

Surface Water Drainage and SuDS Strategy Report

EX2020912

Southview, Top Road

Sharpthorne

RH19 4HU



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Revisions and Additional Material

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Preamble

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1.0 Introduction

- 1.0.1 JMS Engineers have been appointed to prepare a surface water drainage strategy and SuDS report to support the planning application for the development at Southview, Top Road, Sharpthorne, RH19 4HU.
- 1.0.2 This report will review and aim to meet the requirements set out by Mid Sussex District Council in terms of surface water drainage.
- 1.0.3 The report will include a surface water drainage strategy and will consider the use of SuDS wherever possible.

2.0 Location & Existing Conditions

- 2.0.1 The site is specifically located at South View, Top Road, Sharpthorne, East Grinstead RH19 4HU with a wider boundary, shown in blue on the Location Plan, comprises an existing residential dwelling including the access road from the Top Road and associated Landscape around the site.
- 2.0.2 The proposed development area, shown in red on the Location Plan, situated within the wider site boundary. The proposed site boundary has a total area of approximately 0.125ha and is currently a greenfield site. Access to the site is gained from Top Road via the existing access to the residential dwelling

Existing Topography and Site Location plan can be seen in [Appendix A](#).

- 2.0.3 Information taken from the British Geological Survey (BGS) information shows the site is free from any superficial deposits. Bedrock geology is classified as Wadhurst Clay Formation - Mudstone as shown in [Figure 1 & Figure 2](#) below.

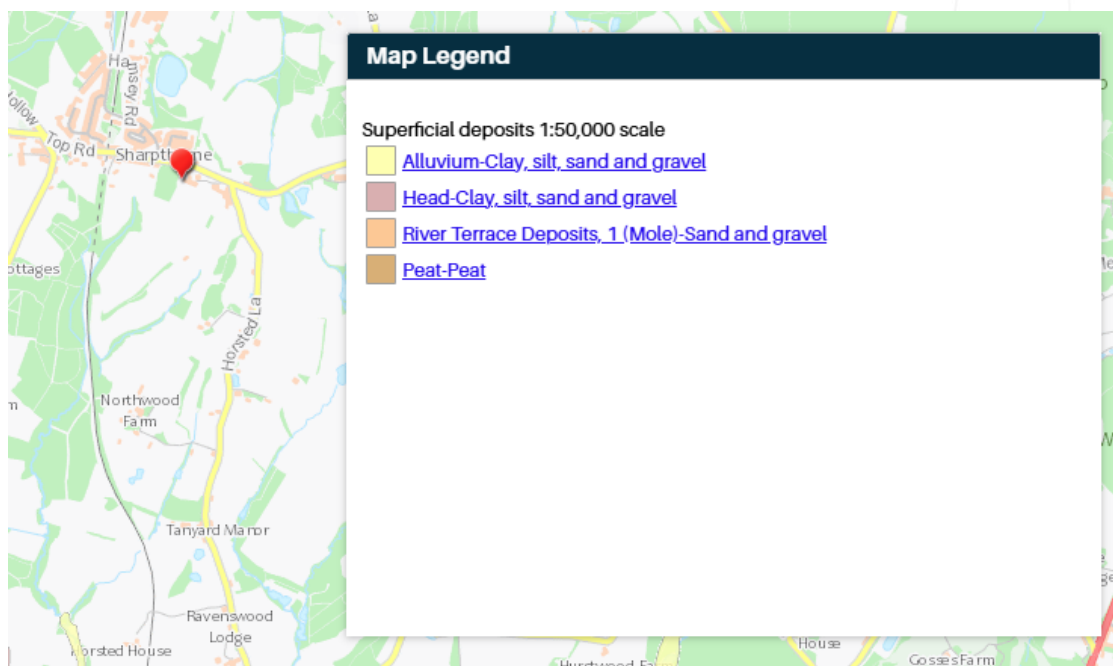


Figure 1: Superficial Geology Plan

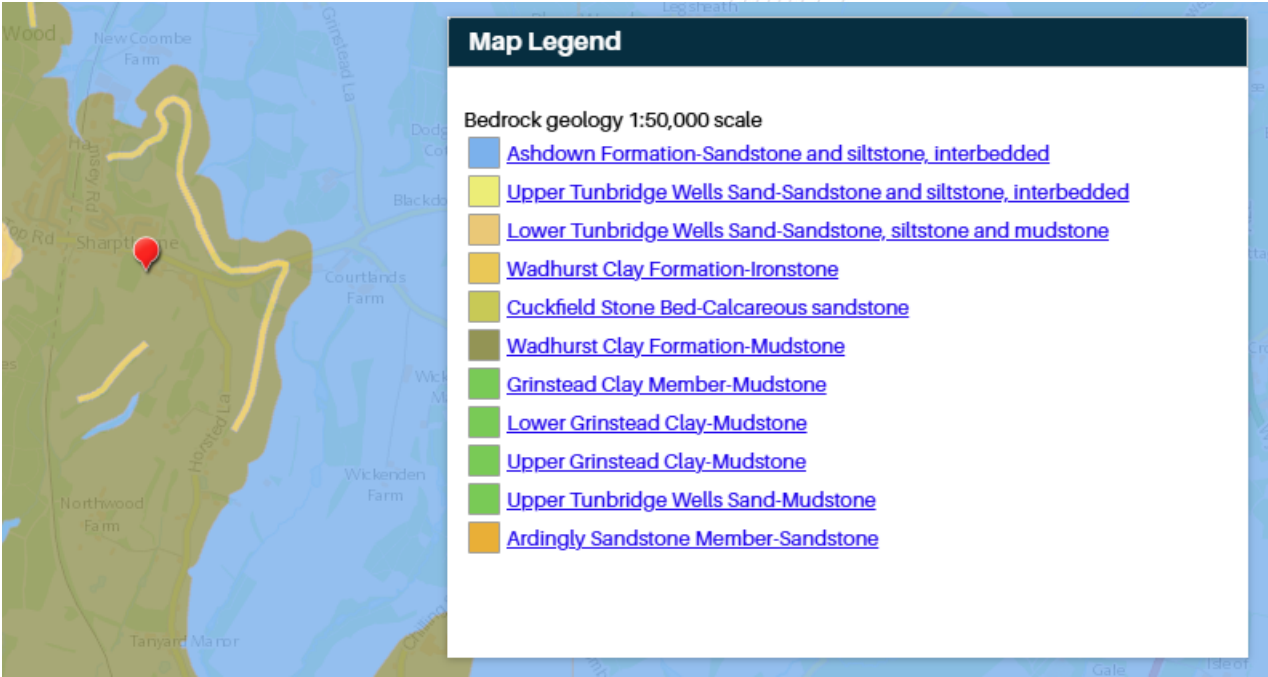


Figure 2: Bedrock Geology Plan

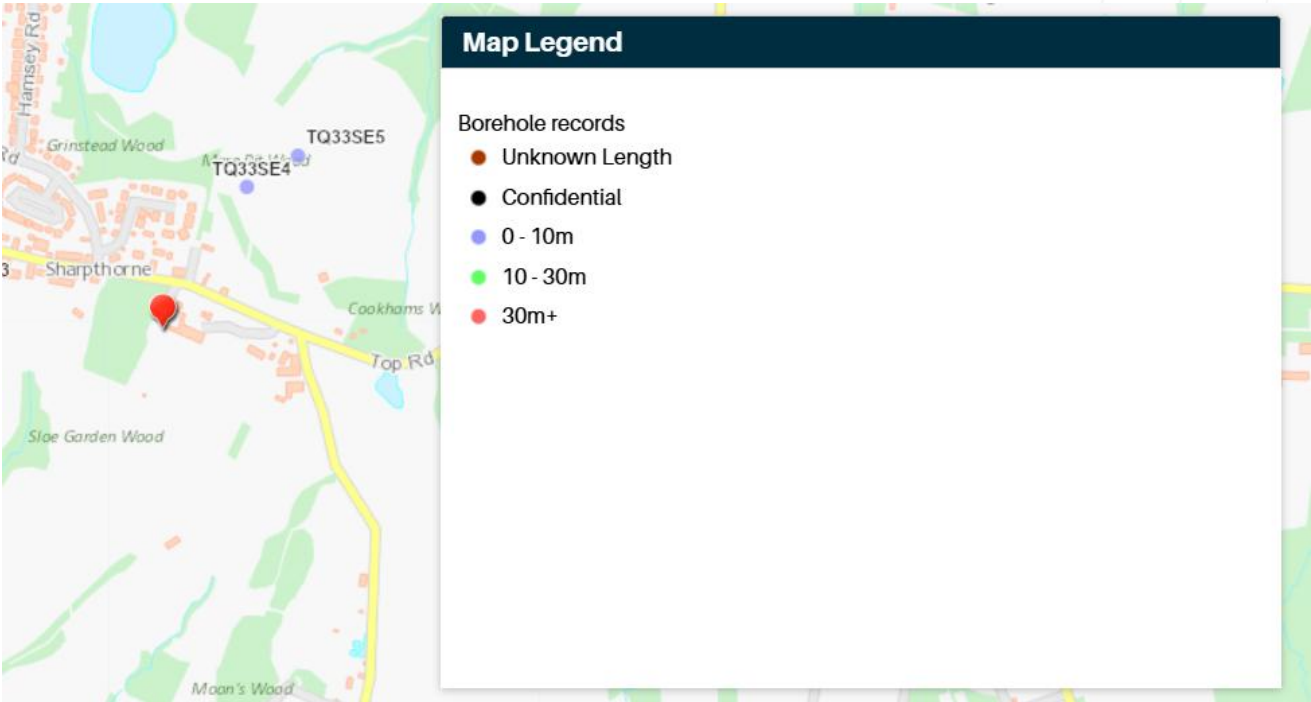


Figure 3: Local Borehole Location Plan



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2.1 Site Proposals

- 2.1.1 The proposed development comprises the construction of a new five-bedroom detached dwelling, with associated garage and driveway to the front and a garden to the rear. The total impermeable area for the proposed development is approximately 0.018 ha. The proposals at the time of writing can be seen in [Appendix B](#).

2.2 Existing Sewer Assets

- 2.2.1 Sewer records from Southern Water shows the presence of an existing 150mm foul water sewer running east to west through Top Road. This can be seen on [Appendix C](#).

2.3 Existing Drainage Regime

- 2.3.1 The site's topographical survey shows a gradual fall in ground levels towards the south, and as such, it is assumed that surface water would naturally drain into the ground by infiltration or run off to the surrounding areas of the site.
- 2.3.2 Given the existing site conditions and drainage regime, a greenfield runoff rate for the proposed development area can be calculated as shown in the table below. The proposed development total impermeable area is taken as 0.018ha based upon the proposed site layout. In order to calculate greenfield runoff rate, ICP SUDS methodology has been adopted. The results are shown below for the varied storm events.

Greenfield Runoff rate calculation outputs can be found in [Appendix D](#)

Table 1: Greenfield runoff rate

	QBAR	1:1 Year Storm Event	1:30 Year Storm Event	1:100 Year Storm Event
Greenfield Runoff (l/s)	0.1	0.1	0.2	0.3

3.0 Flood Risk Assessment

- 3.0.1 The National Planning Policy Framework (NPPF) includes government policy on development and in this case meeting the challenge of climate change and flood risk. The policy states: *“Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk....”*
- 3.0.2 The location of new developments should consider climate change by planning to avoid increasing the vulnerability on development from the impacts of climate change. Where locations are considered vulnerable from the impacts of climate change, these risks should be managed and where possible mitigated to limit the risk.
- 3.0.3 Development in areas at risk of flooding should be made safe without increasing the flood risk elsewhere. Local Plans should be based on evidence, through a Sequential Test, in selecting the appropriate location for new development within the plan period and thus avoiding where possible flood risk to people and property.
- 3.0.4 Development priorities are based on the specific flood risk zones outlined within Table 1 of the technical guidance, as per *Figure 5* below. For Flood Zone 1 – Low Probability, where land having a less than 1 in 1,000 annual probability of river flooding, as defined by the Environment Agency Flood maps.

Flood Zones	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as ‘clear’ on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water must flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Figure 5: Flood Zone Definitions

- 3.0.5 The Environment Agency (EA) website confirms the site location to be within Flood Zones 1.
- 3.0.6 Further guidance in NPPF classifies residential development schemes to be a ‘more vulnerable’ land class use in terms of flood risk.

Flood Risk Vulnerability Classification: More Vulnerable	
Hospitals	
Residential institutions such as residential care homes, children's homes, social services homes, prisons, and hostels	
Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels	
Non-residential uses for health services, nurseries, and educational establishments	
Landfill* an sites used for waste management facilities for hazardous waste	
Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan	

Figure 6: Flood Risk Vulnerability Classifications

3.0.7 NPPG Table 3 (para 67 ID 7-067-20140306) determines the appropriate uses by flood zone, in this case a more vulnerable use is appropriate for a Zone 1 as summarised in PPS25, table D.1.

Flood Zones		Flood Risk Vulnerability Classification			
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a	Exception Test Required	x	Exception Test Requires	✓	✓
Zone 3b	Exception Test Required	x	x	x	✓
✓ Development is appropriate x Development should not be permitted					

Figure 7: Flood Risk Vulnerability and Flood Zone 'Compatibility'

3.0.8 Therefore, given the land use and Flood Zone, it is concluded that it meets the requirements of NPPF.

3.0.9 Consideration for the EA document *Rainfall runoff management for developments* report SC030219 has been made.

3.1 Fluvial Flood Risk

- 3.1.1 Fluvial flooding is a result of the capacity of rivers being exceeded by river flow. In general, rivers have a natural flood plain which can be encroached upon by development in specific circumstances.
- 3.1.2 Tidal flooding is a result of high tides and storm surfaces that raise water levels above the shore or riverbank. These can be sudden and severe.
- 3.1.3 The Environment Agency Flood Map for Planning confirms that the site is located within Flood Zone 1 and is not within Flood Zones 2 or 3. There are no main rivers within the immediate vicinity that would pose a fluvial flood risk to the site. Given the site's location within Flood Zone 1, the probability of flooding from rivers is considered low and, therefore, no specific fluvial flood resilience or mitigation measures are proposed as part of the development.

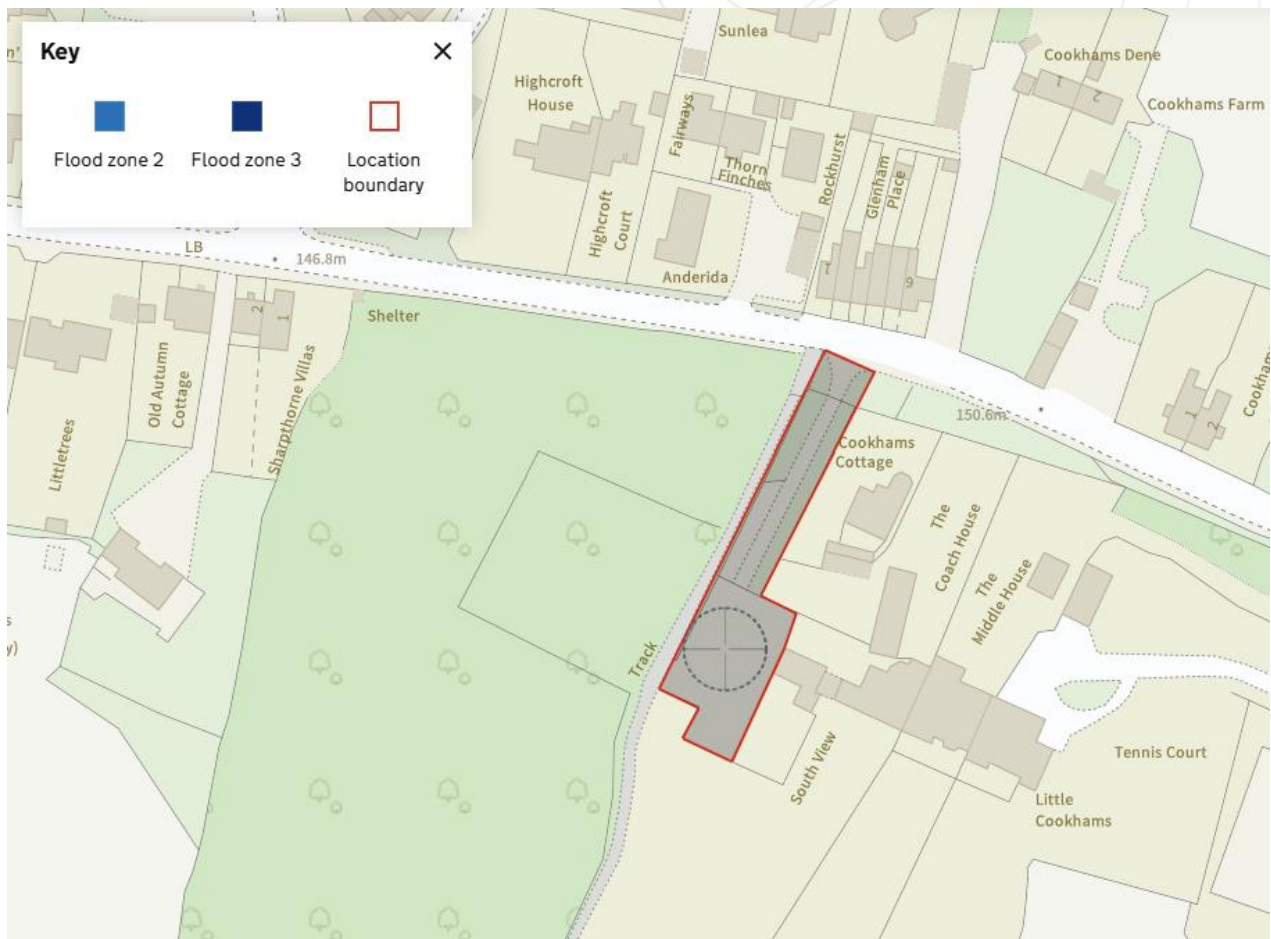


Figure 8: Flood zone map for planning

3.2 Pluvial Flood Risk

3.2.1 Pluvial flooding refers to the flooding event of extreme rainfall which cannot be absorbed within the ground, or when urban drainage systems become overwhelmed. Overland flooding is present at the site as shown in the Figure below.

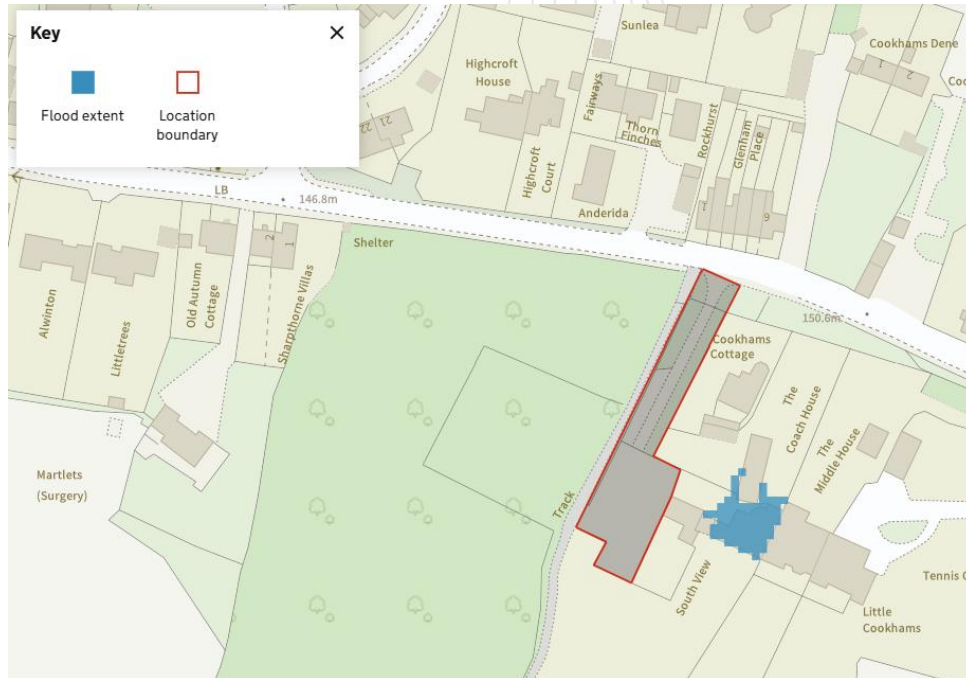


Figure 9: Annual Likelihood of surface water flooding for planning (1 in 100 years)



Figure 10: Annual Likelihood of surface water flooding for planning (1 in 1000 years)

- 3.2.2 The Environment Agency Risk of Flooding from Surface Water mapping indicates that the site is located within Flood Zone 1 and is not at risk of surface water flooding during the 1 in 30 year, 1 in 100 year or 1 in 1000 year rainfall events.
- 3.2.3 The mapping shows no significant surface water flow paths or areas of ponding within the site boundary during these rainfall events.
- 3.2.4 During extreme rainfall events (1 in 1000 AEP), the site remains outside of any mapped surface water flood extent.
- 3.2.5 The proposed development will not increase the risk of flooding on or off site and can therefore be considered acceptable without the need for additional flood resilience or mitigation measures.

3.3 Reservoir Flood Risk

- 3.3.1 There are no bodies of open water within the immediate vicinity of the site, therefore flooding from the reservoir is unlikely in this area.

3.4 Ordinary Watercourses

- 3.4.1 No Main Rivers or ordinary watercourses are located within or adjacent to the site. Furthermore, the site is not at risk of surface water flooding and there are no identified overland flow paths affecting the site. The site is not influenced by any open or culverted streams, ditches, or channels.

3.5 Flood Risk from Sewers

- 3.5.1 Flood risk from sewers has been assessed with reference to the Environment Agency Risk of Flooding from Surface Water mapping and the urban context of the site. Detailed sewer flooding incident records held by Southern Water are not publicly available and have therefore not been reviewed as part of this assessment.
- 3.5.2 The Environment Agency surface water mapping does not indicate a risk of surface water flooding at the site, suggesting a low likelihood of sewer surcharge during extreme rainfall events. In addition, the proposed development will incorporate on-site surface water management measures to ensure there is no increase in flows to the public sewer network. On this basis, the risk of flooding from sewers at the site is considered to be low.

3.6 Flood Risk from Groundwater

- 3.6.1 The site is not located within an area identified as being at risk of groundwater flooding. Available mapping indicates a low likelihood of groundwater emergence, and there are no known records of groundwater flooding affecting the site or its immediate surroundings. A borehole log from the vicinity of the site (refer to Figure 4) does not record any groundwater strikes during the investigation, suggesting that groundwater levels are unlikely to present a risk to the site. Therefore, the risk of groundwater flooding is negligible.

4.0 SuDS Considerations

- 4.0.1 Consideration of SuDS is a planning requirement for new developments. SuDS are designed to replicate the natural course of drainage as closely as possible with a view to reducing the impact of flooding, removing pollutants at source and combining water management with green space.

Developments should utilise SuDS where possible and ensure that surface water run-off is managed as close to its source as possible in line with the following hierarchy:

1. Into ground (infiltration).
2. To a surface water body.
3. To a surface water sewer.
4. To a combined sewer.

- 4.0.2 Sustainable Drainage Systems should be included in the design in order to manage surface water flood risk. SuDS should be inspired by natural drainage processes and manage water as close to its source as possible whilst offering pollution control and landscape benefits.

- 4.0.3 The diagram below highlights the four pillars of SuDS that should be considered within the drainage strategy



Figure 11: Reference 4 pillars of SuDS Diagram CIRICA C753 p.6

4.1 National and Local Planning Policy

- 4.1.1 For this development, the Mid Sussex District Council is the Local Planning Authority and sets out the requirements in relation to the drainage strategy and SuDS.
- 4.1.2 For this development, the relevant Local Planning Authority is Mid Sussex District Council. The development is therefore guided by policies set out within the Mid Sussex District Plan (Adopted March 2018), which include policies relating to flood risk, sustainable drainage, and water management.
- **Policy DP41 – Flood Risk and Drainage:** Requires development to avoid areas at risk of flooding and to ensure that flood risk is not increased elsewhere. Proposals must incorporate appropriate mitigation measures and demonstrate safe management of surface water.
 - **Policy DP42 – Water Infrastructure and the Water Environment:** Seeks to ensure that development is supported by adequate water infrastructure and promotes the protection and improvement of the water environment.
 - **Sustainable Drainage Systems (SuDS):** The use of SuDS is required in new developments to manage surface water runoff, improve water quality, and provide wider environmental benefits, in line with national guidance.

4.2 SuDS Incorporation

- 4.2.1 The underlying geology and local borehole data indicate the presence of predominantly silty clay, which is generally of low permeability and unsuitable for infiltration. Therefore, following the hierarchy, the proposals are to attenuate the surface water on-site and discharged at a controlled rate to the existing private surface water sewer, which ultimately outfalls into the existing surface water body (pond).
- 4.2.2 Table 7.1 below from the SuDS Manual sets out the various components that may be considered in providing SuDS

Component Type	Description	Collection Mechanism	Design Criteria						Further Information (Chapter Ref)
			Water Quantity (Chapter 3)			Water Quality (Chapter 4)	Amenity (Chapter 5)	Biodiversity (Chapter 6)	
			Peak Runoff Rate	Runoff Volumes					
				Small Events (Interceptions)	Large Events				
Rainwater Harvesting Systems	Systems that collect runoff from the roof of a building or other paved surface for use	P		●	●		●		11
Green roofs	Planted soil layers on the roof of buildings that slow and store runoff	S	○	●		●	●	●	12
Infiltration systems	Systems that collect and store runoff, allowing it to infiltrate into the ground	P	●	●	●	●	●	●	13
Proprietary treatment systems	Subsurface structures design to provide treatment to runoff	P				●			14
Filter strips	Grass strips hat promote sedimentation and filtration as runoff is conveyed over the surface	L		●		●	○	○	15

Filter drains	Shallow stone-filled trenches that provide attenuation, conveyance and treatment of runoff	L	●	○		●	○	○	16
Swales	Shallow landscaped depressions that allow runoff to pond temporarily on the surface, before filtering through vegetation and underlying soils	L	●	●	●	●	●	●	17
Bioretention systems	Trees with soil-filled tree pits, tree planters or structural soils used to collect, store and treat runoff	P	●	●	●	●	●	●	18
Trees	Structural paving through which runoff can soak and subsequently be stored in the sub-base beneath, and/or allowed to infiltrate into the ground below	P	●	●		●	●	●	19
Pervious pavements	Structural paving through which runoff can soak and subsequently be stored in the sub-base beneath, and/or allowed to infiltrate into the ground below	S	●	●	●	●	○	○	20
Attenuation storage tanks	Large, below-ground voided spaces used to temporarily store runoff before infiltration-controlled release or use	P	●						21
Detention basins	Vegetated depressions that store and treat runoff	P	●	●		●	●	●	22
Ponds and wetlands	Permanent pools of water used to facilitate treatment of runoff – runoff can also be stored in an attenuation zone above the pool	P	●			●	●	●	23
P-Point L-Lateral S-Surface ● – likely valuable contribution to delivery of design criterion ○ – some potential contribution to delivery of design criterion, if specifically included in the design									

Figure 12: CIRIA Table 7.1 SuDS Components

4.2.3 In accordance with the requirements of Mid Sussex District Council and national planning policy, all developments will be required to submit a SuDS strategy, taking into account climate change allowances.

4.2.4 The above table gives examples of various SuDS components, which may offer SuDS elements in accordance with the requirements.

4.2.5 The proposed site layout offers the opportunity to apply a range of SuDS measures in accordance with the table above. Proposals are as follows:

- **Cellular Attenuation** – located in the rear garden – Below ground voided spaces used to temporarily store surface water run off generated by extreme storm events and allowing it to discharge with a controlled flow rate to the existing private sewer.

SuDS Benefits – **Water quantity.**

- **Permeable Surfacing**– Permeable surfacing proposed for carparking area – allows surface water to penetrate the surface, filtering runoff and being temporarily stored within the sub-base. Considered a method of source control, permeable surfacing slows runoff as it filters through.

SuDS Benefits – **Water quantity. Water quality.**

- **Rainwater Harvesting Systems (Rainwater butts)** – Proposed at the rear of the dwelling – Used to capture roof runoff for non-portable purposes

SuDS Benefits – **Water quantity, Water quality and Amenity.**

- 4.2.6 By use of the above, the development proposals aim to drain all developed areas via SuDS measures. The proposed SuDS strategy includes Cellular Storage, permeable paving and rainwater harvesting unit. These measures fully satisfy the water quantity pillar and partially meet the water quality pillar.
- 4.2.7 The above table gives examples of various SuDS components, which may offer SuDS elements in accordance with the requirements. Permeable paving at the front offers an opportunity of managing surface water at source. As per table 7.1 (Figure 12), surface water is slowed at source by soaking through the surfacing. Permeable paving offers the added benefit of filtering the runoff as it drains through, hence improving the quality.
- 4.2.8 In accordance with Table 26.2 of CIRIA Report C753, the pollution hazard level can be classified as ‘very low’ and ‘Low’. Using table 26.3 of the same document, the mitigation indices values for permeable surfacing exceed the pollution hazard values taken from the previous table. This ensures that proposals offer enough pollution risk mitigation.

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	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	High	0.8	0.8	0.9

Figure 13: Extract from Table 26.2 CIRIA SuDS Manual Pollution hazard indices for different land use classifications

Mitigation Indices			
Type of SuDS component	TSS	Metals	Hydrocarbons
Filter Strip	0.4	0.4	0.5
Filter drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8

Figure 14: Extract from Table 26.3 CIRIA SuDS Manual 2015 Indicative SuDS mitigation indices for discharges to surface waters

4.2.9 The above proposals ensure that an ‘at source’ SuDS measure is applied, and betterment is provided in terms of surface water runoff velocity and quality. Pollution indices from different land types can be found per as per table 26.15 CIRIA SuDS Manual 2015, below.

Land use surface type (Lust)	Impermeability (IMP _{REF})	Total suspended solids pollution index (PI _{TSS})	Organic pollution index (PI _{Org})	Hydrocarbon pollution index (PI _{PAD})	Metals Pollution index (PI)
Roofs					
• Industrial / Commercial	1.0	0.3	0.3-0.4	0.2	0.4-0.8
• Residential	0.9	0.4-0.5	0.6-0.7	0.1	0.2-0.5
Highways					
1. Motorways	0.8-0.9	0.9	0.7	0.9	0.8
2. Major arterial highways	0.7-0.8	0.8	0.7	0.8	0.8
3. Urban distributor roads	0.6-0.7	0.7-0.8	0.5	0.8	0.7
4. Residential Street	0.4-0.6	0.4	0.6	0.6	0.6
5. Pavements	0.5-0.6	0.4	0.6	0.3	0.3
Car Parks / Hardstanding					
• Industrial/Commercial	0.6-0.8	0.6-0.7	0.6-0.7	0.7	0.4-0.5
• Driveways (Residential)	0.5	0.5	0.6	0.4	0.3
Open Areas					
• Gardens (All types)	0.1	0.3	0.2-0.3	0	0.01
• Parks/Golf Courses	0.2	0.2-0.3	0.2	0	0.02
• Grassed Areas (including verges, all types)	0.1	0.2-0.3	0.2-0.3	0.05	0.05
Note					
1	Pollution index values are based on reported land use type EMC distributions and impact potential thresholds from House et al (1991), Luker and Montague (1994), Butler and Clark (1995), D'Arcy et al (2000), Mitchell (2005) and Moy et al (2003)				

Figure 15: Impermeability and pollution indices for different land use types

4.2.10 In determining the flow rate, reference is made to the Non-statutory Technical Standards for SuDS, March 2015. Paragraph S3 and S5 require the discharge rate and volume from previously developed sites to be as close as reasonably practicable to the greenfield runoff rate for the equivalent rainfall event. The discharge rate and volume of runoff should never exceed the rate of discharge from the development prior to redevelopment for the event.

4.2.11 The calculated greenfield runoff rates were found to be as follows:

- 1 in 1 year storm event – 0.1 l/s
- 1 in 30-year storm event – 0.2 l/s
- 1 in 100-year storm event – 0.3 l/s

For lower discharge rates a flow control with a small diameter outflow is required and consideration must be given to the possibility of the flow control unit becoming blocked. Therefore, the system has been designed to reduce the flow rates as much as possible whilst ensuring the outlet diameter is not compromised.

4.2.12 To comply with requirements, discharge rates should be managed as close as possible to the required standard by adopting a suitable flow control measure. On the basis that a flow control can manage flow rates as low as 1 – 2 l/s without incurring blockages, 1.0l/s has been taken as the allowable flow rate for the most extreme storm event and applied to the site including the allowance of 10% urban creep.

4.2.13 Surface water storage is therefore to be provided by combination of permeable pavement, Rainwater Harvesting Unit and Cellular Storage.

4.2.14 The above proposals ensure that SuDS measures are applied, and betterment is provided in terms of surface water runoff velocity, quality and quantity. The introduction of SuDS features also means that biodiversity and amenity space is provided.

4.3 Climate change

4.3.1 The appended drainage calculation allows for a 1:100-year storm plus 45% climate change, this has been sourced from the [DEFRA Hydrology Data Explorer for Climate Change Allowances](#), as below.

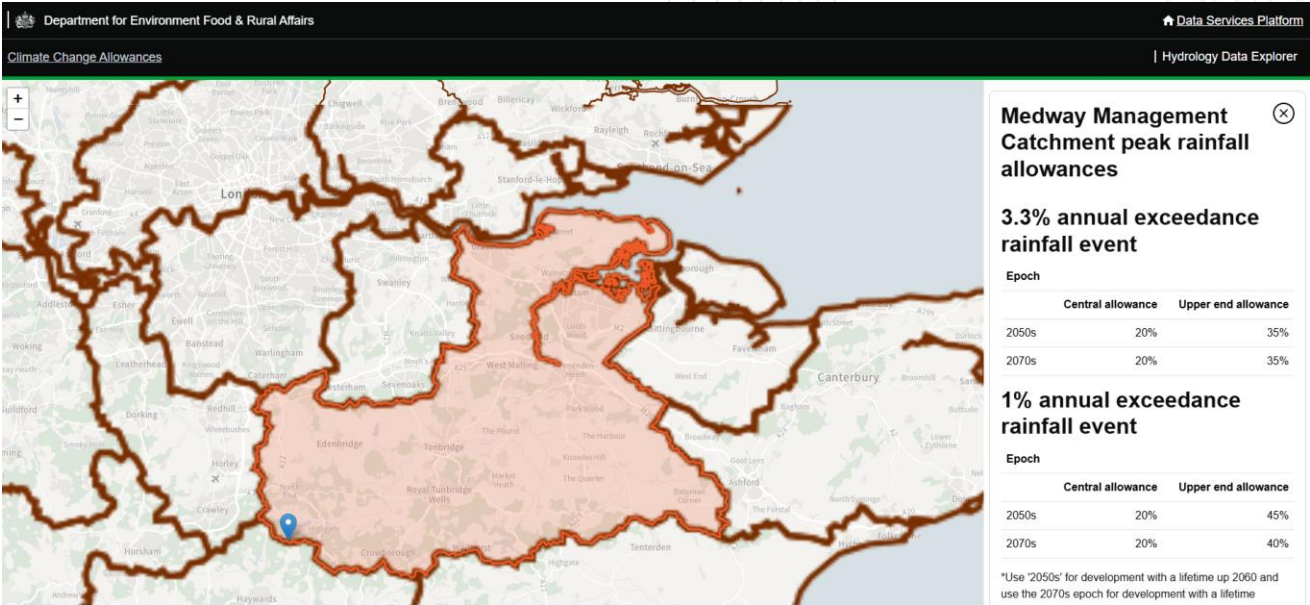


Figure 16: Climate change allowances for peak rainfall in England by catchment area

4.4 Preliminary Surface Water Drainage Maintenance Schedules

- 4.4.1 This section of the report gives guidance on the maintenance of the drainage system and outlines who will be responsible. The proposed development comprises of site clearance, parking, drainage and supporting infrastructure. The SuDS systems will aim to control runoff in terms of velocity and quality.
- 4.4.2 The rainwater from the roofs is collected via rainwater pipes and will be carried to the network. The maintenance of the collection system is the responsibility of the developer, see **Table 2** below

Table 2: System storage operation and maintenance requirements (rainwater pipes and chambers)

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Inspection of silt trap chamber and removal of debris when necessary	Quarterly or as required following monitoring
Remedial actions	Check for blockages in manholes and pipes. Rodding and jetting of pipes to be carried out. CCTV survey can be carried out to inspect condition of pipework.	Quarterly or as required following monitoring
Monitoring	Inspect collection apparatus for debris and litter. Remove where necessary to prevent blockages in the system	Monthly or after periods of heavy rainfall

- 4.4.3 Flow Control unit: The maintenance of the flow control is the responsibility of the developer, see **Table 3** below.

Table 3: System Storage operation and maintenance requirements (flow control)

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Remove litter and debris and grass cuttings from upstream to prevent being washed into the flow control. Inspection of the flow control chamber and the removal of any sediment/debris when required.	Quarterly or as required following monitoring
Remedial Actions	Check flow control is functional	Quarterly or as required following monitoring
Monitoring	Inspect flow control and check flows are not impeded	Monthly or after periods of heavy rainfall

- 4.4.4 Rainwater Harvesting: Surface Water runoff is to be directed to the rainwater harvesting unit for irrigation purposes. Maintenance of the unit will be the responsibility of the developer see **Table 4** below.

Table 4: System Storage operation and maintenance requirements (Rainwater Harvesting)

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Inspection of the tank for debris and sediment build-up, inlets/outlets/withdrawal devices, overflow areas, pumps, filters, Cleaning of tank, inlets, outlets, gutters, withdrawal devices and roof drain filters of silts and debris.	Annually (and following poor performance)
Occasional Maintenance	Cleaning and/or replacement of filters	Three monthly (or as required)
Remedial actions	Repair of overflow erosion damage or tank damage. Pump repairs structural performance.	As required

- 4.4.5 Cellular Storage: The maintenance of the Cellular storage is the responsibility of the developer, see **Table 5** below

Table 5: System Storage operation and maintenance requirements (Cellular Storage)

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Remove litter, debris and grass cuttings from upstream chamber to prevent being washed into the tank. Inspection of the chamber and the removal of any sediment/debris when required.	Quarterly or as required following monitoring
Monitoring	Inspect for evidence of deposits affecting run off	Monthly for 3 no. months after installation, then during regular maintenance visits.

- 4.4.6 Permeable Surfacing: Maintenance of the permeable paving and sub-base will be the responsibility of the developer, see **Table 6** below.

Table 6: System storage operation and maintenance requirements (Permeable paving)

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Sweeping. [NOTE: Any jointing material between the blocks that is lost or displaced as a result of sweeping must be replaced. New jointing material must be the same type as that removed or a suitable replacement]	3 no. times a year: - - At the end of Winter; - Mid-summer; and - After autumn leaf fall. Also as required based on site specific observations
Occasional Maintenance	Stabilise and mow contributing and adjacent areas to prevent excess sediment being washed into the paving	As required
Remedial actions	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users	As required
	Rehabilitation of surface and underlying sand a geo-textile	As required (if local distortion or settlement occurs as a result of wash out of bedding)
Monitoring	Inspect for evidence for weed growth or deposits affecting run off. If required, take remedial action	Monthly for 3 no. months after installation, then during regular maintenance visits

- 4.4.7 The design life of the development is likely to exceed the design life of each of the SuDS components listed above. During the routine inspections of any drainage components, it may become apparent that they have reached the end of their functional lifetime. In the interest of sustainability, repairs should be the first-choice solution where practicable. If this is not the case, then it will be necessary for the property owners to undertake complete replacement of the component in question.

5.0 Surface Water Strategy

The surface water strategy is based on the implementation of SuDS, as outlined above:

A. Store rainwater for later use:

Rainwater harvesting (water butt) is proposed for garden irrigation purposes.

B. Use infiltration techniques, such as porous surfaces:

The ground conditions do not support the use of infiltration techniques. Permeable surface is proposed for the car parking area, where surface water runoff will be collected in the sub-base and directed to the drainage network via perforated pipe that discharges to the existing ditch via a flow control chamber

C. Attenuate rainwater in ponds or open water features for gradual release:

The site layout does not offer the opportunity for open water attenuation features.

D. Permanent storage structure water features for gradual release:

Surface water runoff generated by the proposed development and surfaced areas will be directed through the drainage network towards the flow control chamber where surface water will be restricted, causing it to backup into the attenuation tank and sub-base of the permeable paving where it temporarily stored, discharging into the existing private sewer at an acceptable rate. On that basis, the proposed runoff from the development shall be restricted to 1.0l/s for all storm events up to the 1 in 100-year storm events including climate change and 10% of urban creep allowance. The table below shows the proposed peak site runoff rates.

Table 7: Existing and proposed peak runoff rates

	1:1 year Storm Event	1:2 Year Storm Event	1:30 Year Storm Event	1:100 Year Storm Event	1:100 Year Storm Event (+45% Climate Change)
Greenfield Runoff Rate (l/s)	0.1	-	0.2	0.3	-
Proposed Peak Runoff Rate (l/s)	-	0.4	0.7	1.0	1.0

Calculations and drawings supporting the above are in [Appendices E](#) and [F](#).

E. Direct rainwater to the watercourse/Pond:

The surface water runoff from the development is to discharge into the existing private sewer network, which ultimately outfalls into the existing pond with flows controlled to 1.0 l/s, subject to confirmation of outfall arrangements from pond.

F. Discharge rainwater to a surface water sewer/drain:

Not applicable.

G. Discharge rainwater to combined sewer:

Not applicable.

H. Discharge rainwater to foul sewer:

Not applicable.

5.1 Surface Water Management During Construction

- 5.1.1 Consideration for surface water needs to be taken during the construction process, and how it is managed, including flood risk and pollution control.
- 5.1.2 Generally, there are three options for managing surface water during construction
- Build, use and remediate permanent surface water drainage system
 - Install, use and remove a temporary surface water drainage system
 - Utilise existing drainage system with pollution control measures (brownfield sites only)
- 5.1.3 For this developed site, it is recommended to build, use and remediate the permanent surface water drainage system.
- 5.1.4 Project and Site Managers should sign up for the Met Office weather warning system and take appropriate action. <https://www.metoffice.gov.uk/public/weather/warnings>
- 5.1.5 Consideration for the following legislation and guidance should be made for a construction surface water management plan:

Legislation and Guidance
The Water Environment (England and Wales) Regulation 2009
Land Drainage Act 1991
SEPA Engineering in the Water Environment Good Practice Guide Temporary Construction Methods
Control of Water Pollution from Construction Sites – Guide to Good Practice (SP156)
Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors (C532)
Control of Water Pollution from Linear Construction Projects – Technical Guidance (C648)
Control of Water Pollution from Linear Construction Projects – Site Guide (C649)
Environmental Good Practice – Site Guide (C650)
Site Handbook for the Construction of SUDS (C698)
The SUDS Manual (C753)
BS 8582:2013 Code of Practice for Surface Water Management for Development Sites

Figure 17: Legislation and Guidance for Surface Water Construction Management

5.2 Designing for Exceedance

- 5.2.1 Consideration should be given to external levels to ensure they are set above overland flood risk levels, and low points are created to direct water away from the building footprints during exceedance events.
- 5.2.2 CIRIA document C635 *Designing for exceedance in urban drainage – good practice* states that “at present there are no guidelines on the return period of event (extreme event) that should be used for design exceedance”. However, Section 3.4 also states that “it is suggested that return periods of 1 in 30, to 1 in 100-year events would form a suitable framework for most applications”.
- 5.2.3 In accordance with the above, the system has been modelled using a 1 in 100-year event inclusive of climate change and also considering 10% of Urban creep allowance.

6.0 Conclusions

- 6.0.1 JMS Engineers have been appointed to prepare a drainage strategy and SuDS Report for the development at Southview, Top Road, Sharpthorne, RH19 4HU.
- 6.0.2 The proposed site is a greenfield site.
- 6.0.3 Local geology and borehole data in the vicinity of the site indicate that surface water disposal via infiltration may not be feasible.
- 6.0.4 In accordance with the drainage hierarchy assessment, surface water disposal from the proposed development is to discharge into the existing pond with a restricted flow rate.
- 6.0.5 Rainwater harvesting unit is proposed to provide SuDS measures as required. Further SuDS measures are offered by use of permeable paving and cellular storage.
- 6.0.6 A drainage network with a flow control chamber will limit the discharge rate and ensure significant betterment is provided.
- 6.0.4 The drainage strategy and SuDS measures in this report are in accordance with the requirements of the local and national policies. The report demonstrates that the four pillars of SuDS are met by implementation of the various elements provided.

7.0 Appendices

Appendix A – Site Topography & Location Plan



Sheet Layout

17165-100-A

17165-100-B

17165-100-C

LEGEND

BANKING

Top

Bottom

BUSHES & HEDGES

MT / ST / 0.2 / 6

MT / ST / 0.2 / 6

NOTE: - SPREADS AND HEIGHTS ARE INDICATIVE ONLY

TREES

MT / ST / 0.2 / 6

MT / ST / 0.2 / 6

NOTE: - SPREADS AND HEIGHTS ARE INDICATIVE ONLY

GATES

Single

Double

WALL

Width shown to scale

0.23w

BUILDING

OPEN SIDED BUILDING

GLASS ROOFED

CONTOURS

25.50

ABBREVIATIONS (WHERE APPLICABLE)

ARCH HEAD HEIGHT	AHH	MARKER	MKR
ARCH HEAD LEVEL	AHL	MONITORING WELL	MW
ARCH SPRINGER HEIGHT	ASH	NOTICE BOARD	NB
ARCH SPRINGER LEVEL	ASL	NAME PLATE	NP
AIR VALVE	AV	OVERHEAD WIRES	OHW
BED LEVEL	BL	PARKING METER	PM
BELISHA BEACON	BB	RIDGE LEVEL	RL
BOLLARD	B	ROOF LEVEL	RS
BRITISH TELECOM BOX	BTB	ROAD SIGN	RS
BRITISH TELECOM MANHOLE	BTMH	RODDING EYE	RE
BRICKWORK	BKWK	RETAINING WALL	RTW
BUS STOP	BS	RAIN WATER PIPE	RWP
CABLE TV	CATV	SUICIDE VALVE	SV
COVER LEVEL	CL	STOP COCK	SC
CABLE MARKER	CM	SOFFIT LEVEL	SCF
COLUMN	Col	STRUCTURAL SLAB LEVEL	SSL
CONCRETE POST	CP	TREE STUMP	ST
EAVES LEVEL	EAV	SOIL AND VENT PIPE	SVP
ELECTRICAL COVER	ELEC	THRESHOLD LEVEL	THL
ELECTRICITY CONTROL BOX	ECB	ELECTRICITY POLE	TP
ELECTRICITY POLE	EP	TELEPHONE CALL BOX	TCB
EARTH ROD	ER	TOP OF KERB	TK
FLOWER BED	FB	TURNSTILE	TS
FINISHED FLOOR LEVEL	FFL	TRAFFIC LIGHT	TL
FIRE HYDRANT	FH	TOP OF WALL	TW
FLOOR LEVEL	FL	UNABLE TO LIFT	UTL
FLAG STAFF	FS	UNABLE TO SURVEY	UTS
VENT PIPE	VP	WATER METER	WM
GAS VALVE	GV	WATER LEVEL	WL
GULLY	G	WASH OUT	WO
GATE STOP	GS	WASTE PIPE	WP
INSPECTION COVER	IC	WATER TANK	WT
INVERT LEVEL	IL	WATER VALVE	WV
LAMP POST	LP		

FENCES

BARBED WIRE FENCE	BWF	LARCH LAP FENCE	LLF
CORRUGATED IRON FENCE	CIF	METAL RAILING FENCE	MRF
CLOSE BOARD FENCE	CBF	POST AND CHAIN FENCE	PCF
CHAIN LINK FENCE	CLF	PICKET FENCE	PIF
CHESTNUT PALING FENCE	CPF	POST AND RAIL FENCE	PRF
FENCE POST	FPO	POST AND WIRE FENCE	PWF
INTERWOVEN FENCE	IWF	STEEL PALISADE SECURITY FENCE	SPSF
IRON RAILING FENCE	IRF	TUBULAR STEEL RAIL FENCE	TSRF

REV.	NOTES	DWN	DATE
A	---	---	---

ISO 9001
REGISTERED

A MEMBER OF
THE SURVEY
ASSOCIATION

ISO 14001
REGISTERED

Notes:

Grid and levels relate to OS GPS Active Network.
Sheet is North orientated unless stated.
Ordnance Survey digital data added as background mapping
OS Licence Number ES100017836

Maltby Surveys Ltd

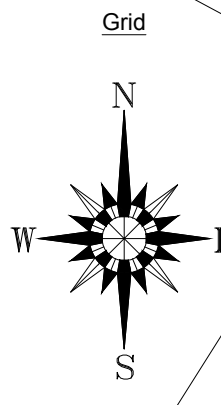
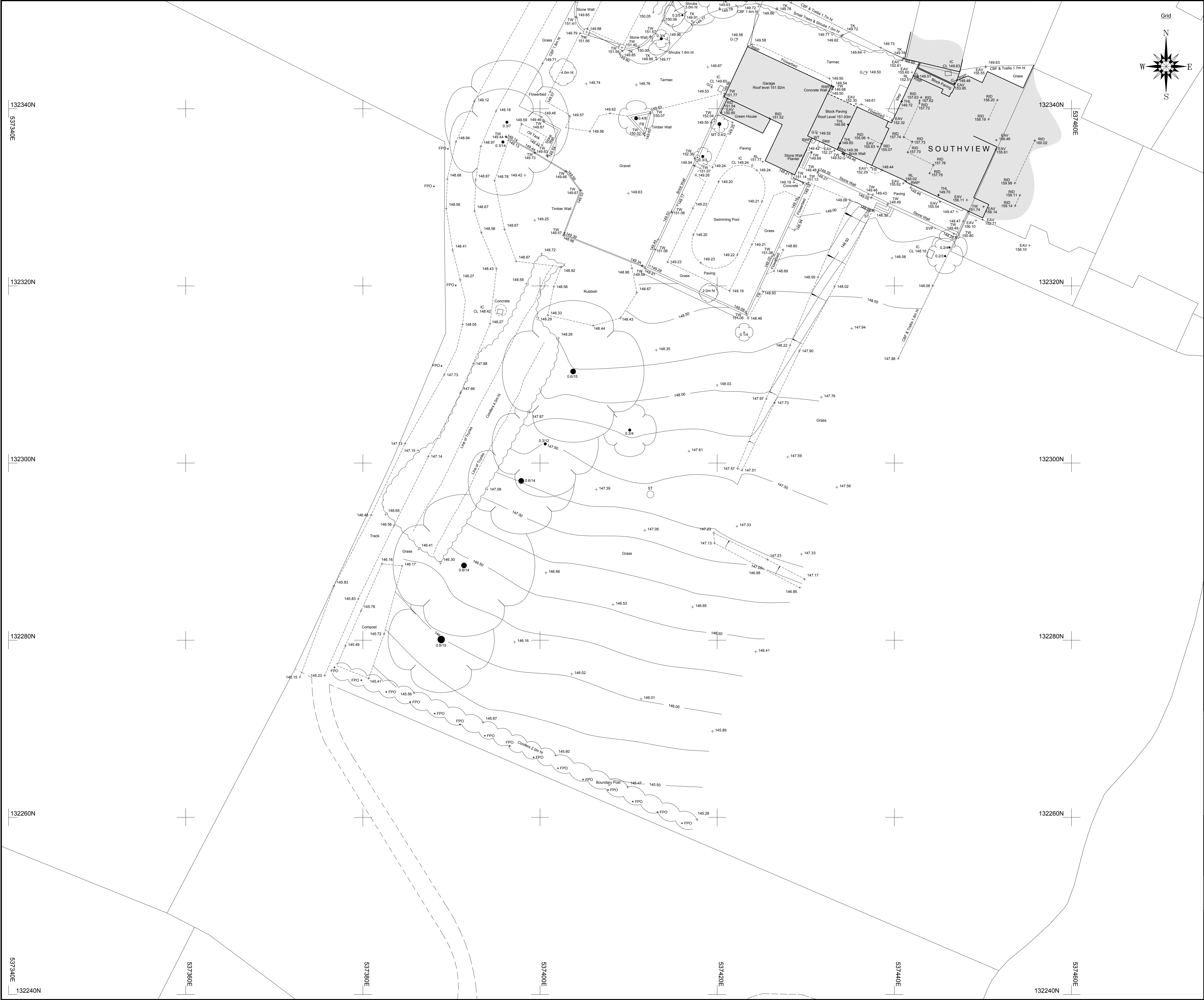
2 QUEENS ROAD
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Tel: 01444 416246
Fax: 01444 417697
E-Mail: mls@maltbysurveys.com
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CHECKED	RM	SCALE
		1/200 (A1 Sheet)

Southview, Top Road, Sharpthorne, RH19 4NS

TOPOGRAPHICAL SURVEY

Job No	Rev	Drawing Number
17/165		17/165/100-A
Date :	June 2017	



Sheet Layout

17165-100-A	17165-100-B
17165-100-C	

LEGEND

BANKING Top Bottom	WALL Width shown to scale 0.23w
BUSHES & HEDGES	BUILDING
TREES MT / ST / 0.2 / 6 MT = Mature Tree ST = Street Tree 0.2 = 0.2m ht 6 = 6m ht	OPEN SIDED BUILDING
GATES Single Double	GLASS ROOFED
	CONTOURS 25.00

ABBREVIATIONS (WHERE APPLICABLE)

ARCH HEAD HEIGHT	AHH	MARKER	MKR
ARCH HEAD LEVEL	AHL	MONITORING WELL	MW
ARCH SPRINGER HEIGHT	ASH	NOTICE BOARD	NB
ARCH SPRINGER LEVEL	ASL	NAME PLATE	NP
AIR VALVE	AV	OVERHEAD WIRES	OHW
BED LEVEL	BL	PARKING METER	PM
BELISHA BEACON	BB	RIDGE LEVEL	RL
BOLLARD	B	ROOF LEVEL	RL
BRITISH TELECOM BOX	BTB	ROAD SIGN	RS
BRITISH TELECOM MANHOLE	BTMH	RODDING EYE	RE
BRICKWORK	BKWK	RETAINING WALL	RTW
BUS STOP	BS	RAIN WATER PIPE	RWP
CABLE TV	CATV	SLUICE VALVE	SV
COVER LEVEL	CL	STOP COCK	SC
CABLE MARKER	CM	SOFFIT LEVEL	SOF
COLUMN	Col	STRUCTURAL SLAB LEVEL	SSL
CONCRETE POST	CP	TREE STUMP	ST
EAVES LEVEL	EAV	SOIL AND VENT PIPE	SVP
ELECTRICAL COVER	ELEC	THRESHOLD LEVEL	THL
ELECTRICITY CONTROL BOX	ECB	TELEGRAPH POLE	TP
ELECTRICITY POLE	EP	TELEPHONE CALL BOX	TCB
EARTH ROD	ER	TOP OF KERB	TK
FLOWER BED	FB	TURNSTILE	TS
FINISHED FLOOR LEVEL	FFL	TRAFFIC LIGHT	TL
FIRE HYDRANT	FH	TOP OF WALL	TW
FLOOR LEVEL	FL	UNABLE TO LIFT	UTL
FLAG STAFF	FS	UNABLE TO SURVEY	UTS
GAS PIPE	GP	VENT PIPE	VP
GAS VALVE	GV	WATER METER	WM
GULLY	G	WATER LEVEL	WL
GATE STOP	GS	WASH OUT	WO
INSPECTION COVER	IC	WASTE PIPE	WP
INVERT LEVEL	IL	WATER TANK	WT
LAMP POST	LP	WATER VALVE	WV

FENCES

BARBED WIRE FENCE	BWF	LARCH LAP FENCE	LLF
CORRUGATED IRON FENCE	CIF	METAL RAILING FENCE	MRF
CLOSE BOARD FENCE	CBF	POST AND CHAIN FENCE	PCF
CHAIN LINK FENCE	CLF	PICKET FENCE	PIF
CHESTNUT PALING FENCE	CPF	POST AND RAIL FENCE	PRF
FENCE POST	FPO	POST AND WIRE FENCE	PWF
INTERWOVEN FENCE	IWF	STEEL PALISADE SECURITY FENCE	SPSF
IRON RAILING FENCE	IRF	TUBULAR STEEL RAIL FENCE	TSRF

REV.	NOTES	DWN	DATE
A	---	---	---

Notes:
Grid and levels relate to OS GPS Active Network.
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OS Licence Number ES 100017836

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DRAWN	NBJ	Belmont Designs
CHECKED	RM	SCALE
		1/200 (A1 Sheet)

Southview, Top Road, Sharpthorne, RH19 4NS

TOPOGRAPHICAL SURVEY		
Job No	Rev	Drawing Number
17/165		17/165/100-C
Date :	June 2017	



Stage 0

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DRAFT ISSUE



P01	First Draft	MM	17.02.26
Rev	Description	Initials	Date

SOUTHVIEW

// Location Plan

Client Name	Peter Pomfrett
Address	South View, Cookhams Top Road, Sharpthorne East Grinstead, West Sussex

Drawn By	MM	Checked By	DAP
Scale	1:1250 @ A4	Date	17/01/26
Scene Ref.	2808F	Rev no.	P01
Dwg no.	STHV-SCN-XX-XX-DR-A-01.002-A0		



1:1250
0m 10m 20m 30m 60m 90m



// SceneArchitects.co.uk // 01245 440 302

Appendix B – Architect Layouts



EXISTING SITE LOCATION PLAN 1:500



PROPOSED SITE LOCATION PLAN 1:500

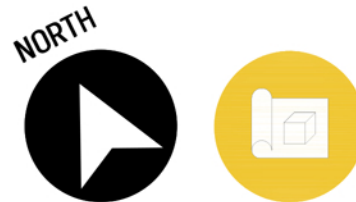
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P00	First Draft	MM	29.12.25
Rev	Description	Initials	Date

SOUTHVIEW

// Existing and Proposed Site Plan

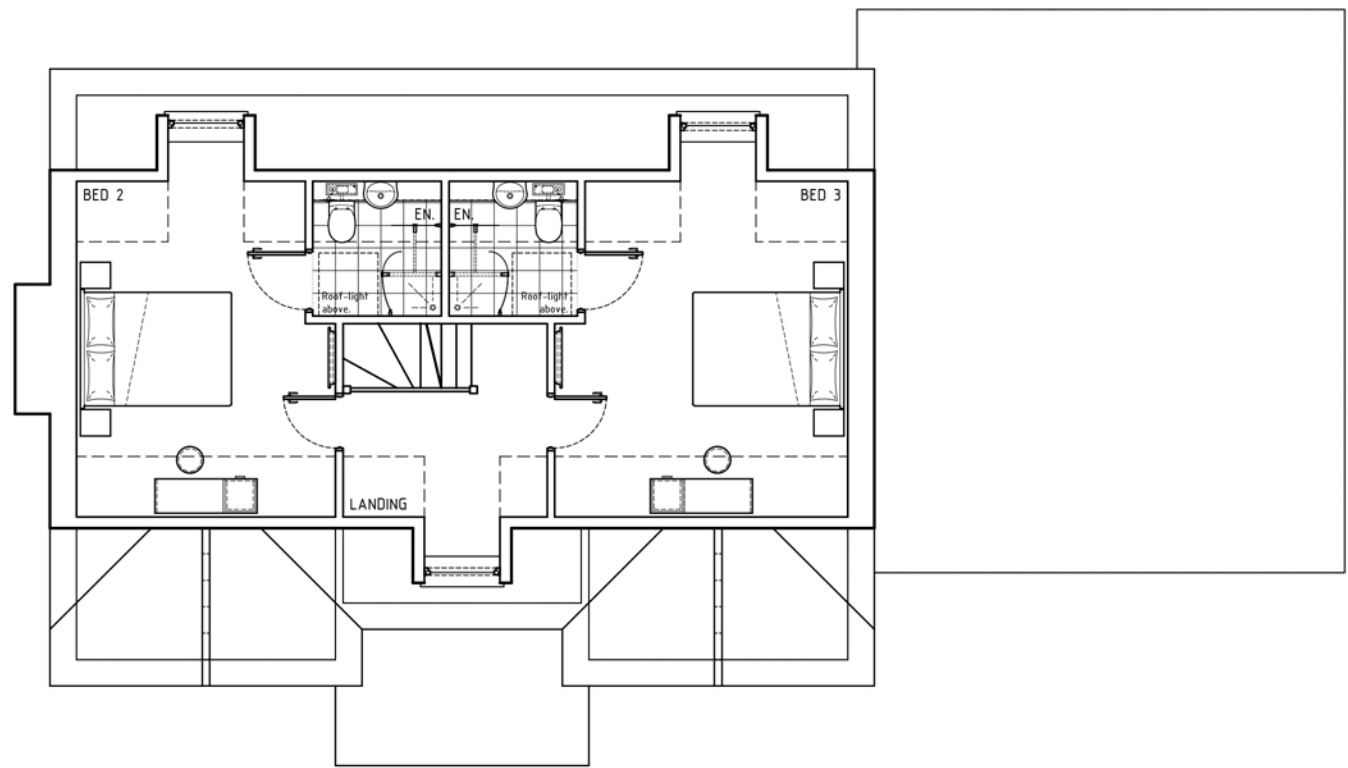
Client Name	Peter Pomfrett
Address	South View, Cookhams Top Road, Sharpstone East Grinstead, West Sussex

Drawn By	MM	Checked By	DAP
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Scene Ref.	STHV	Rev no.	P01
Dwg no.	STHV SCN XX 1215 DR A 01.001 A3		

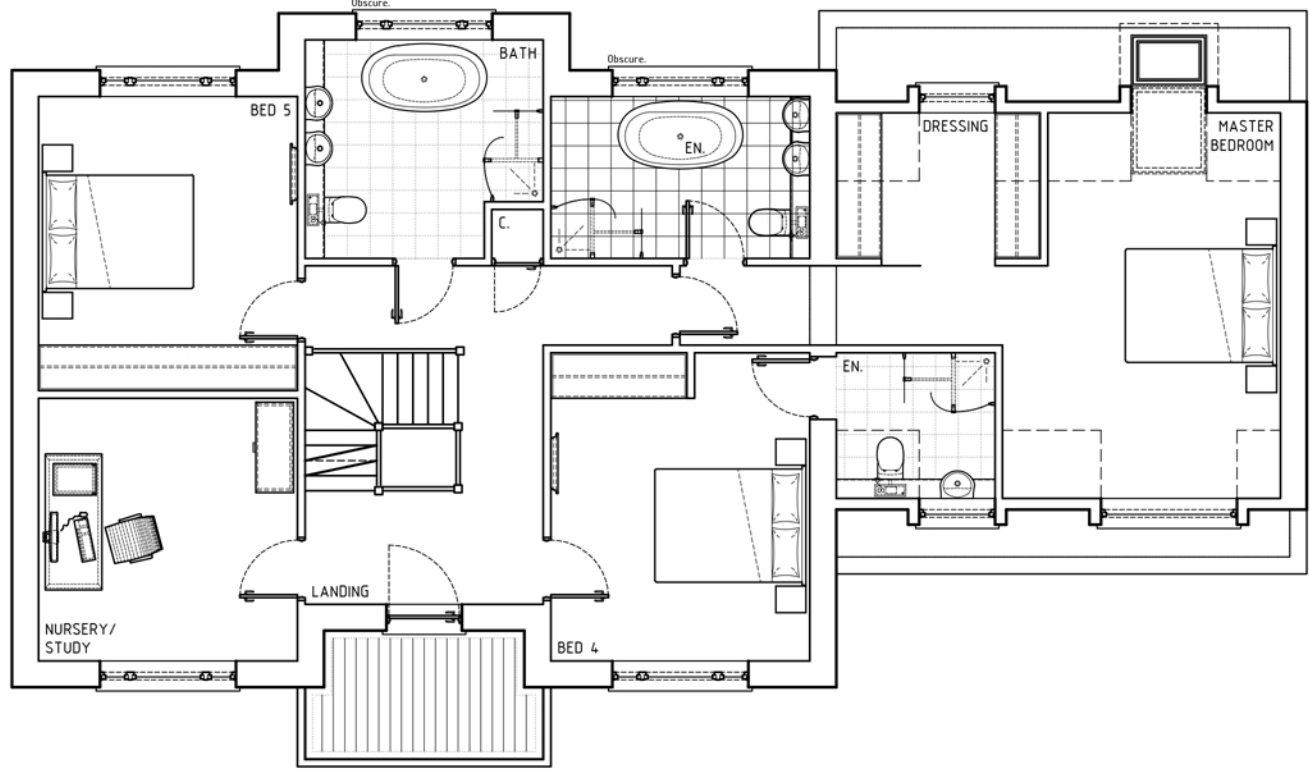


Stage 3

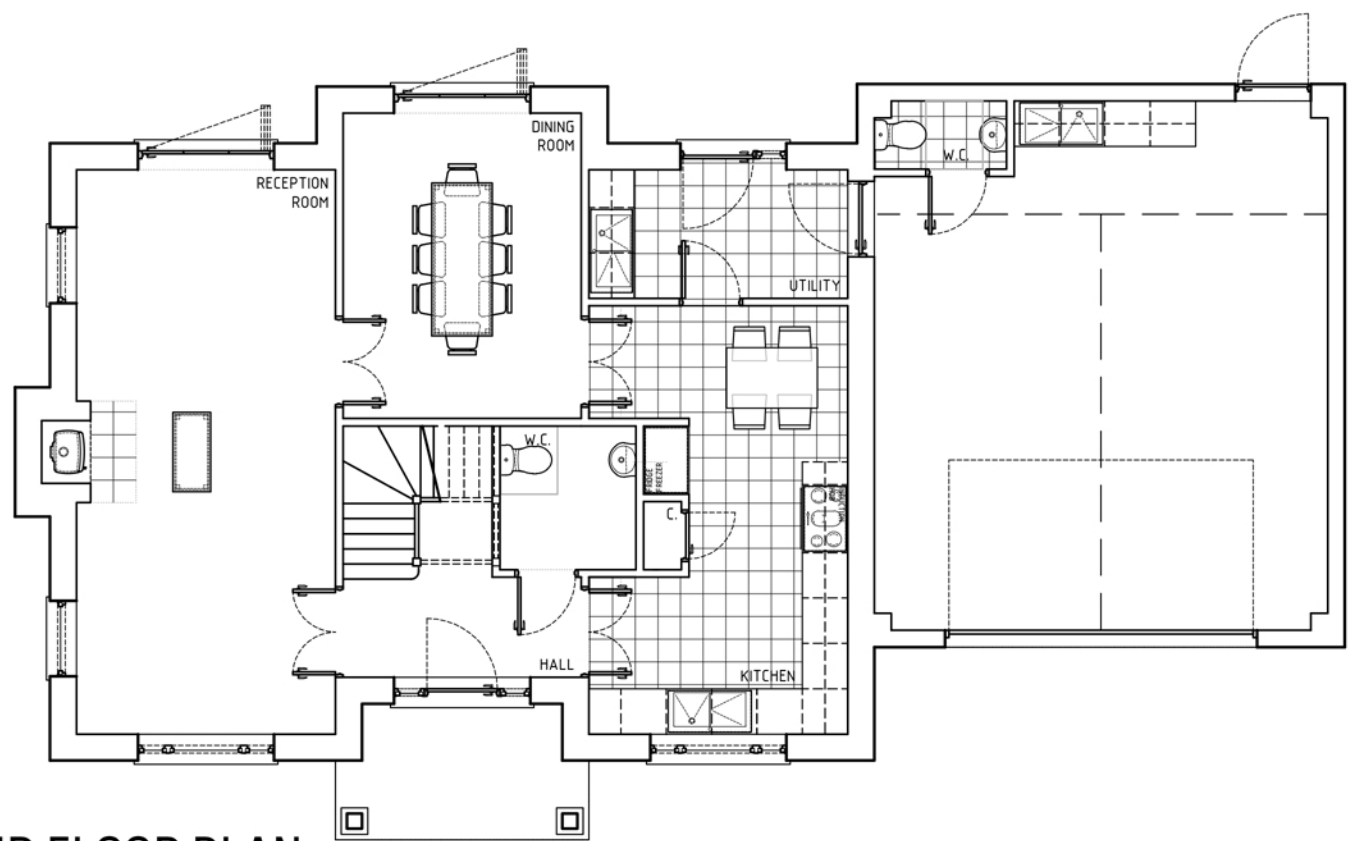




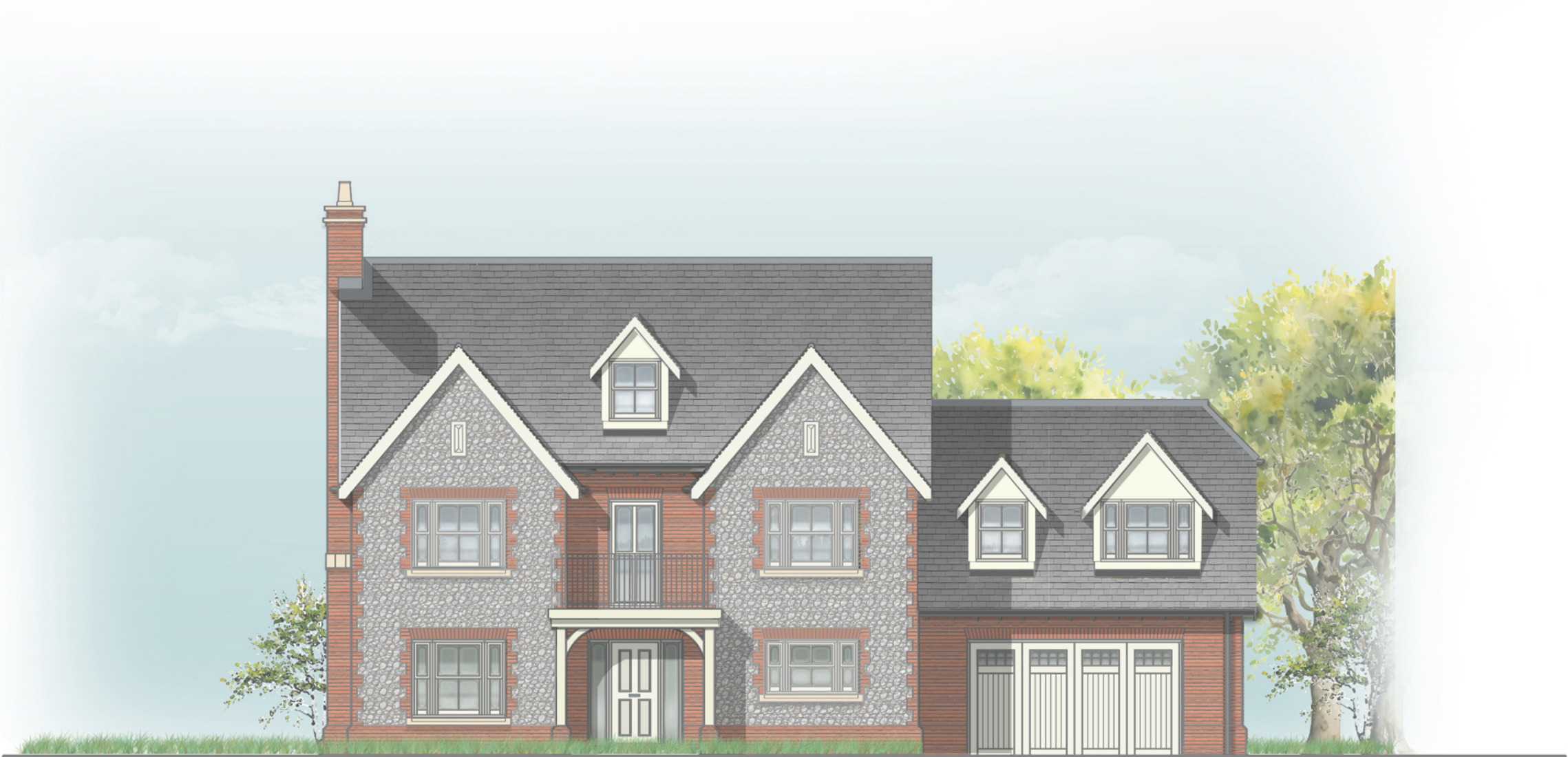
SECOND FLOOR PLAN 1:100



FIRST FLOOR PLAN 1:100



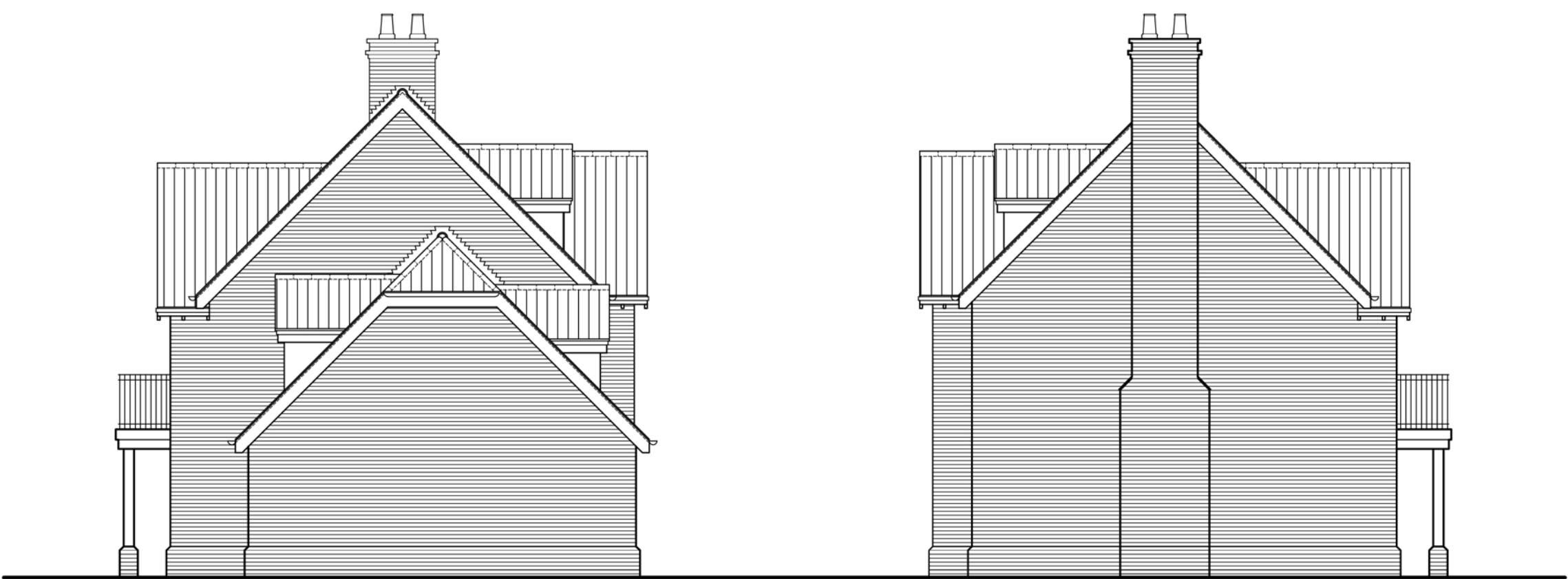
GROUND FLOOR PLAN 1:100



FRONT ELEVATION 1:100



REAR ELEVATION 1:100



SIDE ELEVATIONS 1:100

PL01	Planning issue	MM	24.02.26
PO0	First Draft	MM	29.12.25
Rev	Description	Initials	Date

SOUTHVIEW

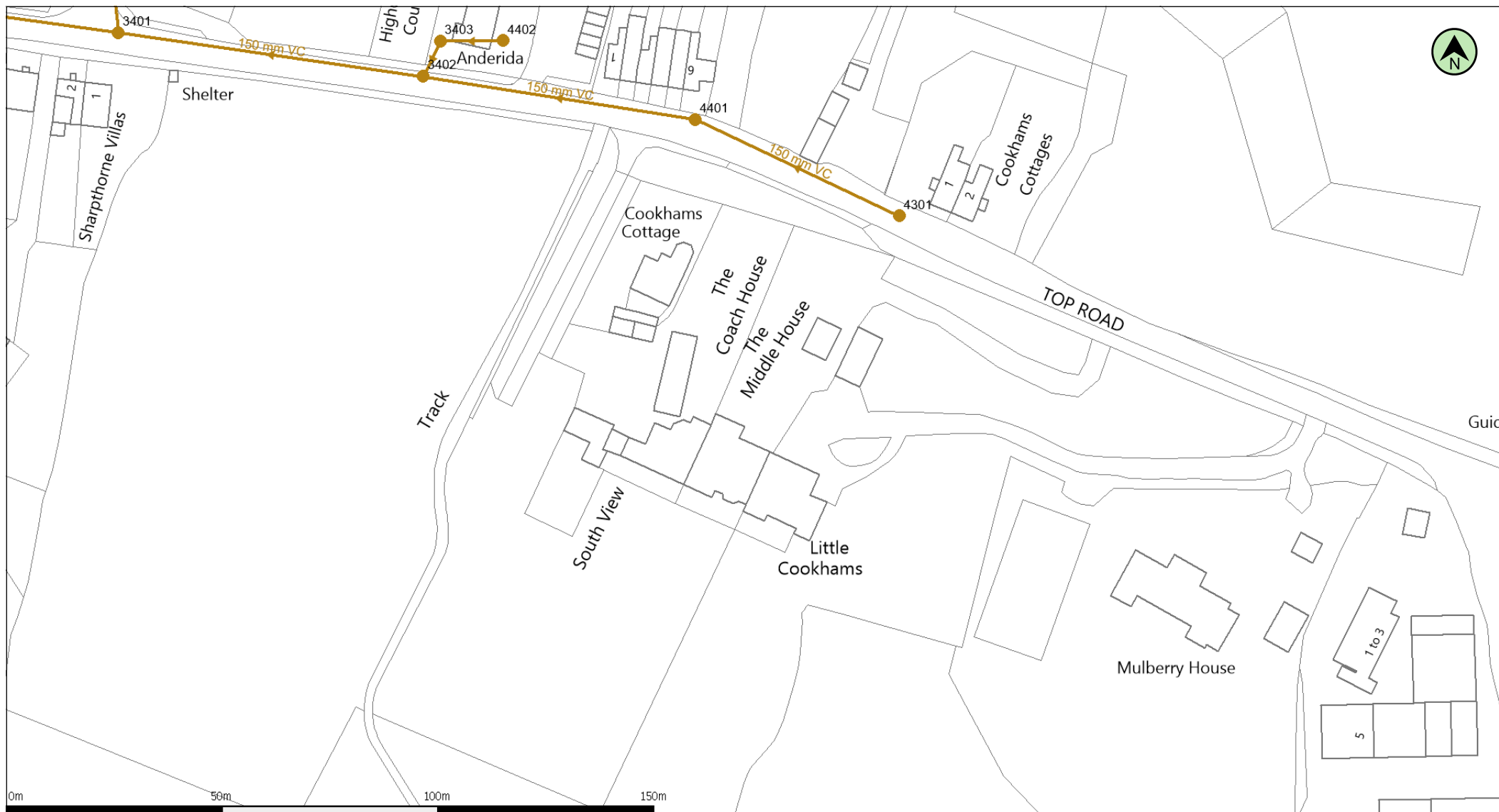
// General Arrangement Drawing

Client Name	Peter Pomfret		
Address	South View, Cookhams Top Road, Sharpthorne East Grinstead, West Sussex		

Drawn By	DAP	Checked By	DAP
Scale	1:100 @ A1	Date	29/12/25
Scene Ref.	STHV	Rev no.	PL01
Dwg no.	STHV SCN XX 1215 DR A 00.101 A3		



Appendix C – Asset Sewer Records



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Date: 11/01/21

Scale: 1:1250

Map Centre: 537464,132345

Data updated: 21/12/20

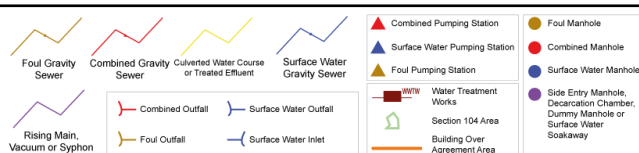
Our Ref: 472941 - 1

Wastewater Plan A4

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. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2020 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

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

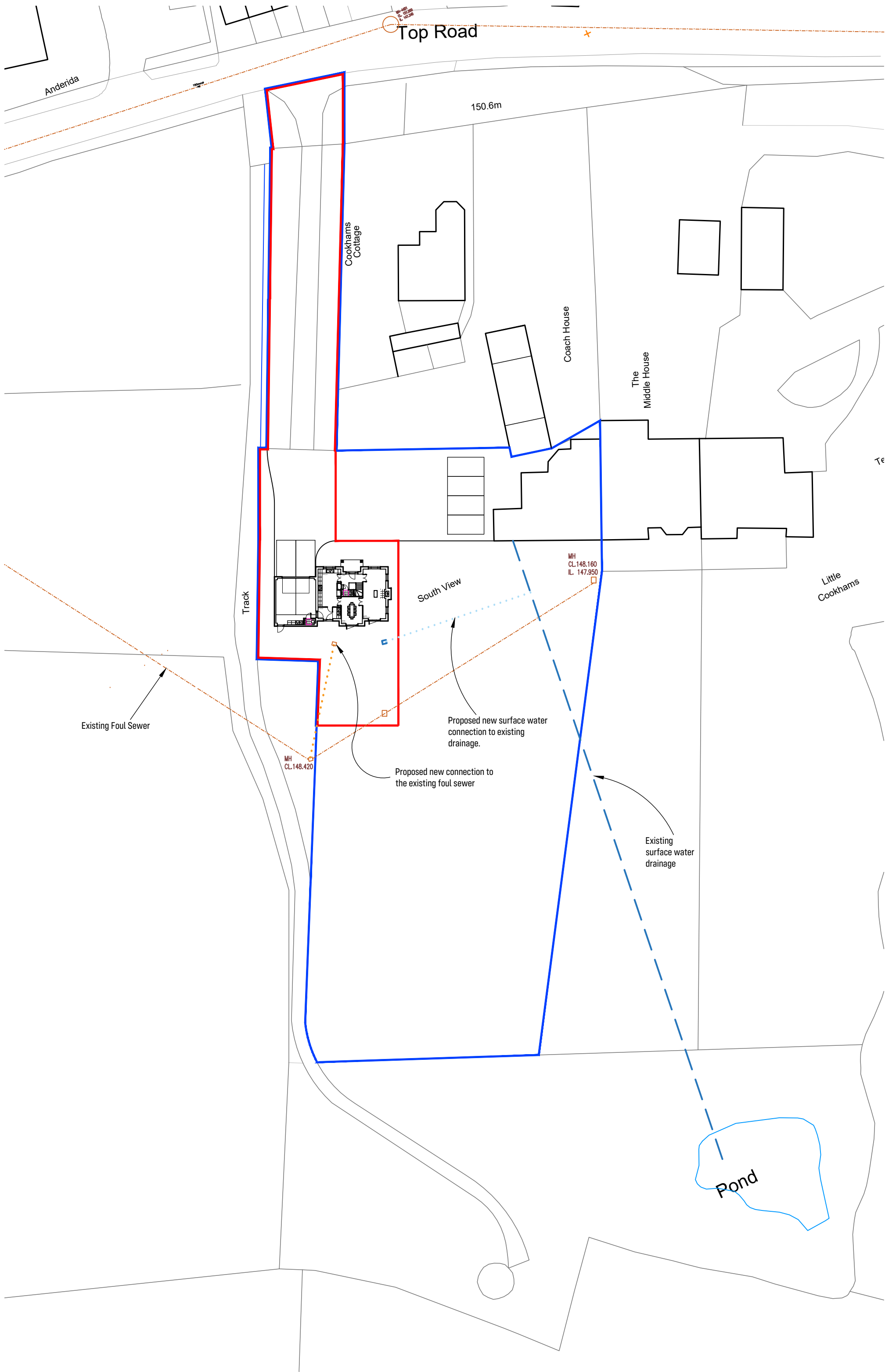


bparmar@jmsengineers.co.uk

EX2020_09_12



PLANNING PURPOSES ONLY



Services Key	
Proposed Surface Water Drainage.	
Existing Surface Water Drainage.	-----
Proposed Surface Water Drainage.	
Existing Foul Water Sewer	-----

General Notes

This Foul water drainage arrangements plan has been prepared for Planning purposes only.

It is not intended for construction.

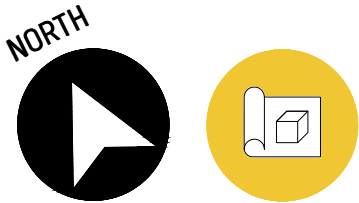
This drawing is to be read in conjunction with all other engineers and architects drawings, and the

P00	Preliminary Issue	MM	19.05.26
Rev	Description	Initials	Date

SOUTHVIEW

//Foul water drainage arrangements

Client Name		Peter Pomfrett	
Address		South View, Cookhams Top Road, Sharpthorne East Grinstead, West Sussex	
Drawn By	MM	Checked By	—
Scale	1:500 @ A2	Date	19/05/26
Scene Ref.	STHV	Rev no.	PL00
Dwg no.	STHV SCN XX 1215 DR A 01.004 A3		



Stage 3

1:500 0m 5m 10m 15m 30m 45m



Appendix D – Greenfield Runoff Rate

JMS Chelmsford Ltd		Page 1
BIC110 - The MedBIC Alan Cherry Drive Chelmsford CM1 1SQ		
Date 18/03/2026 14:55 File	Designed by MathanKumarRenga... Checked by	
XP Solutions		Source Control 2018.1
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.450 Area (ha) 0.018 Urban 0.000 SAAR (mm) 862 Region Number Region 6 Results 1/s QBAR Rural 0.1 QBAR Urban 0.1 Q100 years 0.3 Q1 year 0.1 Q30 years 0.2 Q100 years 0.3		
©1982-2018 Innovyze		

Appendix E – Hydraulic Calculation

JMS (Midlands) Ltd		Page 1
Victoria Count		
Tennant St Nuneaton		
Warwickshire CV11 4LZ		
Date 04/06/26 12:36	Designed by SaiPagadala	
File EX20_209_12 - SOUTH VIE...	Checked by	
XP Solutions	Network 2018.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	100
FEH Rainfall Version	2013
Site Location GB 537416 132337 TQ 37416 32337	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.015	4-8	0.004

Total Area Contributing (ha) = 0.019

Total Pipe Volume (m³) = 0.542

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	17.800	0.222	80.2	0.005	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	10.700	0.134	79.9	0.008	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	17.500	0.219	79.9	0.006	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	-11.23	5.34	148.550	0.005	0.0	0.0	0.0	0.86	6.8	0.0
1.001	-10.81	5.55	148.328	0.013	0.0	0.0	0.0	0.86	6.8	0.0
1.002	-10.19	5.89	148.194	0.019	0.0	0.0	0.0	0.86	6.8	0.0

JMS (Midlands) Ltd		Page 2
Victoria Count Tennant St Nuneaton Warwickshire CV11 4LZ		
Date 04/06/26 12:36 File EX20_209_12 - SOUTH VIE...	Designed by SaiPagadala Checked by	
XP Solutions	Network 2018.1	

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	23.000	1.150	20.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	-9.82	6.11	147.975	0.019	0.0	0.0	0.0	1.73	13.6	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.003		148.000	146.825	0.000	0	0
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Simulation Criteria for Storm

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 537416 132337 TQ 37416 32337
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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<u>Online Controls for Storm</u> <u>Orifice Manhole: 4, DS/PN: 1.003, Volume (m³): 0.4</u> Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 147.975		
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Storage Structures for Storm

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

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.8
Membrane Percolation (mm/hr)	1000	Length (m)	5.5
Max Percolation (l/s)	8.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	149.300	Membrane Depth (mm)	210

Cellular Storage Manhole: 4, DS/PN: 1.003

Invert Level (m)	147.975	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	18.0	18.0	0.801	0.0	31.6
0.800	18.0	31.6			

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 537416 132337 TQ 37416 32337
Data Type	Point
Cv (Summer)	1.000
Cv (Winter)	1.000

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Summer	2	+0%	100/15 Summer				148.577
1.001	2	15 Summer	2	+0%	30/15 Summer				148.371
1.002	3	15 Summer	2	+0%	30/15 Summer				148.247
1.003	4	240 Summer	2	+0%	2/30 Summer				148.113

PN	US/MH Name	Depth (m)	Surcharged Volume (m³)	Flooded Flow / Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.073	0.000	0.16	1.0	OK	
1.001	2	-0.057	0.000	0.39	2.4	OK	
1.002	3	-0.047	0.000	0.54	3.5	OK	
1.003	4	0.038	0.000	0.04	0.5	SURCHARGED	

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<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>																																																																											
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Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000 Foul Sewage per hectare (l/s) 0.000																																																																											
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<table><tr><td colspan="2"></td><td colspan="2">Surcharged Flooded</td><td colspan="2"></td><td colspan="2">Pipe</td><td colspan="2"></td><td>Level</td></tr><tr><td>PN</td><td>US/MH</td><td>Depth (m)</td><td>Volume (m³)</td><td>Flow / Cap.</td><td>Overflow (l/s)</td><td>Flow (l/s)</td><td>Status</td><td>Exceeded</td><td></td><td></td></tr><tr><td>1.000</td><td>1</td><td>-0.058</td><td>0.000</td><td>0.36</td><td></td><td>2.3</td><td>OK</td><td></td><td></td><td></td></tr><tr><td>1.001</td><td>2</td><td>0.133</td><td>0.000</td><td>0.92</td><td></td><td>5.8</td><td>SURCHARGED</td><td></td><td></td><td></td></tr><tr><td>1.002</td><td>3</td><td>0.160</td><td>0.000</td><td>1.29</td><td></td><td>8.4</td><td>SURCHARGED</td><td></td><td></td><td></td></tr><tr><td>1.003</td><td>4</td><td>0.196</td><td>0.000</td><td>0.05</td><td></td><td>0.7</td><td>SURCHARGED</td><td></td><td></td><td></td></tr></table>												Surcharged Flooded				Pipe				Level	PN	US/MH	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	Exceeded			1.000	1	-0.058	0.000	0.36		2.3	OK				1.001	2	0.133	0.000	0.92		5.8	SURCHARGED				1.002	3	0.160	0.000	1.29		8.4	SURCHARGED				1.003	4	0.196	0.000	0.05		0.7	SURCHARGED			
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FEH
 FEH Rainfall Version 2013
 Site Location GB 537416 132337 TQ 37416 32337
 Data Type Point
 Cv (Summer) 1.000
 Cv (Winter) 1.000

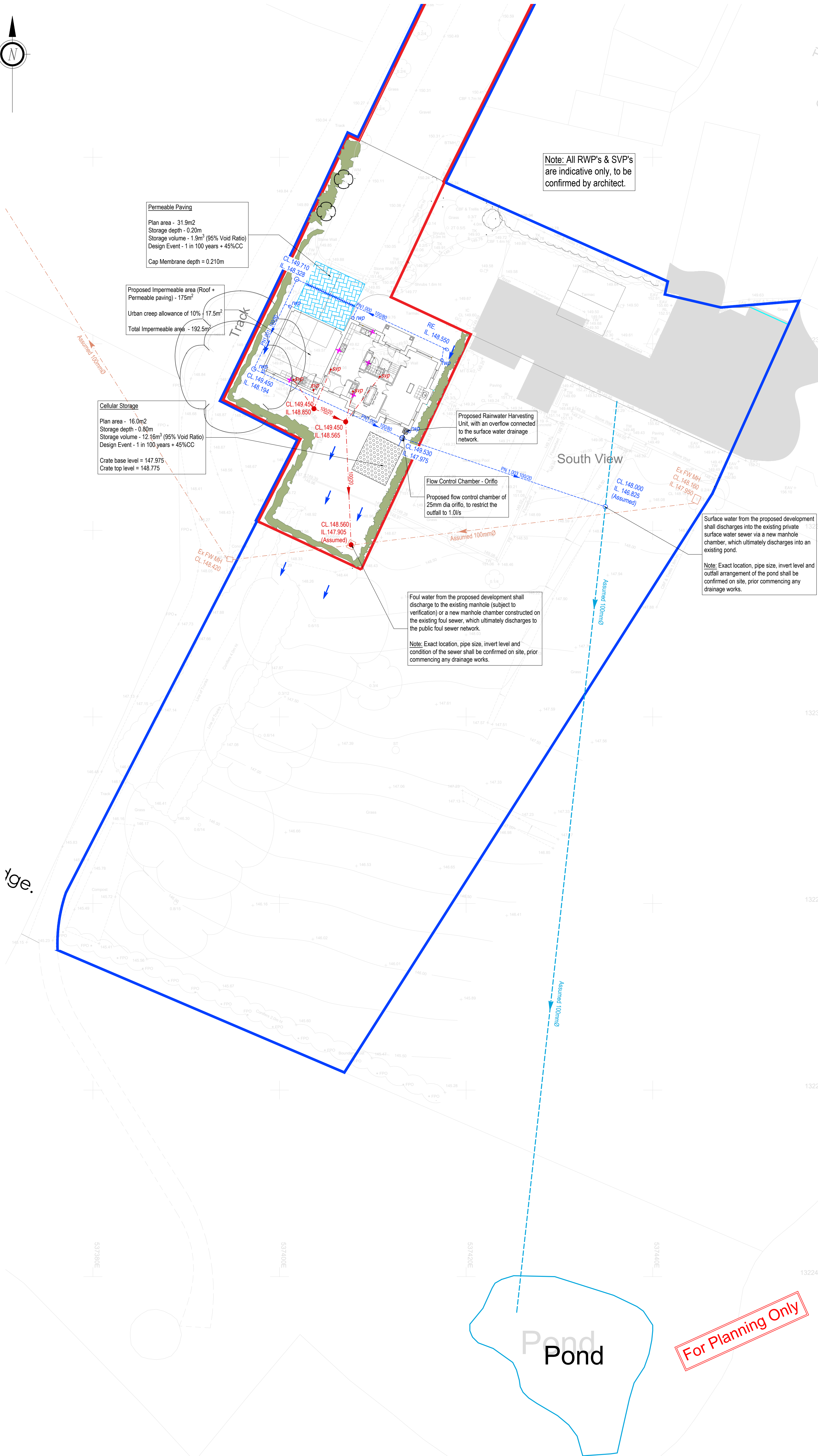
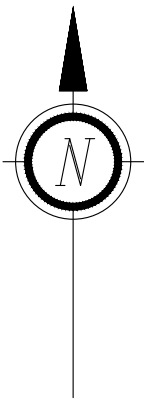
Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 45

US/MH		Return Climate		First (X)		First (Y)		First (Z)		Overflow	Water
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.			Level
1.000	1	15 Summer	100	+45%	100/15 Summer						149.405
1.001	2	15 Summer	100	+45%	30/15 Summer						149.317
1.002	3	15 Summer	100	+45%	30/15 Summer						149.103
1.003	4	120 Summer	100	+45%	2/30 Summer						148.548

US/MH		Surcharged Flooded		Pipe		Pipe		Level	
PN	Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	Exceeded	
1.000	1	0.755	0.000	0.61		3.9	FLOOD RISK		
1.001	2	0.889	0.000	1.47		9.3	SURCHARGED		
1.002	3	0.809	0.000	2.06		13.4	SURCHARGED		
1.003	4	0.473	0.000	0.07		1.0	SURCHARGED		

Appendix F – Proposed Drainage Strategy and Construction Details



General Notes:

1. Do not scale this drawing. All dimensions are in metres unless otherwise noted. Any discrepancies are to be recorded and reported to the engineers immediately.
2. This drawing is to be read in conjunction with all other engineers and architects drawings, and the specification.
3. All work is to be to the satisfaction of the engineer and local authority building control.
4. The contractor is responsible for and must take all necessary precautions to ensure the stability of the works at all times during construction.
5. All workmanship and materials are to be to current British Standards.
6. All services are to be located and protected as necessary by the contractor prior to the commencement of the works.
7. Any existing details which are shown on this drawing are for guidance only and are to be checked on site by the contractor. Any variations are to be recorded and reported to the engineer immediately.
8. All highway works are to be in accordance with the local authorities design guide and specification.
9. Prior to the occupation of the first dwelling, street nameplates shall be erected in accordance with the highway authority and to the wording agreed with the planning authority.
10. During construction works on site, all roads and footpaths are to be swept and kept clear of obstructions, this is to include existing highways as appropriate to ensure safe passage of all road users.
11. Provision shall be made for the installation of all mains services including ducting prior to the laying of the road base-course.
12. All road markings and signs are to be in accordance with 'The Traffic Signs Regulations and Directions' 2016.
13. All sewer works are to be in accordance with the Sewerage Sector Guidance.
14. All private connections to adoptable sewers should be a minimum of 100mm diameter (foul) and 150mm diameter (surface) made in vitrified clay connecting soffit to soffit.

Note:

The contractors are to check all dimensions, drain runs and general conditions on site before works commence

Note:

All works to be carried out in accordance with current building regulations, British Standards, Code of Practice and Local Authority requirements

Drainage Key

Private Surface Water	
Surface Water	CL 00.00
Manhole Text	IL 00.00
Surface Water Pipe Diameter / Gradient	100/80
Inspection chamber 480mm Ø >600mm Depth	
Flow Control Chamber	
Rain Water Pipe	6 r/w/p
Perforated Pipe	
Terrace Permeable Paving	
Rainwater Harvesting / Waterbutt	
Silva Cell System	
Private Foul Water	
Foul Water	CL 00.00
Manhole Text	IL 00.00
Foul Water Pipe Diameter / Gradient	100/80
Inspection chamber 480mm Ø >600mm Depth	
Inspection chamber 225mm Ø 0-600mm Depth	
Foul Connection	s/v/p 225mmØ
Existing Foul Water Sewer	Ex F/W MH CL 00.000 IL 00.000
Existing Foul Water Manhole	225mmØ
Existing Surface Water Sewer	225mmØ



P2	Updated Strategy to attenuation	SP	BN	04.06.2026
P1	Preliminary Issue	MKR	BN	18.03.2026
Issue	Notes	Drawn	Approved	Date

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Project
South View, Top Road
Sharpthorne, RH19 4NS

Drawing Title
Proposed Drainage
Layout

Project No.	Drawing No.	Revision
EX2020912	201	P2

PRELIMINARY

Original Sheet Size: A1

Private Drainage Notes:

1. Formation of trench beds and inspection chambers

- i) Excavate immediately before laying beds and pipes or base slabs for inspection chambers.
- ii) Remove all mud, rock projections, boulders and hard spots and replace with well compacted selected fill. Localised soft spots are to be hardened by tamping in granular bedding material.
- iii) If oil contamination is found adjacent to trench, the trench profile is to be cut back by 150mm from the face of bedding material and replaced with crushed concrete.

2. Concrete and mortar

- i) The concrete used to surround pipes and in the construction of gullies and inspection chambers is to be grade C20P (unless noted otherwise) and mixed using SRPC unless directed otherwise by the engineer or local authority. Sulphate resisting cement is to be used for in-situ or precast concrete and mortars to foul drains.

3. Covers and frames

All inspection chamber cover and frames are to be laid to have the top surface in alignment with both the longitudinal and transverse gradients of adjacent roads, drives, footways and verges. They are otherwise to be laid level. All cover levels as shown on the drainage layout/longsection are approximate. Actual cover levels are to be determined on site from the position in the road, drive, footpath or otherwise.

4. Pipes to as follows:

Pipe dia. (mm)	Type	Remark
100 Internal (110 NOM. dia.)	uPVC	BS EN 1401
150 Internal (160 NOM. dia.)	uPVC	BS EN 1401

5. The contractor/developer is to ensure that all of the works comply with the following:

- i) BS 8301: 1985 (code of practice for building drainage)

- ii) The Building Regulations: Approved Document H 2002

- iii) NHBC Technical requirements

- iv) BRE Digest No. 363

6. The storage and installation of all proprietary drainage items used are to be strictly in accordance with the manufacturers instructions.

7. All uPVC items as specified on this drawing are to comply with BS EN 1401.

8. Mortar

Mortar shall be mixed only as and when required, the relevant proportions indicated in the following table, until its colour and consistency are uniform. The constituent materials shall be accurately gauged, allowance being made for bulking of sand.

Alternative Nominal Mixes by Volume		
Cement:Lime:Sand	Cement:Sand	Cement:Sand with plasticiser
1:½:3	1:3	1:2½ to 3

9. Ready-mixed lime: Sand for mortar and ready-to-use retarded mortar shall comply with the relevant provisions of BS 4721 and to be of category 1.12 and designation (i) respectively.

10. All mortar shall be conveyed fresh to the works as required for use. Mortar which has begun to set or which has been site-mixed for a period of more than 1 hour shall not be used. Plasticising and set retarding mortar admixtures shall comply with BS 4887: part 1 and 2, respectively and shall be supplied with instructions for use.

11. Crushed natural stone and shall comply in all respects with BS 1200.

Pipe Bedding Notes:

Mortar

1. Mortar shall be mixed only as and when required, the relevant proportions indicated in the following table, until its colour and consistency are uniform. The constituent materials shall be accurately gauged, allowance being made for bulking of sand.

Alternative Nominal Mixes By Volume		
Cement:Lime:Sand	Cement:Sand	Cement:Sand with Plasticiser
1:½:3	1:3	1:2½ to 3

2. Ready-mixed lime:sand for mortar and ready-to-use retarded mortar shall comply with the relevant provisions of BS 4721 and to be of category 1.12 and designation (i) respectively.

3. All mortar shall be conveyed fresh to the works as required for use. Mortar which has begun to set or which has been site-mixed for a period of more than one hour shall not be used. Plasticising and set retarding mortar admixtures shall comply with BS 4887: part 1 and 2, respectively and shall be supplied with instructions for use.

4. Fine aggregate for mortar shall be washed natural sand or crushed natural stone and shall comply in all respects with BS 1200.

5. 20mm thick Flexcell, or similar approved filler to be used to form a flexible joint to the concrete surround at the leading edge of a sleeved coupling. Dimensions shown are irrespective of type or diameter of pipe. The surrounds must terminate at a pipe joint.

6. If pipes are surrounded in concrete, the joints are to be protected from the ingress of concrete by wrapping them in polythene sheet or building paper.

General fill material

May be of selected locally excavated material or imported. It shall be uniform readily compacted material free from stones larger than 40mm dia. lumps of clay over 100mm, timber, frozen material, vegetable matter, tree roots and building rubbish. The material shall be placed and compacted in layers not exceeding 300mm loose depth. Mechanical compaction equipment shall not be used until there is a minimum of 450mm of compacted material above the crown of the pipe.

Selected fill material

To be free from stones larger than 40mm dia. lumps of clay over 100mm, timber, frozen material, vegetable matter, tree roots and building rubbish. The material shall be placed uniformly on each side of the pipe in layers not exceeding 100mm. Each layer being compacted by hand tamping. Care to be taken not to displace the pipe from its correct line and level.

Private Drainage Notes:

1. Inspection chamber covers and frames as follows:-

Brickwork and pre-cast concrete:

- i) Private drives accepting vehicle traffic: BS EN124 class D400, 600mm clear opening, solid top cover and frame.
- ii) Footpaths, verges and gardens: BS EN124 class B125, 600mm clear opening, solid top cover and frame.

Polypropylene:

- iii) Areas accepting vehicle traffic: Class B
- iv) Soft landscaped areas: Class C

2. Mortar haunching to inspection chamber and frames.

3. i) For use with brick inspection chambers in non adopted roads, private drives, footways and verges: heavy duty (150mm nominal thickness) precast reinforced concrete cover slab to BS 5911, bedded on 10mm thick mortar bed; or 150mm grade C25P in-situ concrete (reinforced with A393 mesh to BS 4483) cover slab. Other locations inaccessible to vehicles; light duty (75mm nominal thickness) precast reinforced concrete cover slab to BS 5911, bedded on 10mm thick mortar bed; or 100mm grade C25P in-situ concrete (reinforced with A193 mesh to BS 4483) cover slab.
- ii) For use with precast concrete inspection chambers in non adopted roads, private drives, footways and verges; heavy duty (150mm nominal thickness) precast reinforced concrete cover slab to BS 5911, of size and type to suit chamber sections.
- Other locations inaccessible to vehicles: light duty (75mm nominal thickness) precast reinforced concrete cover slab to BS 5911, of size and type to suit chamber sections.

4. With precast or brick inspection chambers, cover slabs with a clear opening of 600x600mm are required. Offset to suit chosen face for step rungs.

5. 215mm thick walls in Class B engineering bricks to BS 3921 layered in English bond with frogs up. Inner faces to be plumb and in true alignment. Brick course to be level. Flush jointing to brickwork inner faces and precast concrete chamber sections to BS 5911.

6. All step rungs to BS 1247

- i) General purpose pattern (with 230mm tail) to be built into chamber wall of brick inspection chambers.

- ii) Precast concrete manhole pattern "let in" to chamber wall of precast inspection chambers. All step rungs to be horizontally and vertically staggered as shown on section x-x. Step rungs are not required to either type of inspection chamber where depth to soffit is less than 750mm.

7. Mass concrete infill.

8. Benching to rise vertically from edges of channel to a height not less than pipe (full section) soffit level. Steel float smooth hard surface with cement mortar 1:1 mix, 25mm thick.

9. 50mm min. thick mortar bed to half round channels.

10. 150mm min. thick mass concrete base slab (grade C20P) to precast, uPVC and brick types of inspection chamber.

11. 75mm thick lean mix concrete blinding.

12. Minimum of 2, and maximum of 4 courses of 215mm thick engineering bricks (Class B) to underside of cover & frame, built off cover slab, may be required to facilitate road or drive construction.

13. A brick relieving arch shall be turned over all pipes where they pass through the walls of a brick inspection chamber.

14. Pipes entering inspection chambers shall have a flexible joint within 150mm of the outer face of the brickwork or concrete surround.

15. Channel junctions within brick or precast concrete inspection chambers to be half round channel sections.

16. Backfill material to be as detailed above for normal pipe bedding.

17. Following the flexible joint from either a precast or brick inspection chamber (note 14 above) a 'rocker' pipe of 600mm length shall be installed.

18. Precast concrete inspection chambers may (if chosen for use) have a purpose made base units.

19. Where precast concrete inspection chambers are constructed wholly above the water table, joints are to be sealed with mortar. In waterlogged ground or where the water table is above the base slab, joints are to be water tight using a mastic sealant or rubber rings of a type suitable to the chamber units.

Minimum Dimensions for Access Fittings and Inspection Chambers

Type	Depth to invert from cover level (m)	Internal dimensions		Cover dimensions	
		Length (mm) x width (mm)	Circular dia. (mm)	Length (mm) x width (mm)	Circular dia. (mm)
Rodding eye		As drain but 100 min.			Same size as pipework.1
Access fitting	Small	150x100	150	150x100.1	Same size as access fitting
	Large	150x100 225x100	225	225x100.1	
Inspection chamber	shallow	0.6 or less	225x100 450x450	190.2 450	190.1 430
	Deep	1.2 or less >1.2	450x450	MIN. 430x430 MAX 300x300.3	access restricted to max 350.3

NOTES

1. The clear opening may be reduced by 20mm in order to provide proper support for the cover and frame.
2. Drains up to 150mm.
3. A larger clear opening cover may be used in conjunction with a restricted access. the size is restricted for health and safety reasons to deter entry.

Materials for Access Points

Material	British Standard
1. Inspection chambers and manholes.	
Clay brick & blocks	BS 3921
Vitrified clay	BS EN 295, BS 65
Concrete-precast	BS 5911
Concrete-in situ	BS 8110
Plastics	BS 7158
2. Rodding eyes and access fittings (excludes covers and frames).	As pipes refer to materials for below ground drainage

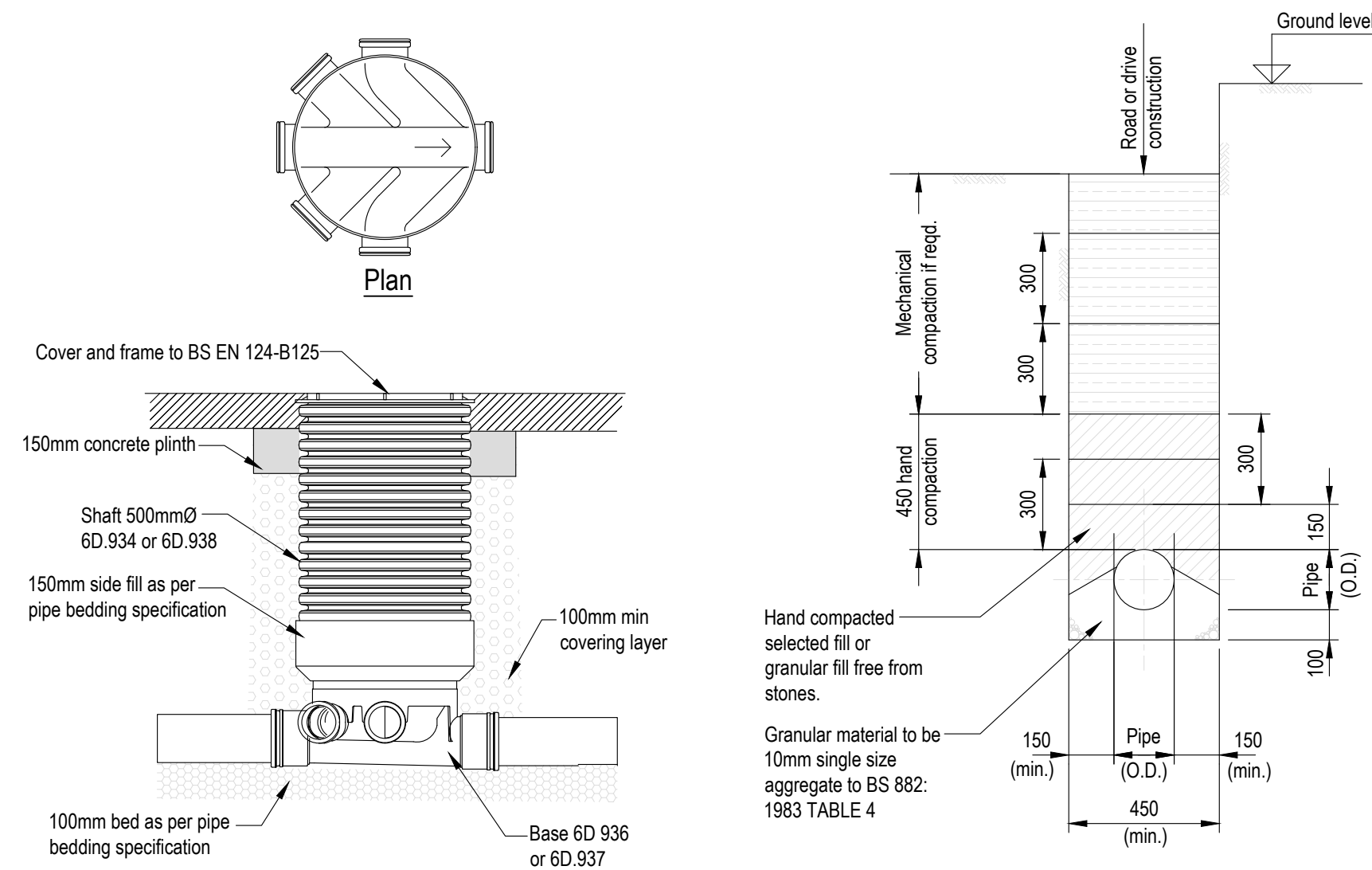
Materials for Below Ground Drainage

Material	British Standard
1. Rigid pipes:	
Vitrified clay	BS 65, BS EN 295
Concrete	BS 5911
Gray iron	BS 437
Ductile iron	BS EN 598
2. Flexible pipes:	
UPVC	BS EN 1401*
PP	BS EN 1852*
Structure walled Plastic pipes	BS EN 13476

*Application area code "UD" should normally be specified

Note

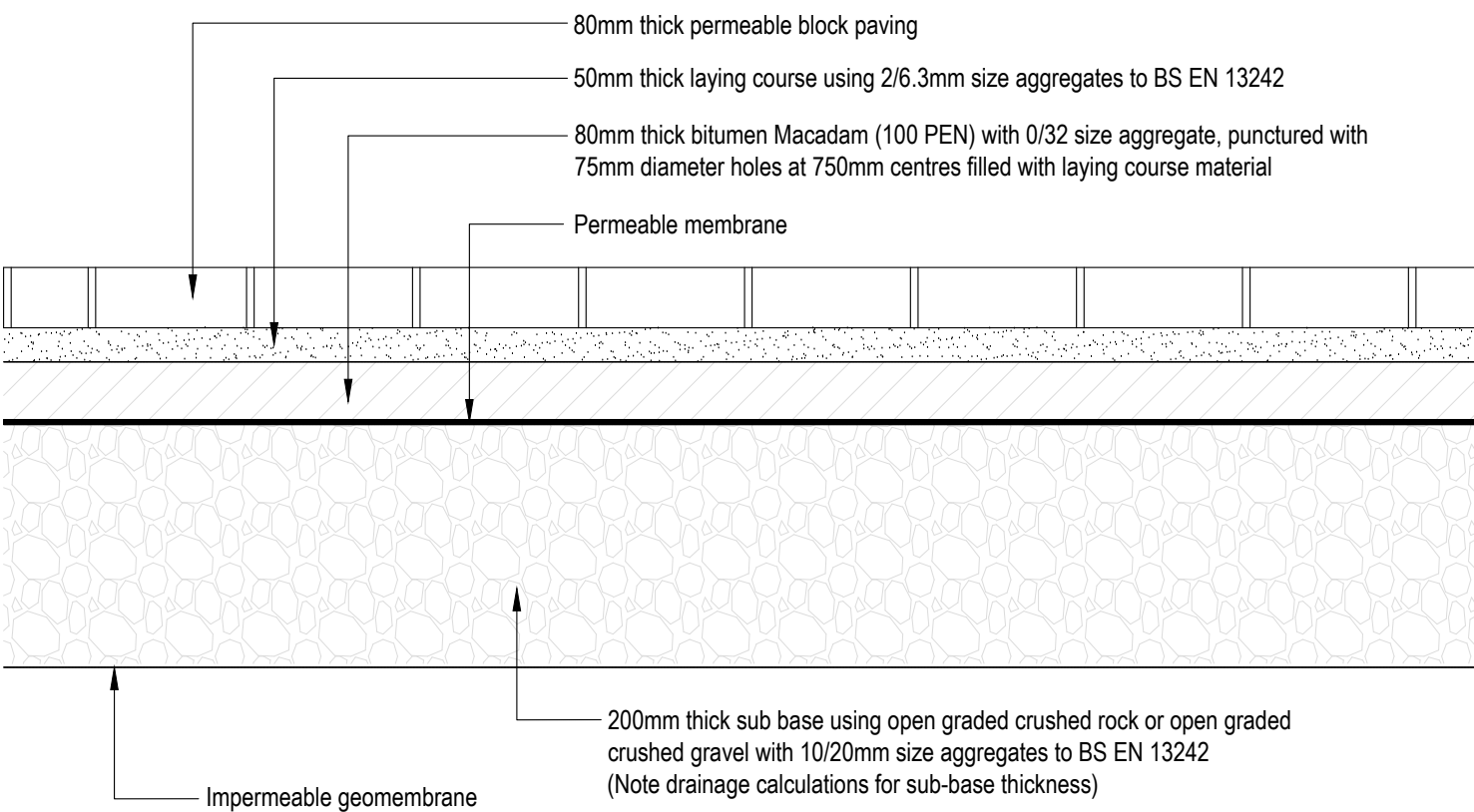
Some of these materials may not be suitable for conveying trade effluent.



Polypropylene Shallow Inspection Chamber
Ø450mm (Light Loading B125)

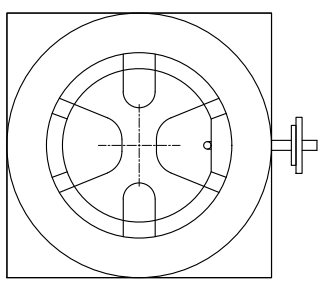
Scale 1:20

Note:
3m maximum depth. Up to Ø150mm pipework for 450mm shaft, or up to 300mm pipework on 500mm shaft. B125 maximum Loading, suitable for car parks and private drives

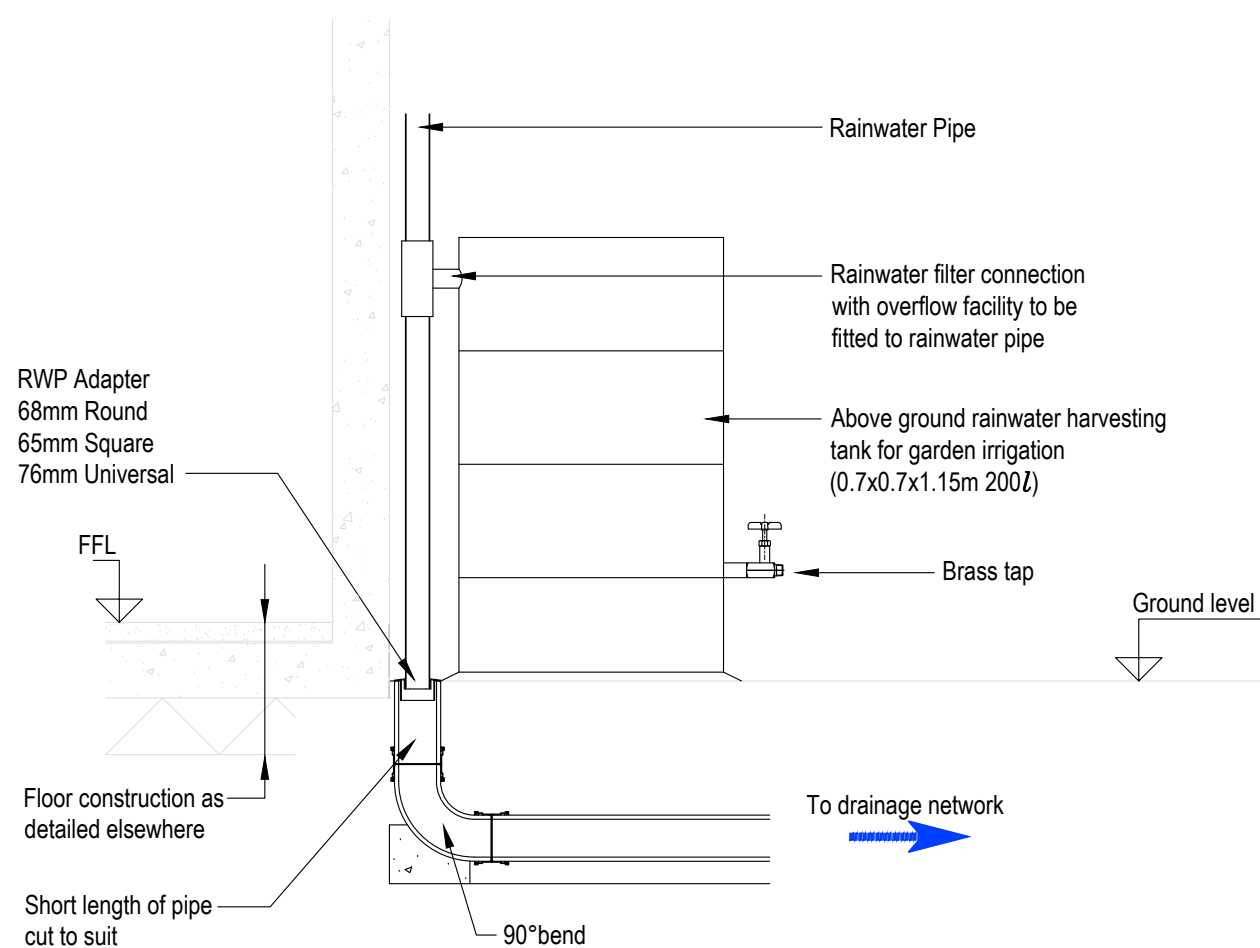


Typical Permeable Paving Construction Detail

Scale 1:10



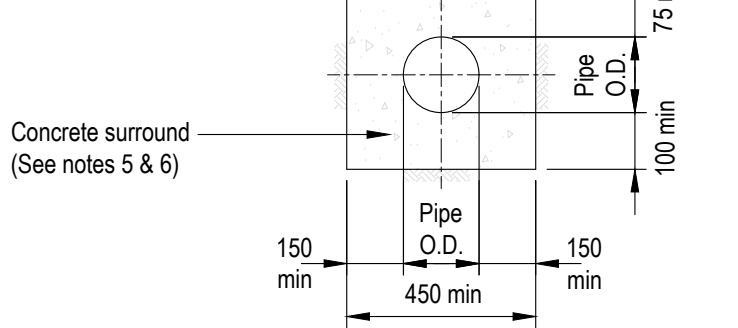
Plan



Rainwater Harvesting Detail

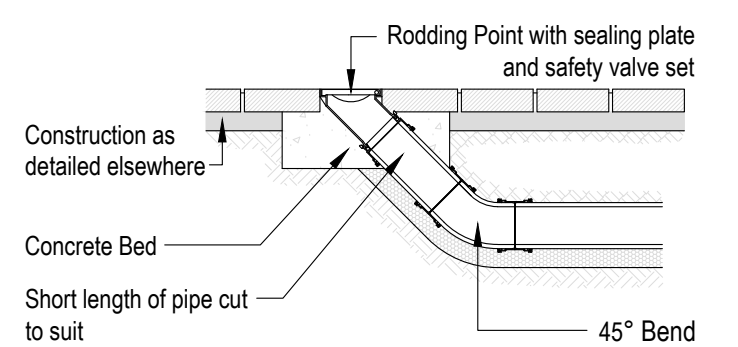
SCALE 1:20

General fill material in layers not exceeding 300mm loose depth. Not deposited within 24 hours of placing concrete (time to be extended as appropriate for adverse weather)



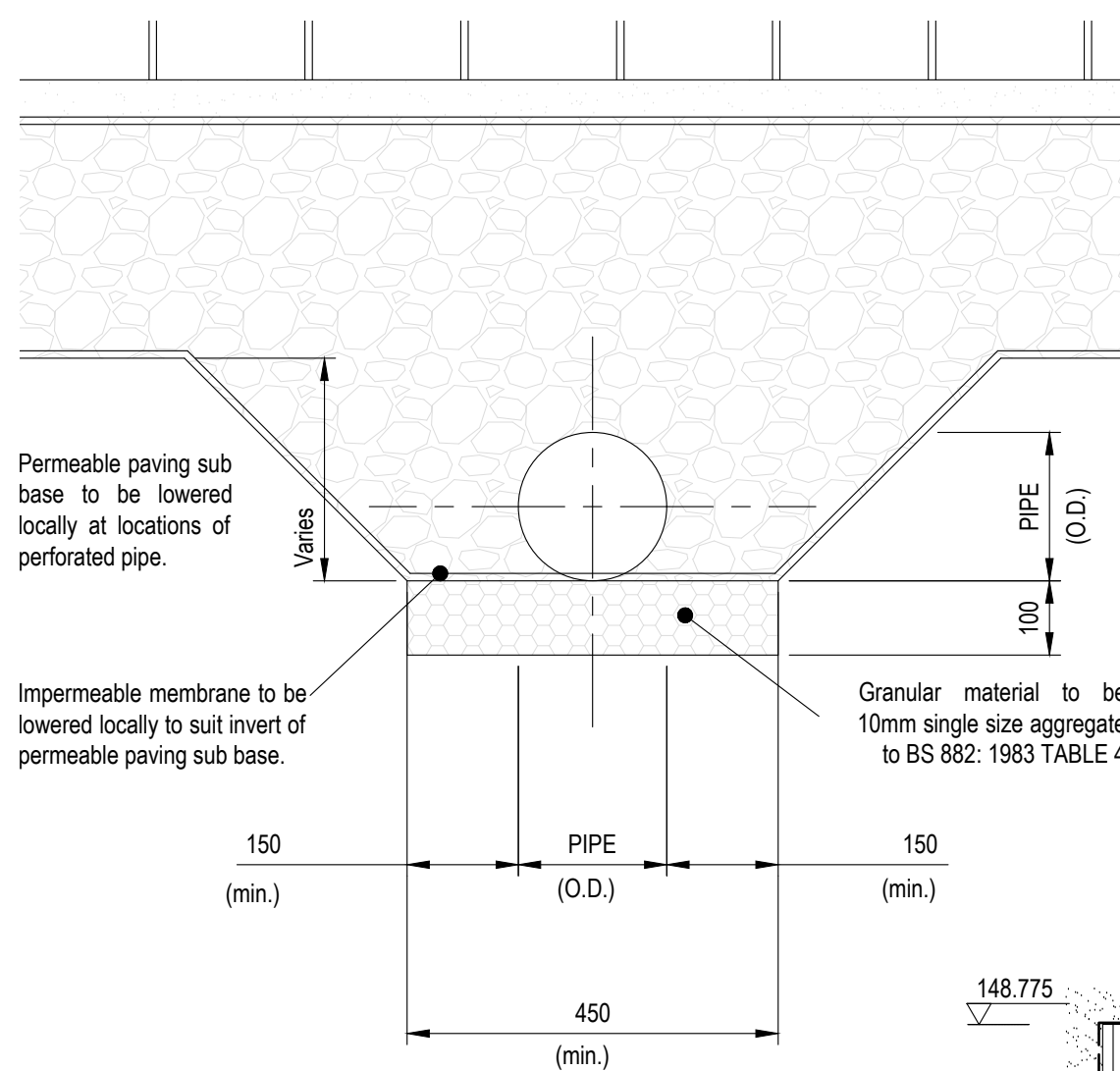
Concrete Surround Pipe Bedding

Scale 1:20



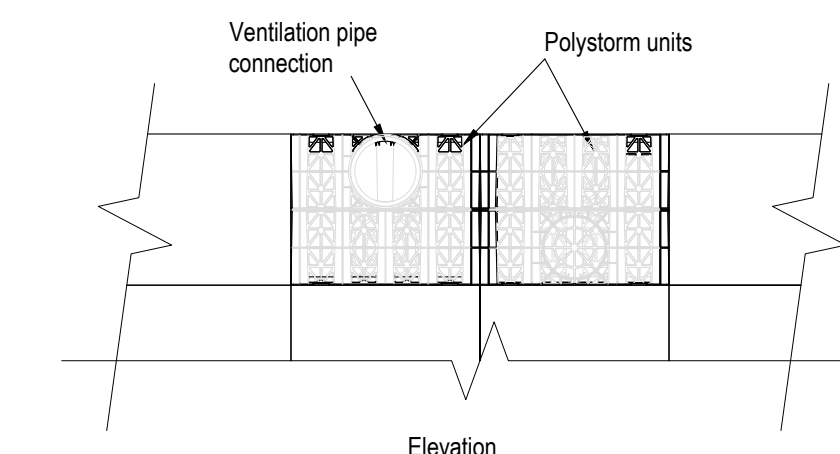
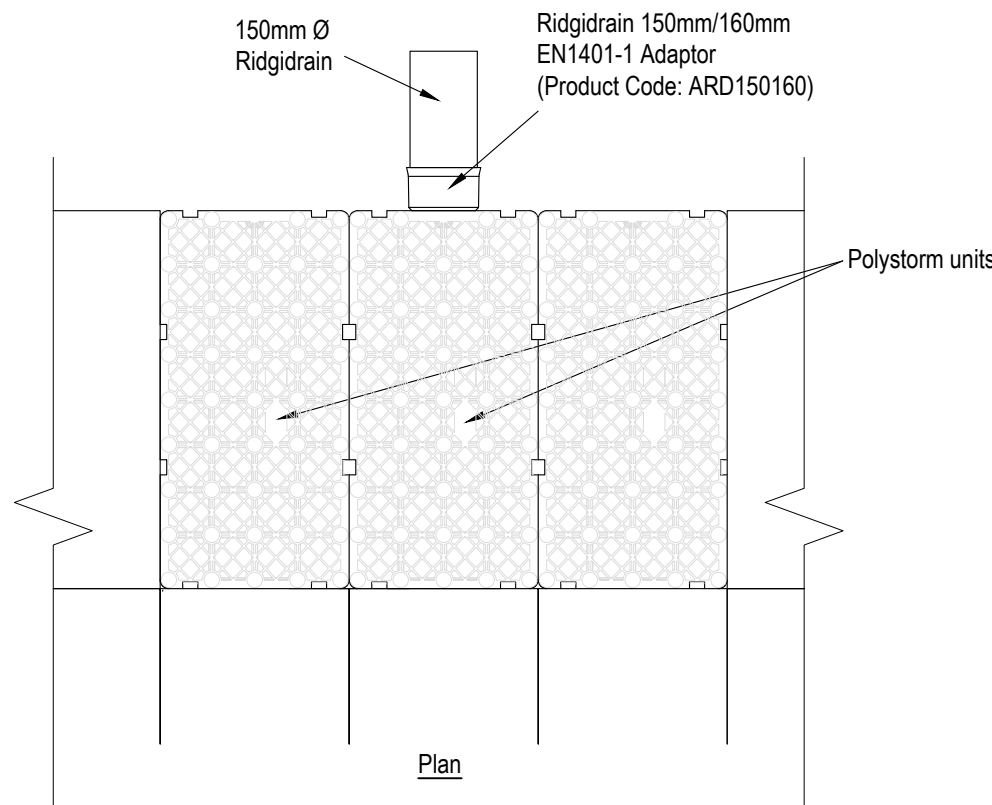
Rodding Point

Scale 1:20



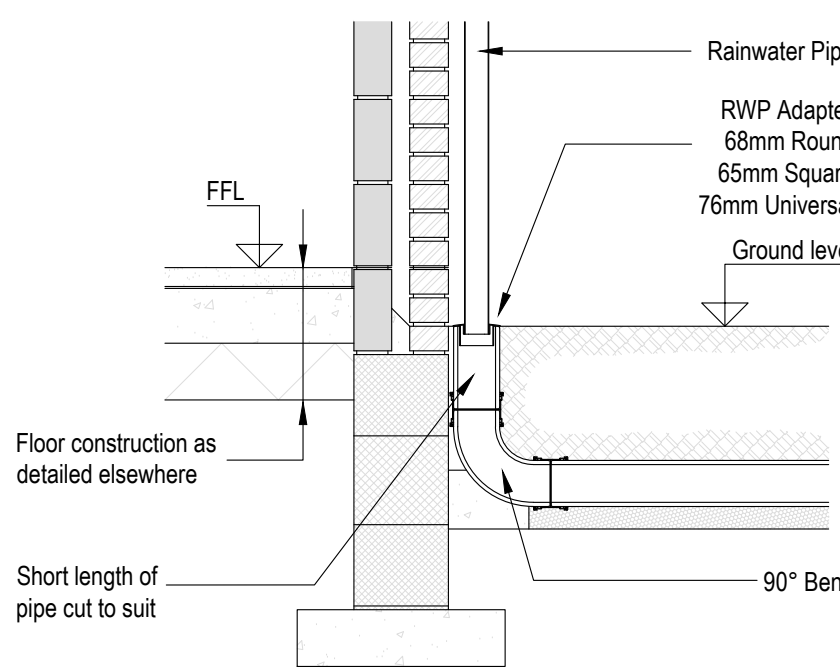
Perforated Pipe Bedding

Scale 1:10



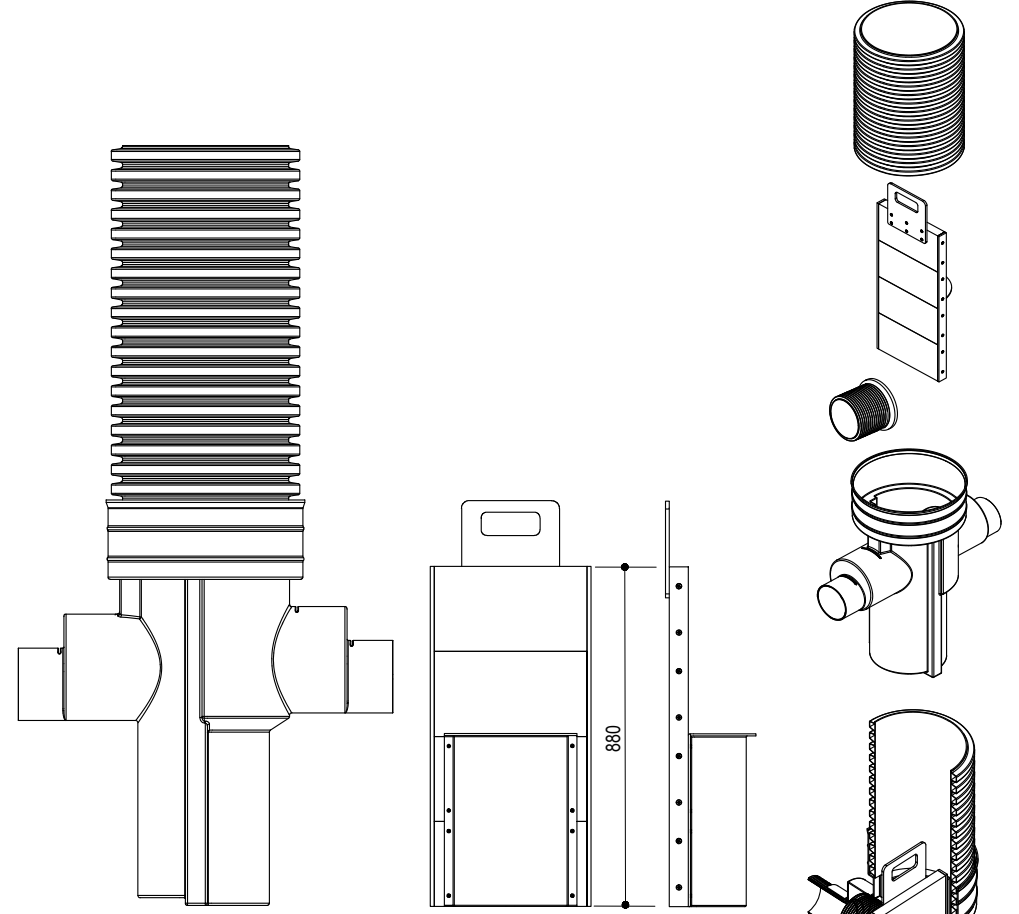
Polystyrene 150mm ventilation pipe connection

Scale 1:20



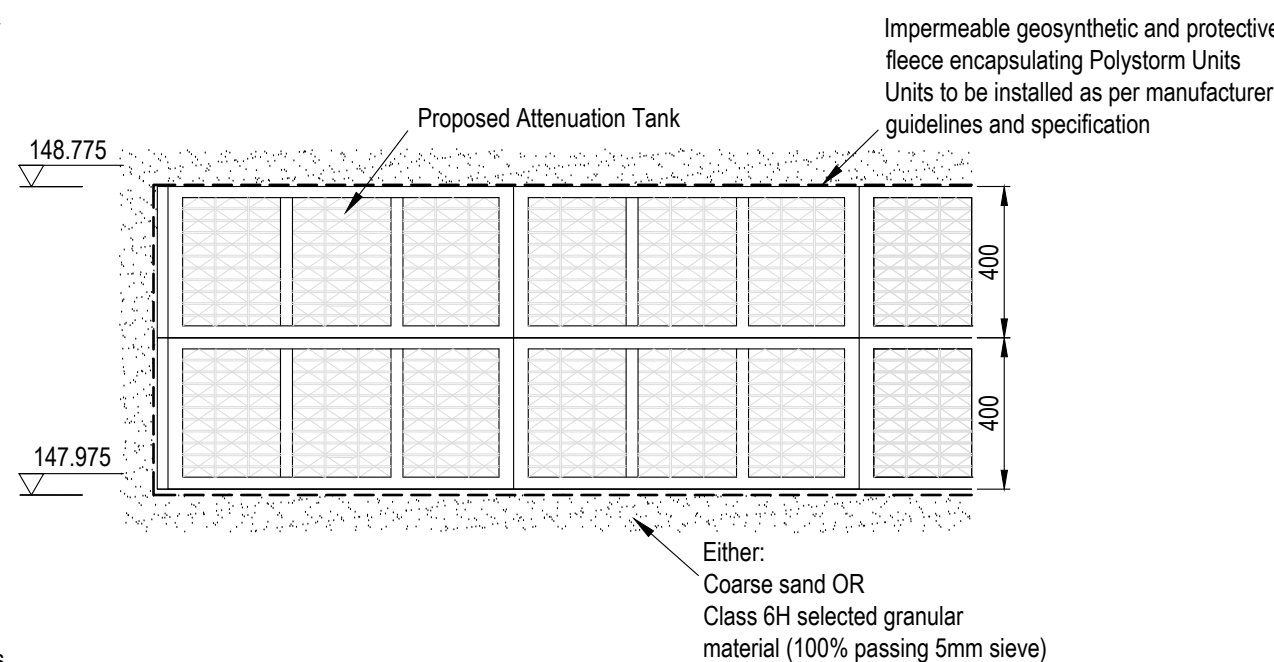
External RWP Connection Detail

Scale 1:20



Ø450mm Orifice Control Chamber
- Protected with SILTBLOK

Not to Scale



Typical Section Through Attenuation Tank

Scale 1:20

Scale
As Shown

P2	Updated Construction Details	SP	BN	04.06.2026
P1	Preliminary Issue	MRK	BN	18.03.2026
Issue	Notes	Drawn	Approved	Date
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Project No. EX2020912		Drawing No. 202		Issue P2
PRELIMINARY				