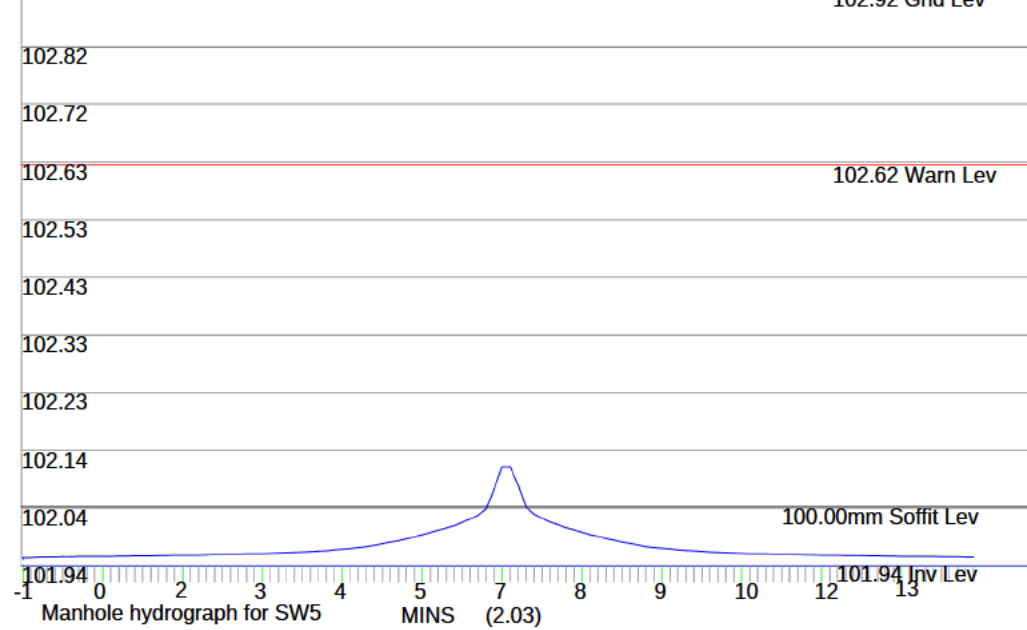
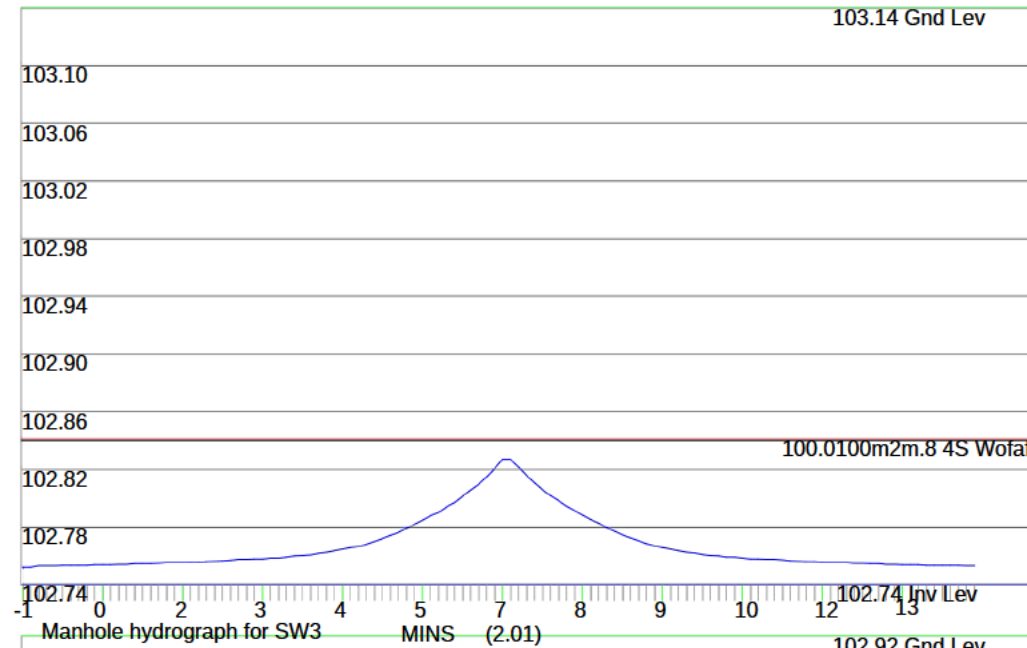
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Job No. 891		
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Date	14/05/26	
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Project **NEW BARN FARM** <http://www.easitd.co.uk>

Title **Surcharge calcs (Sized at 30 yrs storm) for NEW BARN FARM.SW CCF = 45%**





MasterDrain
SW

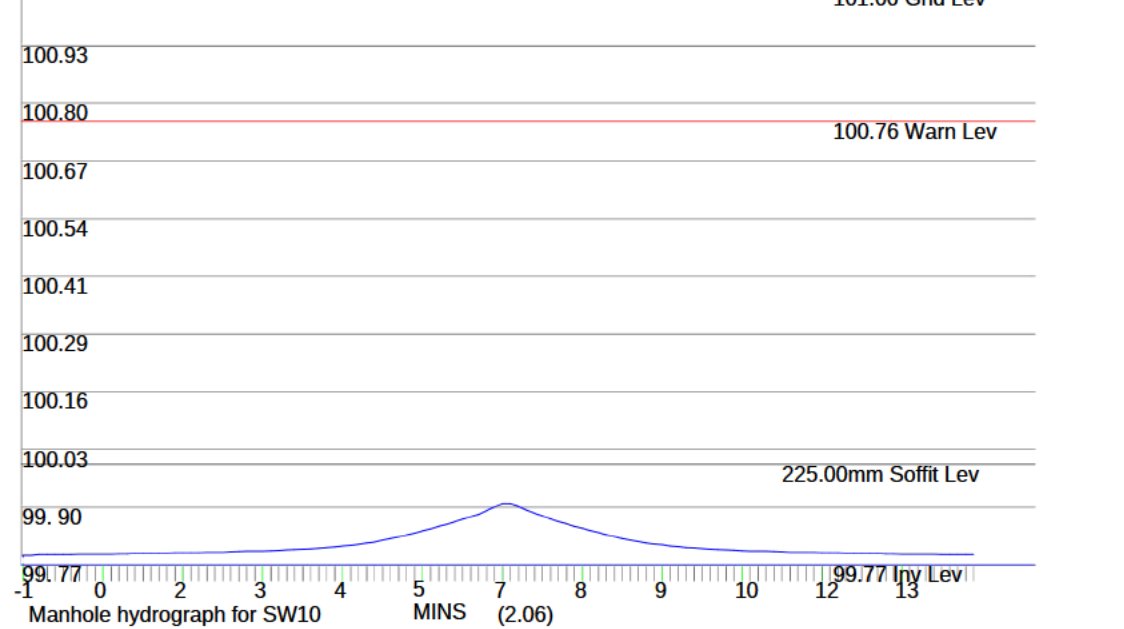
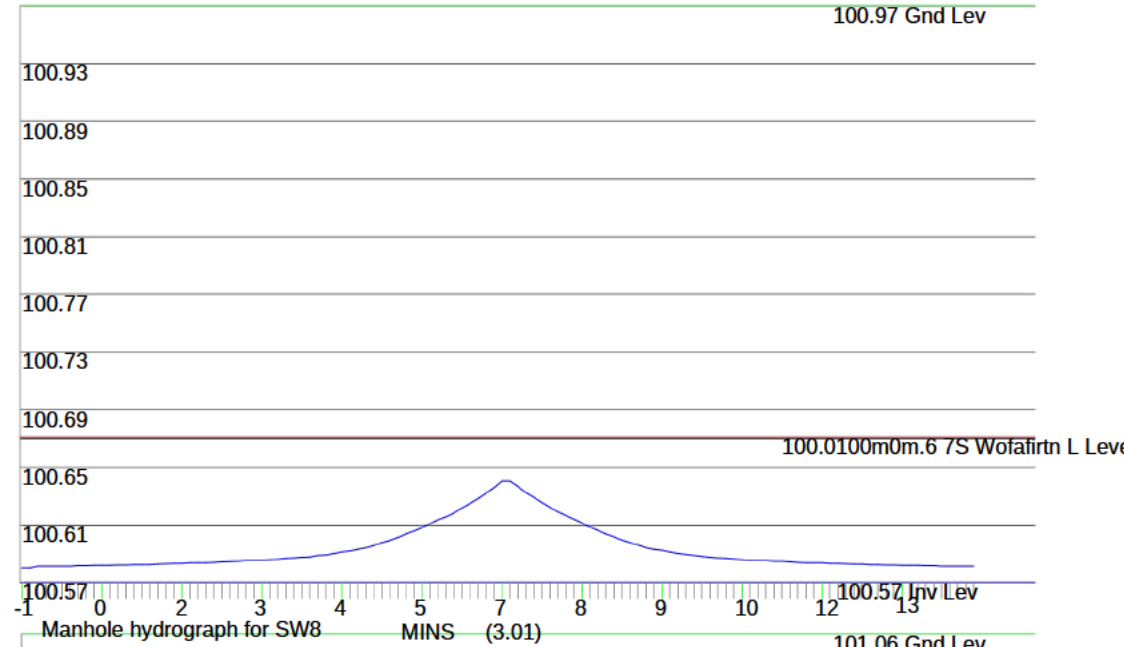
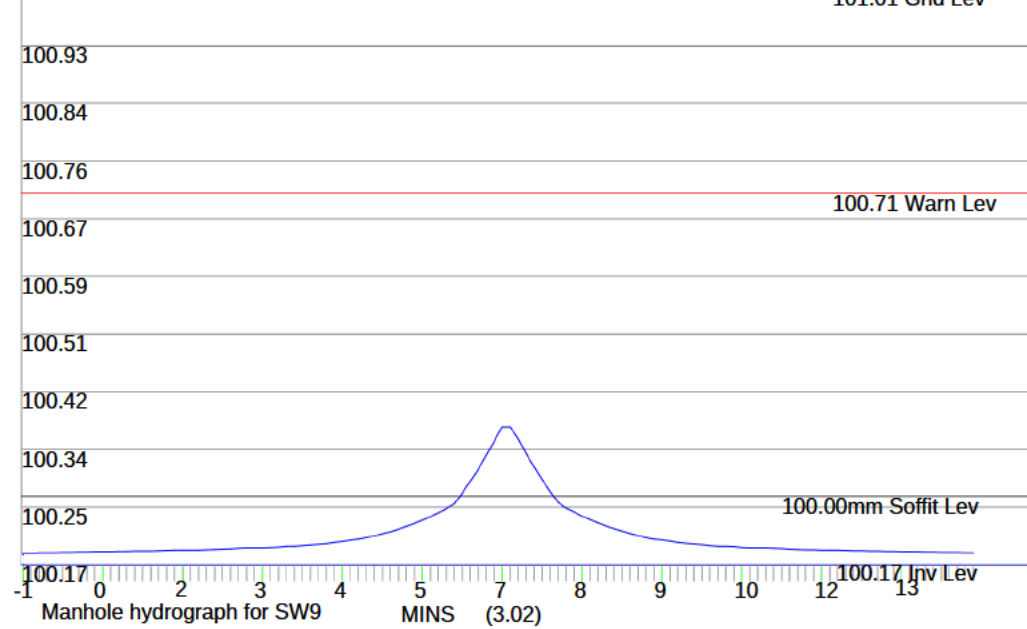
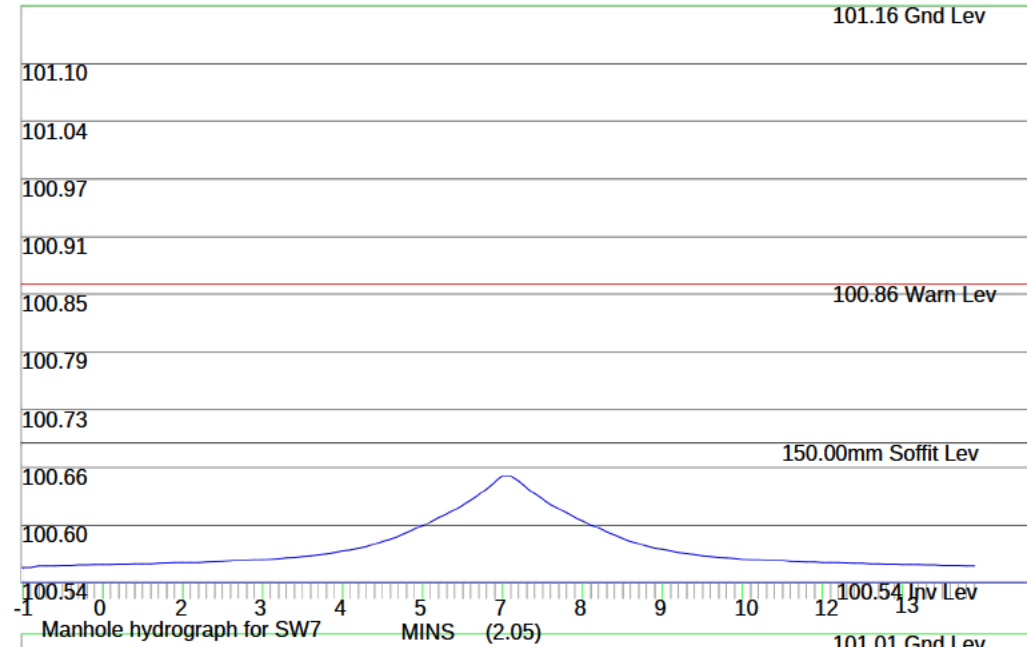
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Date	14/05/26	
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Project **NEW BARN FARM** <http://www.easLtd.co.uk>

Title **Surcharge calcs (Sized at 30 yrs storm) for NEW BARN FARM.SW CCF = 45%**





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SW

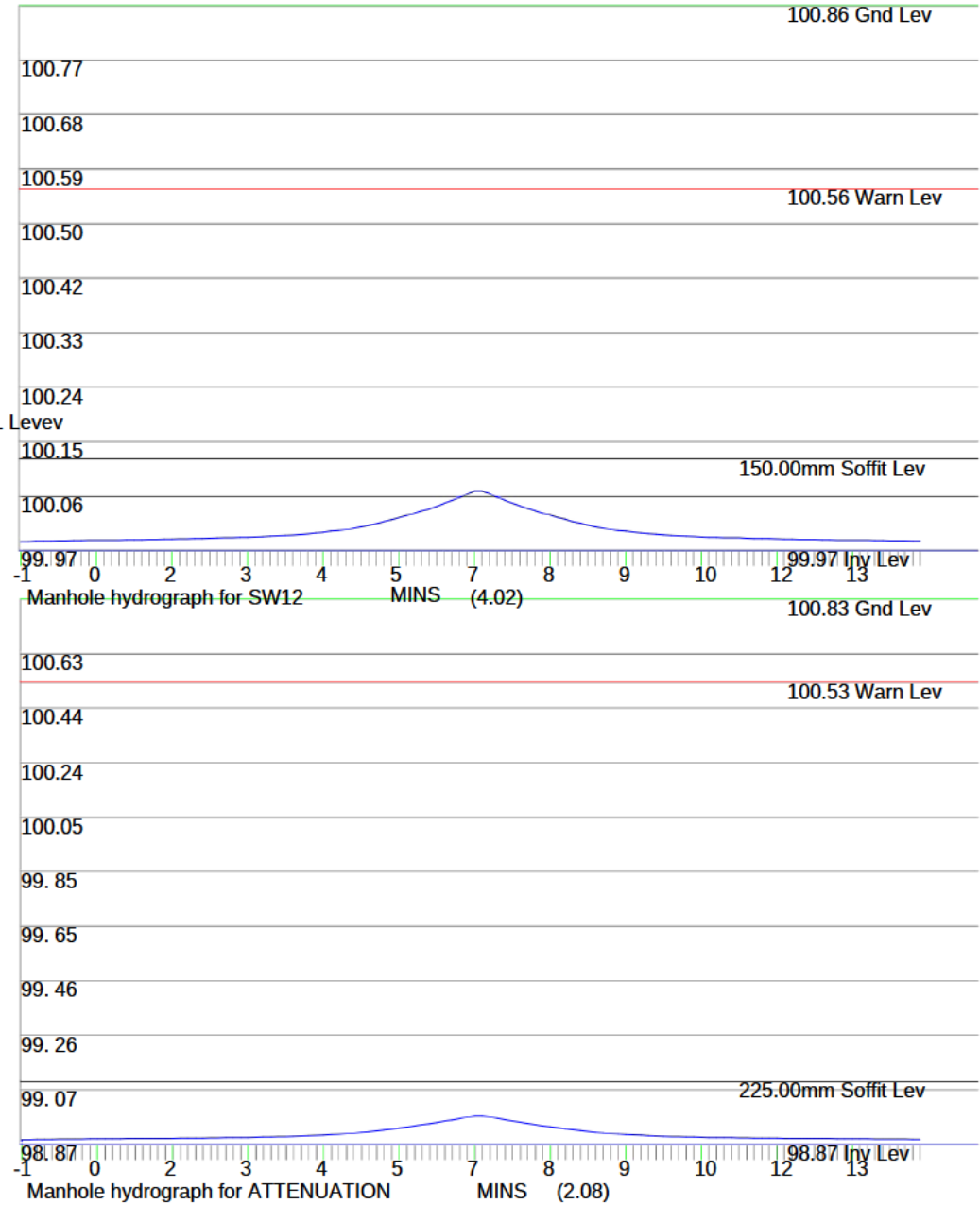
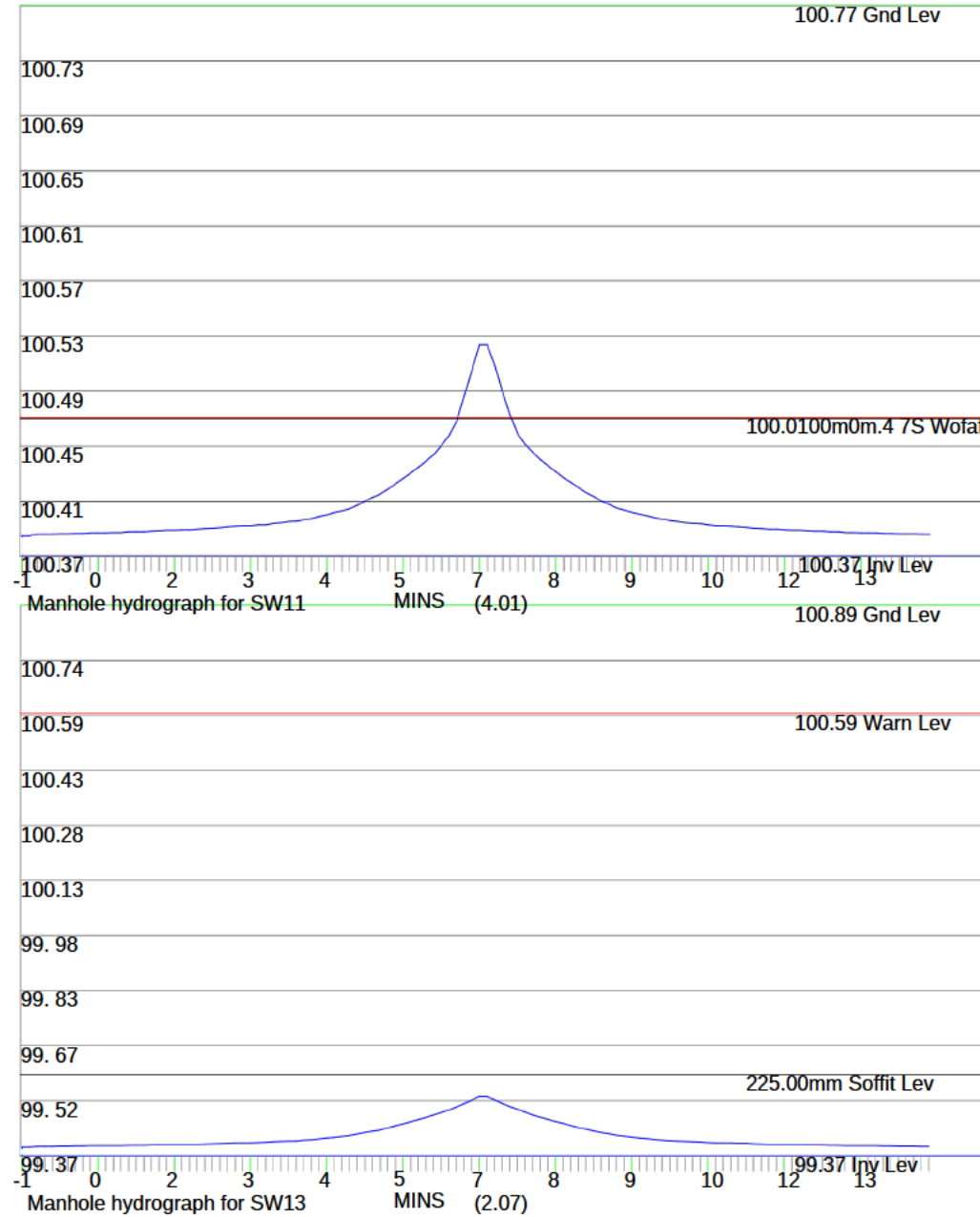
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Sheet no.	7	
Date	14/05/26	
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Project **NEW BARN FARM** <http://www.easitd.co.uk>

Title **Surcharge calcs (Sized at 30 yrs storm) for NEW BARN FARM.SW CCF = 45%**





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Date 14/05/26		
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Project NEW BARN FARM	http://www.easltd.co.uk
Title Surcharge calcs (Sized at 30 yrs storm) for NEW BARN FARM.SW CCF = 45%	





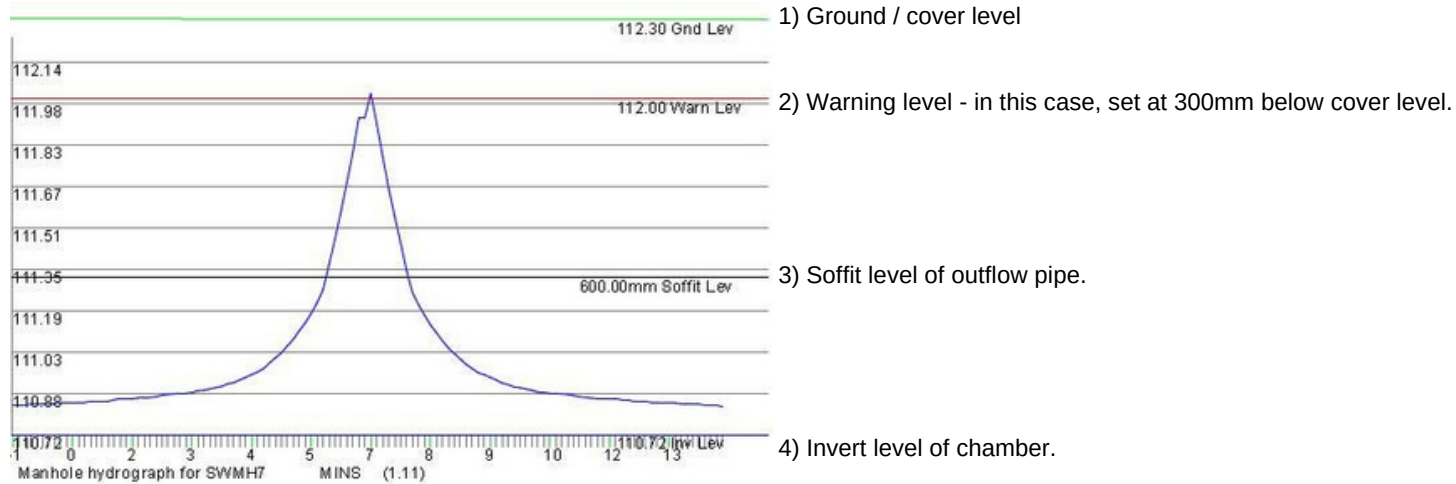
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SW

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Job No.	891	
Sheet no.	9	
Date	14/05/26	
By	XL	
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Reviewed		

Project	NEW BARN FARM	http://www.easLtd.co.uk
Title	Surcharge calcs (Sized at 30 yrs storm) for NEW BARN FARM.SW CCF = 45%	



Notes

- Lower section of the graph shows the water depth filling the channel. Channel is assumed to be a full pipe diameter in depth.
- Upper section of the graph shows the water depth filling the chamber. Chamber has a greater width/diameter than the channel, so increases in depth are proportionally less.
- The top of the graph clips the warning level and would be marked thus on the printout.
- In many cases the invert of the offline storage is required to enter at the channel soffit level, meaning that the pipe will still surcharge but flooding risk reduced.
- The diagram above is a general one and is not part of the current calculation.

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				Sheet no. 1	
				Date 14/05/26 13:53	
Project New Barn Farm		http://www.easitd.co.uk		By XL	Checked
Title Manhole printout for NEW BARN FARM.SW					Reviewed

Manhole ref.	X ref	Y ref	Form	Chamdiam. or length	Rect. width	Chamb. height	Shaft height	MH Volume	Exit Diam	Exit Crown	Exit Invert	Chamb const	Slab level	Cover Level	Dwnstr MH
SW1	204.84	30.70	circ	600	N/A	0.40		0.11	100	101.435	101.310	N/A	101.260	101.710	SW2
SW2	218.42	15.44	circ	600	N/A	0.51		0.14	150	100.085	99.910	N/A	99.860	100.420	NUATION 1
TENUATION 1	190.33	25.30	circ	1200	N/A	0.39		0.44	150	99.595	99.420	N/A	99.370	99.810	SW14
SW14	190.44	44.72	circ	900	N/A	1.28		0.81	100	99.045	98.920	N/A	98.870	100.200	TERCOURSE
SW3	94.88	48.74	circ	600	N/A	0.40		0.11	100	102.865	102.740	N/A	102.690	103.140	SW4
SW4	101.95	38.33	circ	600	N/A	0.60		0.17	100	102.465	102.340	N/A	102.290	102.940	SW5
SW5	102.51	28.65	circ	600	N/A	0.98		0.28	100	102.065	101.940	N/A	101.890	102.920	SW6
SW6	93.77	21.58	circ	600	N/A	1.98		0.56	150	101.115	100.940	N/A	100.890	102.920	SW7
SW7	72.93	4.28	circ	900	N/A	0.62		0.39	150	100.715	100.540	N/A	100.490	101.160	SW10
SW8	68.47	25.3	circ	600	N/A	0.40		0.11	100	100.695	100.570	N/A	100.520	100.970	SW9
SW9	91.16	20.65	circ	600	N/A	0.84		0.24	100	100.295	100.170	N/A	100.120	101.010	SW10
SW10	69.21	24.93	circ	900	N/A	1.29		0.82	225	100.020	99.770	N/A	99.720	101.060	SW13
SW11	113.3	37.4	circ	600	N/A	0.40		0.11	100	100.495	100.370	N/A	100.320	100.770	SW12
SW12	93.02	40.93	circ	600	N/A	0.89		0.25	150	100.145	99.970	N/A	99.920	100.860	SW13
SW13	72.93	45.02	circ	1200	N/A	1.52	1.96	1.72	225	99.620	99.370	N/A	99.320	100.890	NUATION 2
ATTENUATION	61.58	52.28	circ	1200	N/A	0.50		2.22	225	99.120	98.870	N/A	98.820	99.780	SW15
SW15	63.28	83.96	circ	900	N/A			0.32	100	95.405	95.280	N/A	95.230	95.780	TERCOURSE

All manholes to be as per 'Sewers for Adoption'

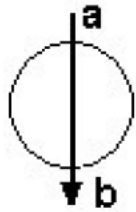
Environmental Assessment Services Ltd

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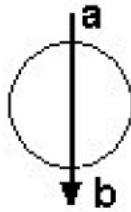
Job No. 891		
Sheet no.	2	
Date	14/05/26 13:53	
By XL	Checked	Reviewed

Project **New Barn Farm** <http://www.easitd.co.uk>

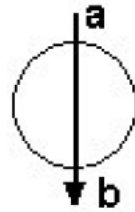
Title **Manhole printout for NEW BARN FARM.SW**



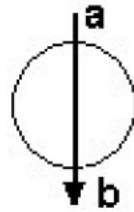
MH = SW1
a=head
b = 100



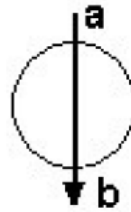
MH = SW2
a= 100
b = 150



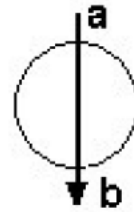
MH = ATTENUATION
a= 150
b = 150



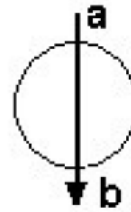
MH = SW14
a= 150
b = 100



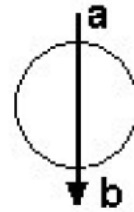
MH = SW3
a=head
b = 100



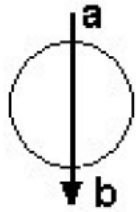
MH = SW4
a= 100
b = 100



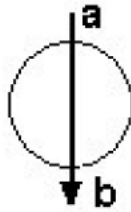
MH = SW5
a= 100
b = 100



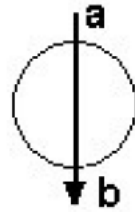
MH = SW6
a= 100
b = 150



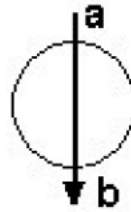
MH = SW7
a= 150
b = 150



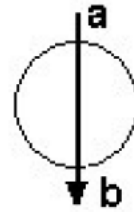
MH = SW8
a=head
b = 100



MH = SW9
a= 100
b = 100



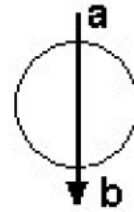
MH = SW10
a= 150
b = 225
c = 100



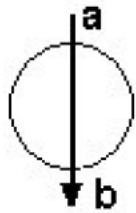
MH = SW11
a=head
b = 100



MH = SW12
a= 100
b = 150



MH = SW13
a= 225
b = 225
c = 150



MH = SW15
a= 225
b = 100

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				Sheet no. 3		
				Date 14/05/26 13:53		
Project	New Barn Farm	http://www.easltd.co.uk		By XL	Checked	Reviewed
Title	Manhole printout for NEW BARN FARM.SW					

These explanatory notes should be read in conjunction with the Manhole printout

- 1) Manhole ref - the reference for the manhole in question
- 2) Form - either circular or rectangular
- 3) Chamberdiam or length - diameter of chamber if circular, or length if rectangular - in metres
- 4) Rectangular width - if form is rectangular, this gives the width of the chamber
- 5) Chamber height - height of chamber from invert
- 6) Shaft height - height of access shaft if applicable, from top of chamber to ground level
- 7) Manhole volume - cubic capacity of manhole chamber
- 8) Exit diameter - diameter of pipe leaving this manhole
- 9) Exit crown - crown level of pipe leaving this manhole
- 10) Exit invert - invert level of pipe leaving this manhole
- 11) Chamb const - manhole construction :-
 - N/A - not specified
 - Conc - concrete rings
 - Poly - polypropylene rings surrounded by selected fill
 - Poly/conc - polypropylene rings surrounded by concrete
 - Brick - brick built with waterproof render
 - In situ - concrete cast in situ
- 12) Slab level - surface level of base slab (if no sump, this is placed at 50mm below exit invert to allow levels manipulation).
- 13) Manhole diameters of 9999 have exceeded the sizes available in SfA
- 14) Manhole diameters may have to be modified due to the number of branches



Master Drain
SW

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Date	14/05/26
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Project	New Barn Farm Attenuation 1
Title	Hydrograph storage analysis (Winter profile) for Rusper

Data:-

FEH Hydrology:-

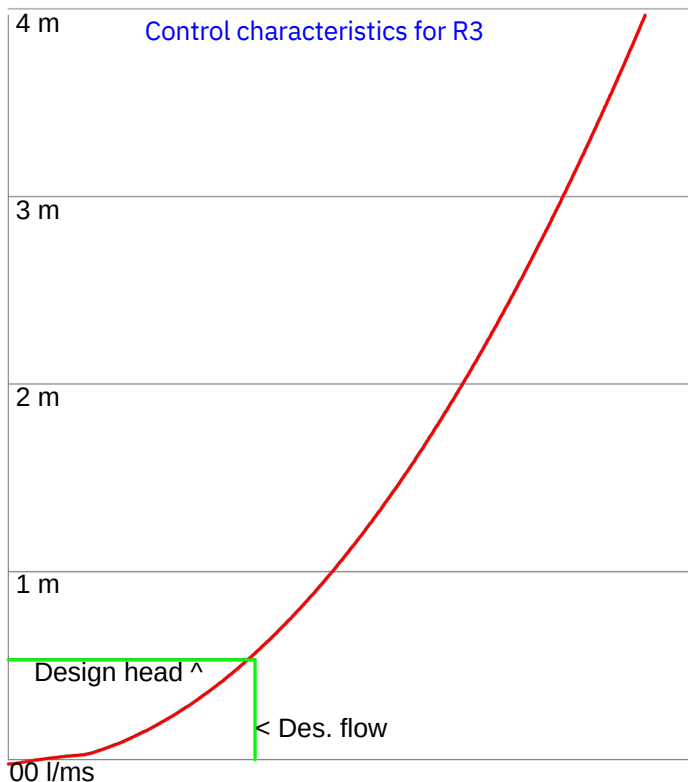
Location = Rusper Grid reference = TQ2037
 $c = -0.0260$ $d1 = 0.3470$ $d2 = 0.3420$
 $d3 = 0.3650$ $e = 0.3190$ $f = 2.4660$
 Return period = 100 Climate change = 45%

Percentage runoff = 95.0% (manual setting)

Imperv. area = 579 m² Pervious area = 0 m²
 Total area = 579 m² Equiv area = 550 m² (Tot. area x % runoff).
 Total runoff = 55.8 m³ Discharge rate = 2.000 l/s

Design Head = 0.6m Peak flow = 2.00 l/s
 Control device = R3 Orifice diam = 44.9 mm
 Max. calc. depth = 0.61 m Available depth = 0.0 m³
 Mean discharge = 1.18 l/s

Available system storage = 0.00 m³ under a system plane at the design head level.
 Offline storage = 0.0 m³
 Total storage = 41.0 m³ Peak input flow = 9.69 l/s



Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
0.01	0.04	2.01	3.66
0.05	0.47	2.05	3.70
0.10	0.82	2.10	3.74
0.15	1.00	2.15	3.79
0.20	1.15	2.20	3.83
0.25	1.29	2.25	3.87
0.30	1.41	2.30	3.92
0.35	1.53	2.35	3.96
0.40	1.63	2.40	4.00
0.45	1.73	2.45	4.04
0.50	1.83	2.50	4.08
0.55	1.91	2.55	4.12
0.60	2.00	2.60	4.16
0.65	2.08	2.65	4.20
0.70	2.16	2.70	4.24
0.75	2.24	2.75	4.28
0.80	2.31	2.80	4.32
0.85	2.38	2.85	4.36
0.90	2.45	2.90	4.40
0.95	2.52	2.95	4.43
1.00	2.58	3.00	4.47
1.05	2.65	3.05	4.51
1.10	2.71	3.10	4.55
1.15	2.77	3.15	4.58
1.20	2.83	3.20	4.62
1.25	2.89	3.25	4.65
1.30	2.94	3.30	4.69
1.35	3.00	3.35	4.73
1.40	3.06	3.40	4.76
1.45	3.11	3.45	4.80
1.50	3.16	3.50	4.83
1.55	3.21	3.55	4.86
1.60	3.27	3.60	4.90
1.65	3.32	3.65	4.93
1.70	3.37	3.70	4.97
1.75	3.42	3.75	5.00
1.80	3.46	3.80	5.03
1.85	3.51	3.85	5.07
1.90	3.56	3.90	5.10
1.95	3.61	3.95	5.13
2.00	3.65	4.00	5.16



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SW

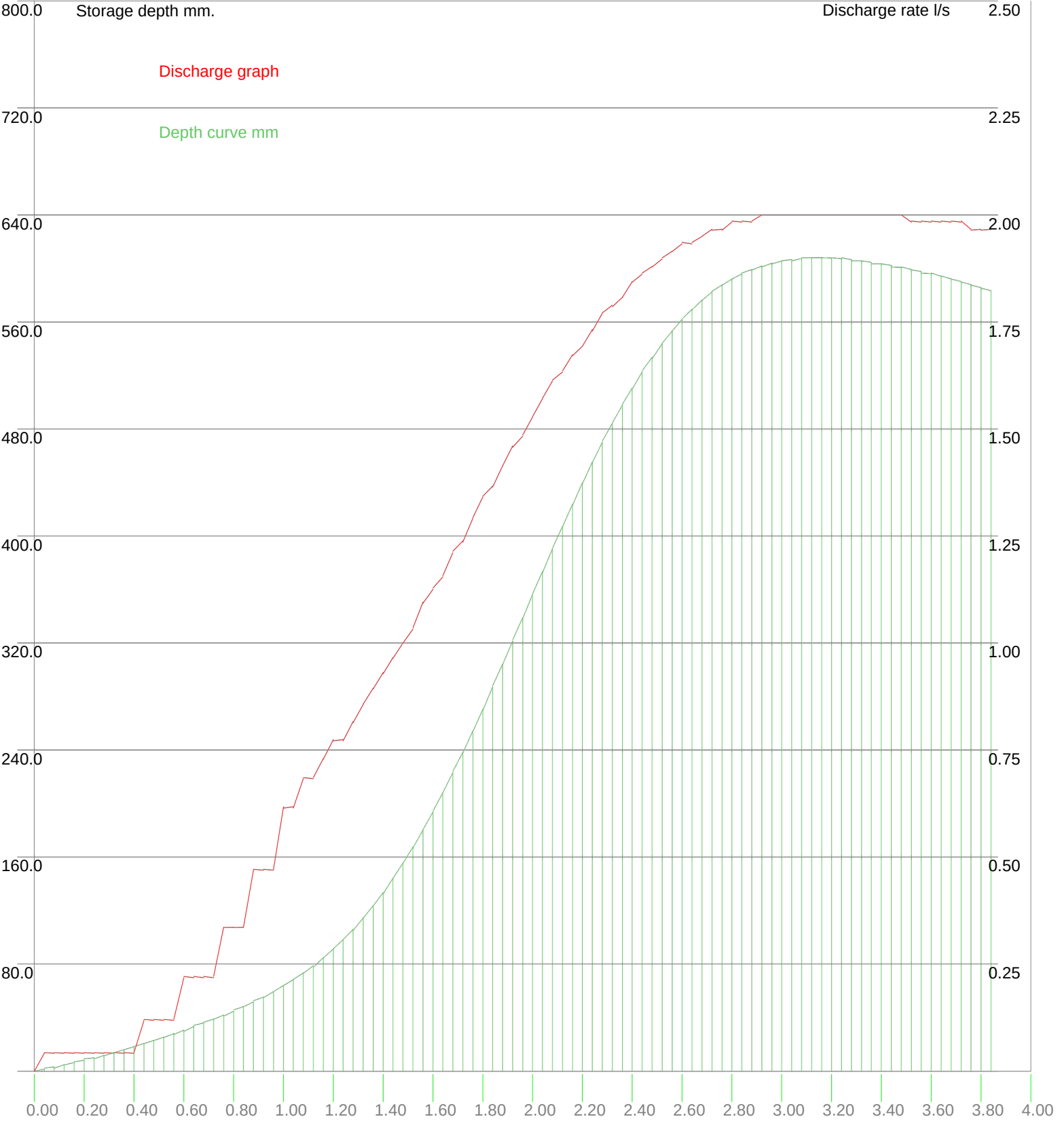
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Job No.	891		
Sheet no.	2		
Date	14/05/26		
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Project	New Barn Farm Attenuation 1		
Title	Hydrograph storage analysis (Winter profile) for Rusper		

Storage curves for a 4 hours storm.





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				Date 14/05/26		
Project	New Barn Farm Attenuation 1			By XL	Checked	Reviewed
Title	Hydrograph storage analysis (Winter profile) for Rusper					

Incremental rainfall figures.

Storm Mins	Storage Depth mm	Control Flow l/s	Storm Mins	Storage Depth mm	Control Flow l/s
2.4 4.8	1.6 3.2 4.8	0.04 0.04	122.4	373.3	1.57
7.2 9.6	6.4 8.1 9.9	0.04 0.04	124.8	390.4	1.61
12.0	11.8 13.8	0.04 0.04	127.2	407.2	1.63
14.4	16.0 18.2	0.04 0.04	129.6	423.7	1.67
16.8	20.7 23.1	0.04 0.04	132.0	439.7	1.69
19.2	25.5 28.0	0.12 0.12	134.4	455.2	1.73
21.6	30.7 33.4	0.12 0.12	136.8	470.0	1.77
24.0	36.1 38.9	0.22 0.22	139.2	484.2	1.79
26.4	41.9 44.8	0.22 0.22	141.6	497.8	1.81
28.8	48.1 51.8	0.34 0.34	144.0	510.6	1.84
31.2	55.4 59.5	0.34 0.47	146.4	522.6	1.86
33.6	63.9 68.4	0.47 0.47	148.8	533.6	1.88
36.0	73.4 78.8	0.62 0.62	151.2	543.8	1.90
38.4	84.8 91.3	0.68 0.68	153.6	553.2	1.91
40.8	98.2 105.9	0.73 0.77	156.0	561.7	1.93
43.2	114.4	0.77 0.82	158.4	569.4	1.93
45.6	123.6	0.86 0.89	160.8	576.3	1.95
48.0	133.4	0.93 0.97	163.2	582.4	1.97
50.4	144.1	1.00 1.03	165.6	587.6	1.97
52.8	155.4	1.10 1.13	168.0	592.0	1.98
55.2	167.5	1.15 1.21	170.4	595.9	1.98
57.6	180.2	1.24 1.29	172.8	599.1	1.98
60.0	193.8	1.34 1.37	175.2	601.8	2.00
62.4	208.1	1.41 1.46	177.6	603.9	2.00
64.8	223.0	1.48 1.53	180.0	605.5	2.00
67.2	238.3		182.4	606.6	2.00
69.6	254.2		184.8	607.5	2.00
72.0	270.5		187.2	607.9	2.00
74.4	287.2		189.6	608.1	2.00
76.8	304.3		192.0	607.8	2.00
79.2	321.5		194.4	607.3	2.00
81.6	338.8		196.8	606.5	2.00
84.0	356.1		199.2	605.6	2.00
86.4			201.6	604.6	2.00
88.8			204.0	603.4	2.00
91.2			206.4	602.2	2.00
93.6			208.8	600.7	2.00
96.0			211.2	599.2	1.98
98.4			213.6	597.7	1.98
100.8			216.0	596.0	1.98
103.2			218.4	594.2	1.98
105.6			220.8	592.2	1.98
108.0			223.2	590.2	1.98
110.4			225.6	588.0	1.97
112.8			228.0	585.7	1.97
115.2			230.4	583.3	1.97
117.6			232.8	580.9	1.97
120.0			235.2	578.5	1.95
			237.6	576.0	1.95
			240.0	573.5	1.95

Using the Get Max button causes the program to step through a series of storm durations until a maximum volume is obtained.
Each duration is sampled 600 times and the results recorded. The storm durations (hrs) are:-

0.25, 0.5, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 18, 20, 24, 30, 36, 42, 48, 54, 60, 66, 72, 84, 96, 120, 150, 175, 200, 250, 300, 375, 500, 750, 1000, 1250, 1500, 1570, 2000, 2500, 3000, 3500, 4000

It should be noted that the six hour storm frequently requested rarely demonstrates the worst case for storage.



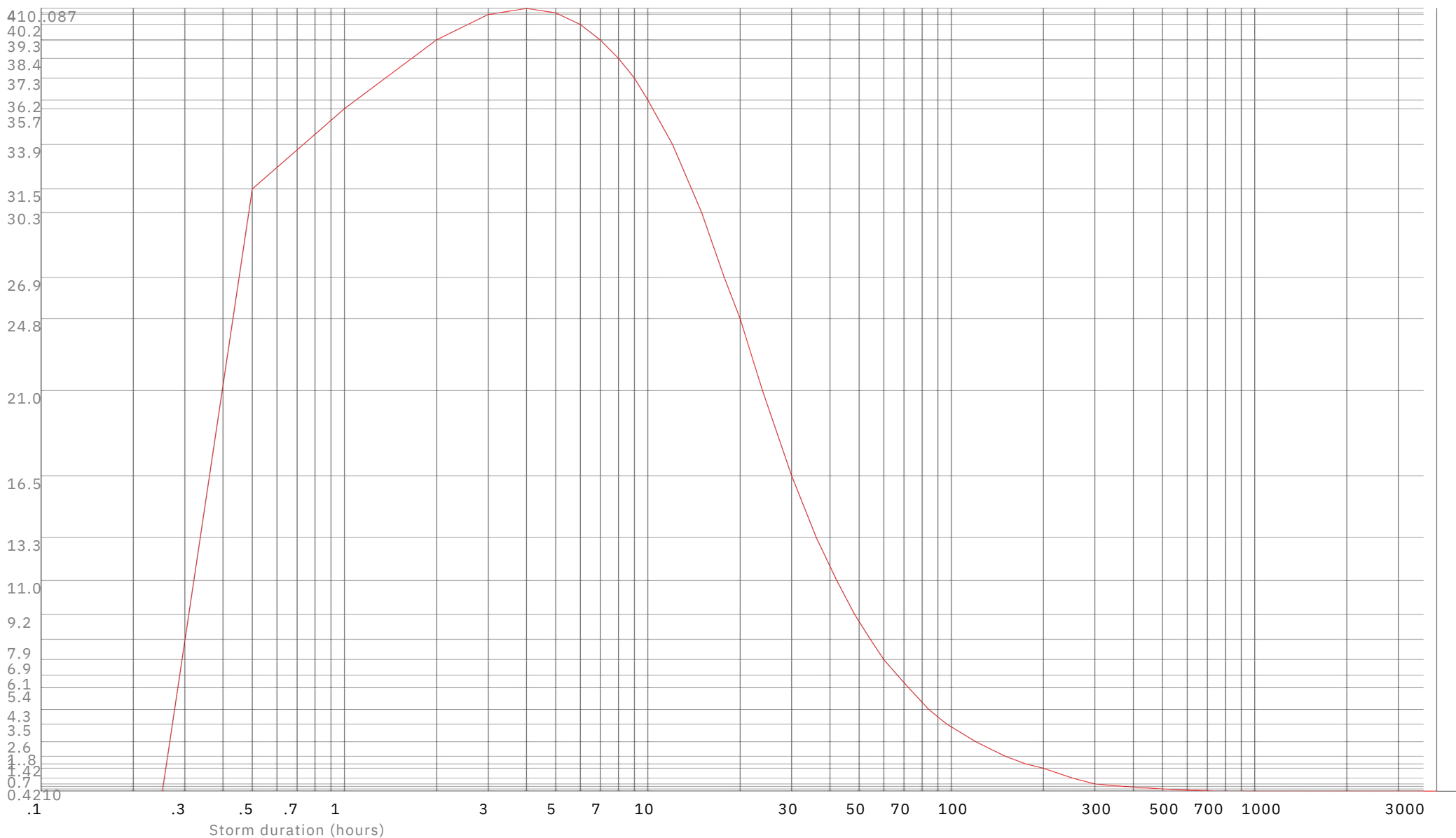
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Job No.	891		
Sheet no.	4		
Date	14/05/26		
By	XL	Checked	Reviewed

Project	New Barn Farm Attenuation 1		
Title	Hydrograph storage analysis (Winter profile) for Rusper		

Sequential storage volume at specific storm durations.

m³





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Job No.	891		
Sheet no.	1		
Date	14/05/26		
By	XL	Checked	Reviewed

Project	New Barn Farm Attenuation 2		
Title	Hydrograph storage analysis (Winter profile) for Rusper		

Data:-

FEH Hydrology:-

Location = Rusper

Grid reference = TQ2037

c = -0.0260

d1 = 0.3470

d2 = 0.3420

d3 = 0.3650

e = 0.3190

f = 2.4660

Return period = 100

Climate change = 45%

Percentage runoff = 95.0% (manual setting)

Imperv. area = 1392 m² =

Pervious area = 0 m²

Total area = 1392 m²

Equiv area = 1322 m² (Tot. area x % runoff).

Total runoff = 172.3 m³

Discharge rate = 2.000 l/s

Design Head = 0.7m

Peak flow = 2.00 l/s

Control device = R3

Orifice diam = 43.2 mm

Max. calc. depth = 0.71 m

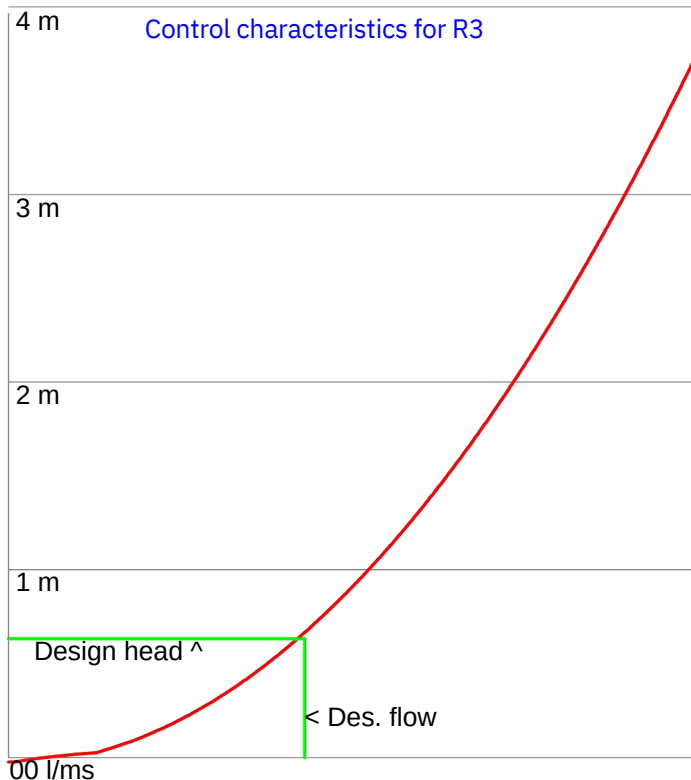
Available depth = 0.0 m³

Mean discharge = 1.03 l/s

Available system storage = 0.00 m³ under a system plane at the design head level.

Offline storage = 0.0 m³

Total storage = 128.0 m³ Peak input flow = 9.97 l/s



Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
0.01	0.04	2.01	3.39
0.05	0.45	2.05	3.42
0.10	0.76	2.10	3.46
0.15	0.93	2.15	3.51
0.20	1.07	2.20	3.55
0.25	1.20	2.25	3.59
0.30	1.31	2.30	3.63
0.35	1.41	2.35	3.66
0.40	1.51	2.40	3.70
0.45	1.60	2.45	3.74
0.50	1.69	2.50	3.78
0.55	1.77	2.55	3.82
0.60	1.85	2.60	3.85
0.65	1.93	2.65	3.89
0.70	2.00	2.70	3.93
0.75	2.07	2.75	3.96
0.80	2.14	2.80	4.00
0.85	2.20	2.85	4.04
0.90	2.27	2.90	4.07
0.95	2.33	2.95	4.11
1.00	2.39	3.00	4.14
1.05	2.45	3.05	4.17
1.10	2.51	3.10	4.21
1.15	2.56	3.15	4.24
1.20	2.62	3.20	4.28
1.25	2.67	3.25	4.31
1.30	2.73	3.30	4.34
1.35	2.78	3.35	4.38
1.40	2.83	3.40	4.41
1.45	2.88	3.45	4.44
1.50	2.93	3.50	4.47
1.55	2.98	3.55	4.50
1.60	3.02	3.60	4.54
1.65	3.07	3.65	4.57
1.70	3.12	3.70	4.60
1.75	3.16	3.75	4.63
1.80	3.21	3.80	4.66
1.85	3.25	3.85	4.69
1.90	3.30	3.90	4.72
1.95	3.34	3.95	4.75
2.00	3.38	4.00	4.78



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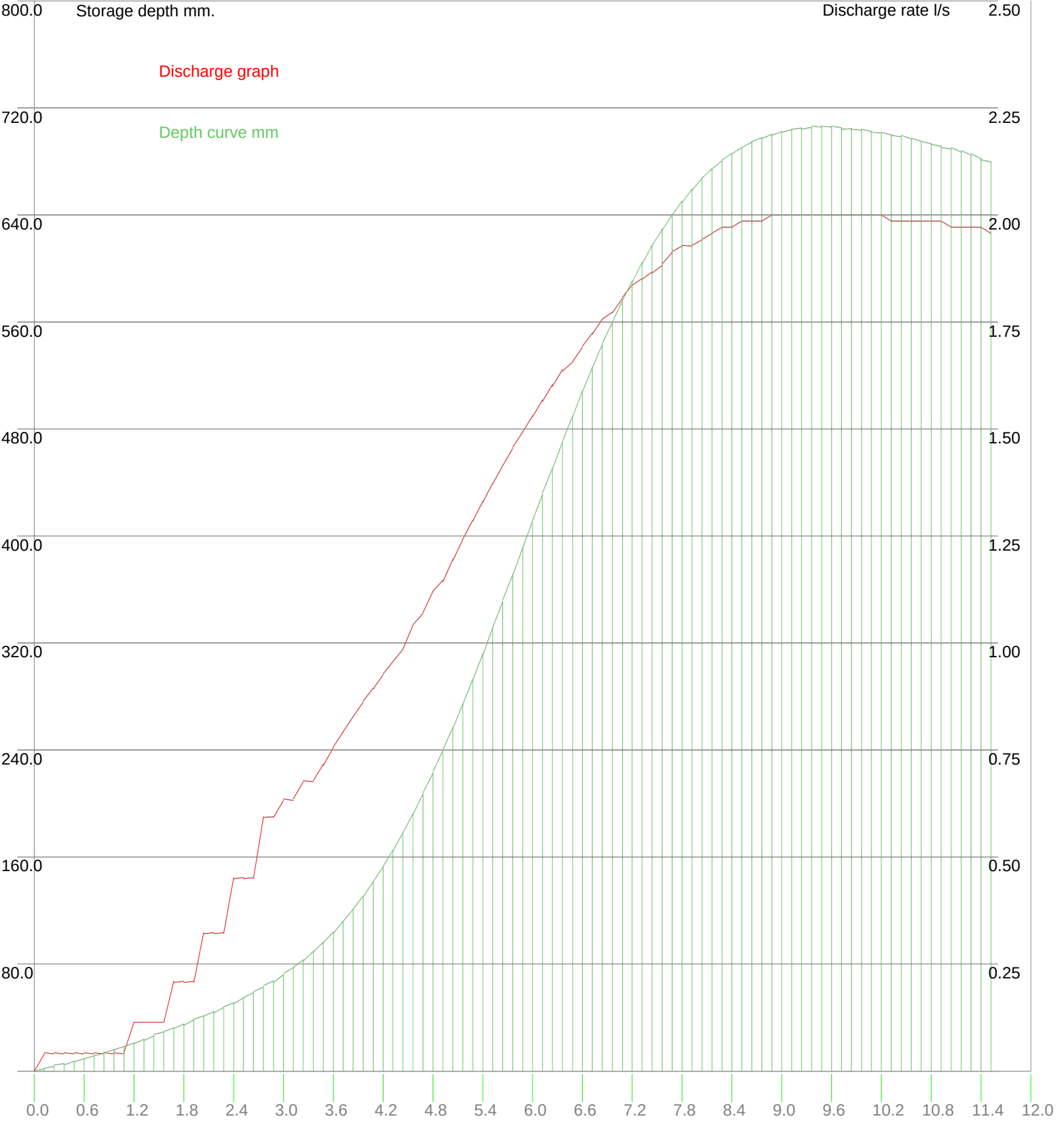
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Job No.	891		
Sheet no.	2		
Date	14/05/26		
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Title			

Project New Barn Farm Attenuation 2
Title Hydrograph storage analysis (Winter profile) for Rusper

Storage curves for a 12 hours storm.





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				Sheet no. 3		
				Date 14/05/26		
Project	New Barn Farm Attenuation 2			By XL	Checked	Reviewed
Title	Hydrograph storage analysis (Winter profile) for Rusper					

Incremental rainfall figures.

Storm	Storage	Control	Storm	Storage	Control
Mins	Depth mm	Flow l/s	Mins	Depth mm	Flow l/s
7.2 14.4	1.9 3.7 5.6	0.04 0.04	367.2	431.0	1.57
21.6	7.4 9.4	0.04 0.04	374.4	450.8	1.60
28.8	11.5 13.7	0.04 0.04	381.6	470.4	1.64
36.0	16.0 18.5	0.04 0.04	388.8	489.5	1.66
43.2	21.1 23.8	0.04 0.11	396.0	508.1	1.69
50.4	26.5 29.3	0.11 0.11	403.2	526.1	1.72
57.6	32.3 35.2	0.11 0.21	410.4	543.3	1.76
64.8	38.3 41.4	0.21 0.21	417.6	559.8	1.77
72.0	44.4 47.6	0.32 0.32	424.8	575.6	1.80
79.2	51.1 54.7	0.32 0.45	432.0	590.5	1.84
86.4	58.6 62.9	0.45 0.45	439.2	604.5	1.85
93.6	67.3 72.2	0.59 0.59	446.4	617.4	1.87
100.8	77.4 83.1	0.63 0.63	453.6	629.3	1.88
108.0	89.4 96.4	0.68 0.68	460.8	640.3	1.91
115.2	104.0	0.72 0.76	468.0	650.3	1.93
122.4	112.1	0.79 0.83	475.2	659.2	1.93
129.6	120.9	0.86 0.89	482.4	667.4	1.94
136.8	130.8	0.93 0.96	489.6	674.6	1.96
144.0	141.5	0.99 1.04	496.8	680.7	1.97
151.2	152.8	1.07 1.12	504.0	685.9	1.97
158.4	165.1	1.15 1.20	511.2	690.5	1.99
165.6	178.3	1.24 1.29	518.4	694.4	1.99
172.8	192.3	1.33 1.37	525.6	697.6	1.99
180.0	207.1	1.41 1.45	532.8	700.2	2.00
187.2	222.9	1.49 1.53	540.0	702.1	2.00
194.4	239.4		547.2	703.6	2.00
201.6	256.7		554.4	704.8	2.00
208.8	274.5		561.6	705.4	2.00
216.0	292.9		568.8	705.7	2.00
223.2	311.8		576.0	705.6	2.00
230.4	331.2		583.2	705.1	2.00
237.6	351.0		590.4	704.3	2.00
244.8	371.0		597.6	703.4	2.00
252.0	391.0		604.8	702.3	2.00
259.2	411.1		612.0	701.2	2.00
266.4			619.2	699.8	1.99
273.6			626.4	698.4	1.99
280.8			633.6	696.8	1.99
288.0			640.8	695.1	1.99
295.2			648.0	693.3	1.99
302.4			655.2	691.4	1.99
309.6			662.4	689.2	1.97
316.8			669.6	687.0	1.97
324.0			676.8	684.6	1.97
331.2			684.0	682.1	1.97
338.4			691.2	679.6	1.96
345.6			698.4	676.9	1.96
352.8			705.6	674.3	1.96
360.0			712.8	671.5	1.96
			720.0	668.8	1.94

Using the Get Max button causes the program to step through a series of storm durations until a maximum volume is obtained.

Each duration is sampled 600 times and the results recorded. The storm durations (hrs) are:-

0.25, 0.5, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 18, 20, 24, 30, 36, 42, 48, 54, 60, 66, 72, 84, 96, 120, 150, 175, 200, 250, 300, 375, 500, 750, 1000, 1250, 1500, 1570, 2000, 2500, 3000, 3500, 4000

It should be noted that the six hour storm frequently requested rarely demonstrates the worst case for storage.



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SW

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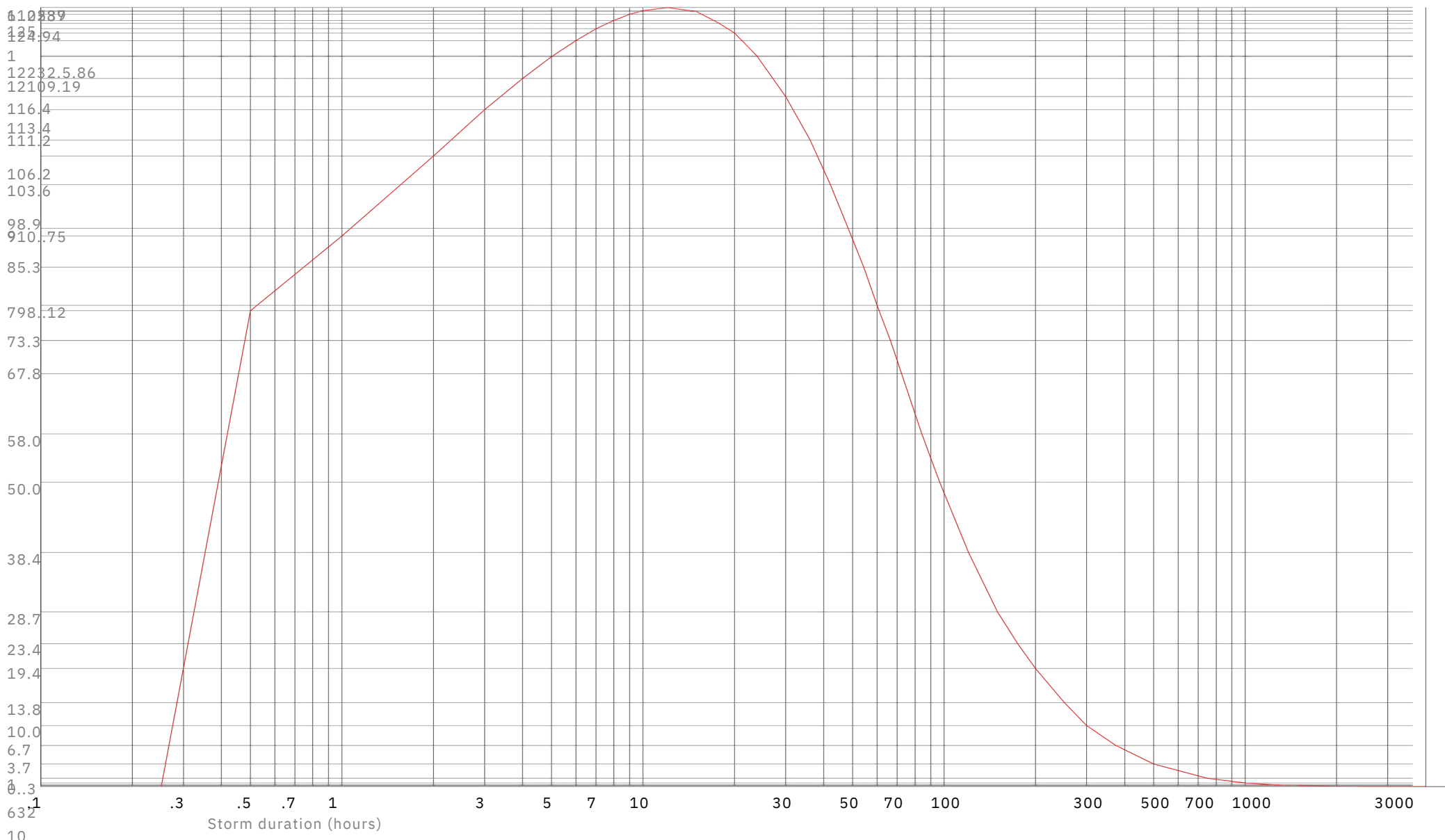
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Job No.	891		
Sheet no.	4		
Date	14/05/26		
By	XL	Checked	Reviewed

Project	New Barn Farm Attenuation 2		
Title	Hydrograph storage analysis (Winter profile) for Rusper		

Sequential storage volume at specific storm durations.

m³





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Foul 11.5

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Job No. 891		
Sheet no.	0	
Date	14/05/26	
By XL	Checked	Reviewed

Project New Barn Farm <http://www.easitd.co.uk>

Title Manhole printout for NEW BARN FARM.FL

Manhole Form ref.	Chamdiam. or length	Rect. width	Chamb. height	Shaft height	MH Volume	Ent. Diam	Ent. Crown	Ent. Invert	Exit Diam	Exit Crown	Exit Invert	Chamb const	Cover Level	Dwnstr MH
FW1 circ	450	N/A	0.50		0.08	Head	----	----	100	102.765	102.640	N/A	103.140	FW2
FW2 circ	450	N/A	0.83		0.13	100	0.000	0.000	100	102.365	102.240	N/A	103.070	FW3
FW3 circ	600	N/A	1.03		0.29	100	0.000	0.000	100	101.965	101.840	N/A	102.870	FW4
FW4 circ	600	N/A	0.63		0.18	100	0.000	0.000	100	101.565	101.440	N/A	102.070	FW5
FW6 circ	450	N/A	0.40		0.06	Head	----	----	100	100.725	100.600	N/A	101.000	FW7
FW7 circ	450	N/A	1.11		0.18	100	0.000	0.000	100	100.325	100.200	N/A	101.310	FW5
FW5 circ	900	N/A	1.81		1.15	100	0.000	0.000	150	99.975	99.800	N/A	101.610	FW11
FW8 circ	450	N/A	0.40		0.06	Head	----	----	100	100.585	100.460	N/A	100.860	FW9
FW9 circ	450	N/A	0.69		0.11	100	0.000	0.000	100	100.185	100.060	N/A	100.750	FW10
FW10 circ	600	N/A	1.03		0.29	100	0.000	0.000	100	99.785	99.660	N/A	100.690	FW11
FW11 circ	1200	N/A	-1.06		-1.20	150	0.000	0.000	100	99.525	99.400	N/A	98.340	ENT PLANT

All manholes to be as per 'Sewers for Adoption'

Levels calculated for level inverts



MasterDrain
Foul 11.5

Environmental Assessment Services Ltd

London Rd, Hickstead
Haywards Heath,
West Sussex, RH17 5LZ
Tel: 01444 882552
email: info@easLtd.co.uk

Job No. 891		
Sheet no. 0		
Date 14/05/26		
By XL	Checked	Reviewed

Project **New Barn Farm** <http://www.easLtd.co.uk>

Title **Manhole printout for NEW BARN FARM.FL**

These explanatory notes should be read in conjunction with the Manhole printout

- 1) Manhole ref - the reference for the manhole in question
- 2) Form - either circular or rectangular
- 3) Chamber diam or length - diameter of chamber if circular, or length if rectangular - in metres
- 4) Rectangular width - if form is rectangular, this gives the width of the chamber
- 5) Chamber height - height of chamber from invert
- 6) Shaft height - height of access shaft if applicable, from top of chamber to ground level
- 7) Manhole volume - cubic capacity of manhole chamber
- 8) Exit diameter - diameter of pipe leaving this manhole
- 9) Exit crown - crown level of pipe leaving this manhole
- 10) Exit invert - invert level of pipe leaving this manhole
- 11) Manhole diameters of 9999 have exceeded the sizes available in SfA
- 12) Manhole diameters may have to be modified due to the number of branches

APPENDIX E: PHOTOGRAPHS

Parking area to the north of the site



Second entrance to the northeast



Stable block in the centre of the site



Site Office (to be replaced – separate application)



Existing caravan



Track to the east



Existing eastern building to be retained



Sand school to the south



Existing dwelling to the west (to remain)



Existing track to the west



Existing manhole leading from sewage treatment plant



Highams Gill watercourse to the south (flowing west)



APPENDIX F

SOUTHERN WATER SEWER PLANS LETTER



Directorate of Planning
Horsham District Council
Parkside
Chart Way
Horsham
West Sussex
RH12 1RL

Developer Services
Southern Water
Sparrowgrove House
Sparrowgrove
Otterbourne
Hampshire
SO21 2SW

Tel: 0330 303 0119

Email: southernwaterplanning@atkinsglobal.com

Your Ref

DC/17/2835

Our Ref

PLAN-021583

Date

09/02/2018

Dear Sirs,

Proposal: Conversion of commercial equestrian buildings into 10 dwellings together with a corner shop, partial demolition of main equestrian building to create courtyard and replacement of all concrete hardstanding with permeable surfacing and landscaping.

Site: Sports Horses International Ltd, Stud Farm, New Barn Farmhouse, Capel Road, Rusper, Horsham West Sussex RH12 4PZ.
DC/17/2835

Thank you for your letter of 22/01/2018.

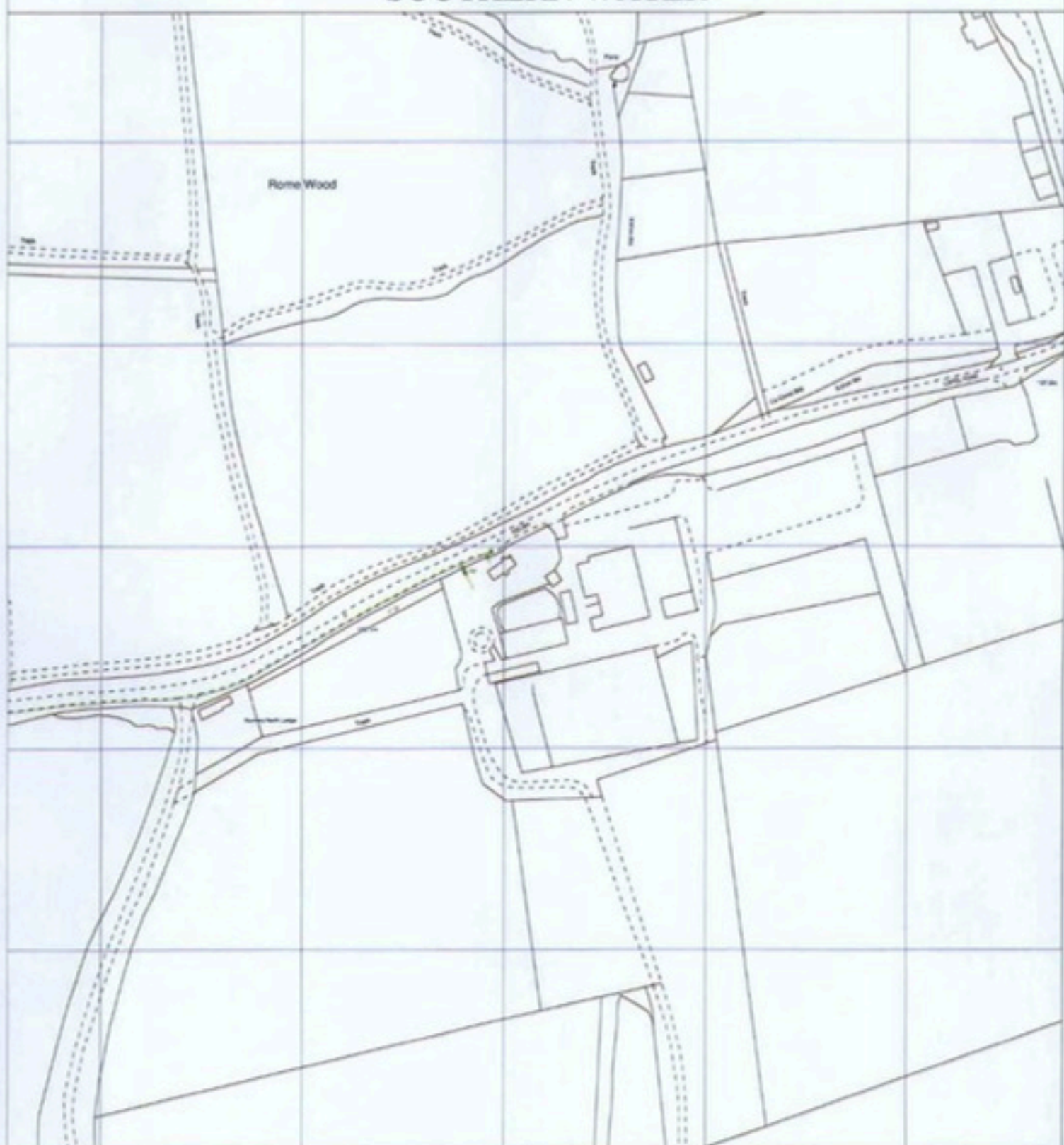
There is no public foul sewer in the vicinity of the site. The applicant is advised to examine alternative means of foul sewage disposal.

The Environment Agency should be consulted directly regarding the use of a private wastewater treatment works or septic tank drainage which disposes of effluent to sub-soil irrigation. The owner of the premises will need to empty and maintain the works or septic tank to ensure its long term effectiveness.

The Council's Building Control officers or technical staff should be asked to comment on the adequacy of soakaways to dispose of surface water from the proposed development.

Due to changes in legislation that came in to force on 1st October 2011 regarding the future ownership of sewers it is possible that a sewer now deemed to be public could be crossing the above property. Therefore, should any sewer be found during construction

SOUTHERN WATER



The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site.

Based upon Ordnance Survey Digital Data with the permission of the controller of B.M.S.O. Crown Copyright Reserved Licence No. WS 298330

O.S. REF: TQ1937NW

Scale: 1:2500

Screen Print

WARNING: BAC pipes are constructed of Bonded Asbestos Cement

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement

 Southern Water



Printed By: banuh

Date: 6-2-2018

Southern Water MapGuide Browser

Requested By:

APPENDIX G

ENVIRONMENT AGENCY PRODUCT 4 INFORMATION

Our reference: EIR2026/10168

Thank you for your request of 27th February 2026 to use Environment Agency Product 4 data for the site at 519225,137531 (easting and northing coordinates).

Response to your request

The Environment Agency's records indicate that the above site is located in Flood Zone 1 (land assessed as having less than 0.1% (1 in 1,000) chance of flooding in any given year from **rivers or the sea**). Therefore, the likelihood of flooding from rivers and sea in this area is estimated as 'very low'.

Proximity to Flood Zones 2 or 3

The above site is approximately 490m away from Flood Zone 3. We are therefore unable to provide data from our detailed fluvial or tidal models which is relevant to your site.

More information on Flood Zones can be found on the GOV.UK website:

<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-1-flood-zones/>

Surface water flooding

Our mapping indicates that this site **is** at risk of surface water flooding.

For information on flooding from all other sources, such as surface water, please contact the Lead Local Flood Authority, which in this case is West Sussex County Council. A link to their information available online is shown below:

<https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/dealing-with-flooding/flood-risk-management/local-flood-risk-management-strategy/>

Please note that the above is a link to an external website which the Environment Agency does not control or maintain. Therefore, the link may not be the most up-to-date at the date of this letter. If the link does not work, and you are unable to find the information about surface water flooding on the relevant website, please contact the authority named above directly.

Where you can find further information

- Detailed long-term flood information and maps can be found on the GOV.UK website:
<https://flood-warning-information.service.gov.uk/long-term-flood-risk/>
- Flood maps for planning can be found on the GOV.UK website:
<https://flood-map-for-planning.service.gov.uk/>
- Please be aware that in February 2016 the Environment Agency updated its guidance on climate change allowances. The standard allowance of adding 20% to peak flows – as per previous guidance in the National Planning Policy Framework, may not be applicable for the purposes of informing development proposals. It is possible that our current modelling has under estimated flood risk when taking climate change into consideration. This does not however have an effect on Flood Zones 2 or 3. For further information please visit:
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>
- Further details about the Environment Agency information supplied can be found on the GOV.UK website:
<https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>
- If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency information for Flood Risk Assessments:
<https://www.gov.uk/planning-applications-assessing-flood-risk>
<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

If you have any queries or would like to discuss the content of this letter further please call us on 03708 506 506, or reply to the email sent to you with this letter attached.

Please get in touch if you have any further queries or contact us within two (2) months if you would like us to review the information we have sent.

For information on what you can expect from us and our full service commitment to you, please click on this link:

<https://www.gov.uk/government/publications/environment-agency-customer-service-commitment--2/environment-agency-customer-service-commitment>



eas ltd

Environmental Assessment Services Ltd

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