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civil and structural engineers

114290

Orchard Gate, Dibden Purlieu
Proof of Evidence: Relating to Matter of Drainage

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Content
Proof of Evidence: Relating to Matters of Drainage

1 Introduction

1.1 Qualifications and Experience

1.1.1 I am Gerry Bird. I have a Bachelor of Science Degree in Product Design BSc (Hons) having studied at Bournemouth University. I joined Calcinotto in September 2010 following over 6 years of experience in civil engineering and currently hold the position of Civil Engineering Technical Manager. I have extensive experience designing and managing drainage and civil infrastructure projects within multiple sectors including residential developments for private clients, developers and housing associations.

1.1.2 Calcinotto Civil and Structural Engineers have been operating since 2003 and provide civil and structural design and consulting services for clients the length and breadth of the country.

1.1.3 I personally overview the design for the drainage and external works that is the subject of this appeal and have been involved since our initial appointment in April 2021. This involvement has included the preparation of a concept surface water drainage strategy scheme followed by a full detailed drainage and external works design, negotiation with the local water authority (Southern Water) and revised designs based on the outcome of on-site investigation works.

1.1.4 Calcinotto have extensive experience in the design and delivery of many similar residential developments mainly located across the south of the UK and have an extensive portfolio of built examples.

1.2 Brief

1.2.1 The application that is the subject of the appeal comprises the upgrading of the existing access, demolition of the existing dwelling and the erection of 25 dwellings with associated landscaping, accesses, private gardens and parking.

1.2.2 Calcinotto were instructed by AJC Developments Ltd in April 2021; initially our appointment was to produce a viable surface water drainage scheme for the proposed residential development at Orchard Gate, Dibden Purlieu. This concept scheme was based on; the topographic survey, architects plans and the results of the site investigation carried out by Geo-environmental, summarised in a preliminary information report issued April 2021.

1.2.3 Calcinotto were later requested by AJC Developments to review and develop the concept drainage scheme, providing a detailed drainage and external works design for a revised housing layout, which would be issued in July 2022. The design would be informed by a new site investigation undertaken and issued by Geo-environmental in June of 2022. The new site investigation was more extensive, taking readings via trial pits over a greater area of the site.

1.2.4 The drainage design for the site comprised both foul drainage and surface water drainage solutions: The foul drainage facilitates efficient discharge of domestic wastewater from the development to the downstream public foul sewer. The surface water drainage can either be controlled at source using SuDS (Sustainable Drainage Systems) techniques (see 2.3 below) and / or released at a controlled discharge to the nearest suitable connection point. In this case, the use of 'Soakaways', to drain the surface water over time (i.e. roof and hardstand run-off) into the ground was considered, subject to the results of on-site Investigation testing.

1.2.5 Further on-site infiltration testing was carried out by Geo-environmental in December of 2022. The final tests were conducted to fully comply with the standards specified within BRE Digest 365, and to assess the performance of the ground conditions during the winter period when it is most heavily surcharged. Calcinotto engineers were then reapproached by AJC Developments in January of 2023, to comment on the new site investigation and advise on the implications. We reviewed the results, and I advised the client that an infiltration only solution would not be practical for these site conditions. We then completed a capacity check enquiry form to Southern Water to investigate the potential for a new positive connection into the existing public foul water sewer within Noads Way. This was accompanied by a new drainage strategy drawing which I designed to utilise an attenuation tank and pumped flow control system. The capacity check was issued to Southern Water in February of 2023 along with the revised strategy drawing which was also issued to AJC Developments.

1.3 Scope of Evidence

1.3.1 This proof focuses on the third reason for refusal. *'The scheme has failed to demonstrate that surface water can be dealt with in a manner that would not give rise to increased surface water flooding on-site and meet the requirements of delivering sustainable drainage contrary to policy STR1 of the New Forest Local Plan Part 1: Planning Strategy 2020.'*

1.3.2 My evidence is therefore confined to matters of the surface water drainage design, flood risk, sustainability and climate change. This evidence should be read in conjunction with the submitted application drawings and documents listed within section 8.

1.4 Structure

1.4.1 This evidence defines and summarises the approach taken to the surface water drainage design and how it has evolved from the initial scheme design to the most recent, adapting to the results of each site investigation to prioritise sustainability and minimise flood risk. The evidence will address how the current proposed drainage solution follows the core design principles of 'Sustainable Drainage Systems' (SuDS) hierarchy as set-out in 'Part H3' of the 'Government Building Regulations 2010'.

1.4.2 This evidence further explores whether a more sustainable option is viable should additional infiltration features be adopted, based on the findings of the most recent infiltration tests carried out by Geo-environmental in December 2022.

2 Executive Summary

2.1 The application that is the subject of the appeal comprises the upgrading of the existing access, demolition of the existing dwelling and the erection of 25 dwellings with associated landscaping, accesses, private gardens and parking.

2.2 This proof focuses on the third reason for refusal. *'The scheme has failed to demonstrate that surface water can be dealt with in a manner that would not give rise to increased surface water flooding on-site and meet the requirements of delivering sustainable drainage contrary to policy STR1 of the New Forest Local Plan Part 1: Planning Strategy 2020.*

2.3 This evidence defines and summarises the approach taken to the surface water drainage design to prioritise sustainability and minimise flood risk. The evidence will address how the current proposed drainage solution follows the core design principles of 'Sustainable Drainage Systems' (SuDS) hierarchy and further explores whether a more sustainable option is viable should additional infiltration features be adopted.

2.4 There are two documents that are referenced within the reason for refusal, one directly and one by association. STR1 within the 'New Forest Local Plan Part 1' and the SuDS Hierarchy as outlined within 'Part H3' of the 'Government Building Regulations 2010'. These elements are also addressed by the 'Planning Policy Guidelines (PPG) on Flood Risk and Coastal Changes'.

2.4.1 The surface water drainage has been modelled and analysed using Micro Drainage Software, which is an industry standard application. Appropriate storm return periods have been used in accordance with the CIRIA Documents including an allowance for climate change.

2.5 The infiltration rates used within the drainage analysis have been taken from site investigation findings produced by Geo-environmental. Three investigations have been done in total, the first two in April 2021 and June 2022, which both provided infiltration rates but not fully in compliance with the methodology outlined within BRE Digest 365. The final site investigation was carried out in December 2022, meeting the standard, and assessing the infiltration rate during the winter period.

2.6 Factors of safety have been included within the design analysis as outlined within table 25.2 within the 'CIRIA SuDS Manual' see Fig 3.0.

2.7 Any proposed infiltration feature will need to meet the requirements of the 24-hour half drain time as referenced in 'BRE Digest 365' and the 'Ciria SuDS Manual'.

2.8 Due to the residential nature of the site, a 10% allowance has been added to the total roof areas for urban creep, increasing the overall run-off area for the surface water drainage.

2.9 The site is located at Orchard Gate, Noads Way, Dibden Purlieu, SO45 4PD.

2.10 The Environment Agency flood maps show that the site sits entirely within a Zone-1 'very Low' flood risk area for flooding from 'Rivers or the Sea'. The flood map for surface water does however show a localised area of 'Medium' to 'High Flood Risk' within the centre of the site. This is likely due to the on-site levels and conditions as there are no public surface water sewers, drainage ditches or watercourses adjacent to the site.

2.11 Trial pits have been excavated across the site, the results of which can be seen in the three site investigations carried out by Geo-environmental. These investigations reveal the ground to be comprised of 'silty sandy clay' down to a depth of between 0.5 and 0.7m. The underlying soils are comprised of a 'clayey, gravelly sandy medium'. The ground make-up is consistent with and classed as 'River Terrace Deposits'

2.12 Infiltration testing has been carried out across the site revealing low rates of infiltration consistent with the site conditions. The final round of tests conducted in December 2022 recorded rates in the low x10-6 m/s range for the deeper tests and failed to record any infiltration rate for the shallower tests, since the tests stalled and an insufficient drop in water level was recorded.

2.13 Pictures taken on-site by a third party confirm that standing water is currently an issue for the site. These images would appear to support the findings of the 3 No. site investigations, that a large amount of clay content makes up the ground and that little to no infiltration is being achieved within the shallower ground formation, despite the existing site being almost entirely unpaved surface.

2.14 There are no public surface water sewers within the vicinity of the site as confirmed via review of the Southern Water public sewer records. A network of 150mm diameter public foul water sewers run within the highway in front of and around the site.

2.15 Two separate drainage schemes were produced for the development, both utilising infiltration measures for the disposal and management of the Surface Water drainage. These schemes were both based on the results of the first two site investigations carried out by Geo-environmental in April 2021 and June 2022. While both schemes did present a solution that would be viable, they were each reliant on a large amount of permeable paving which would work alongside additional SuDS measures such as infiltration tanks.

2.16 The new infiltration testing, carried out in December 2022, recorded a dramatic drop in the amount of infiltration being achieved. This will be partly due to the tests being repeated within each trial pit, in accordance with the BRE Digest 365 Guidelines, but this will also be due to the wetter conditions encountered during the winter months. The new results cut the infiltration rates that could be used in the design of the infiltration tanks and eliminated any possibility of infiltrating via permeable paving. This would make an infiltration only system unviable for the site.

2.17 To further assess the viability of an infiltration only SuDS solution I looked at how utilising more infiltration tanks would affect the overall performance of the system. The results of this exercise demonstrate that an infiltration only solution would be unviable for the development, even when designing to optimum parameters and standards. This is due to the low infiltration rates being achieved by the proposed infiltration tanks and the lack of any infiltration at shallower depths negating the use of permeable paving as an infiltration method.

2.18 Taking into account the analysis and ground conditions illustrated within this Proof of Evidence and following the steps within the SuDS hierarchy, it is now proposed to discharge all surface water flows to the existing public foul sewer in Noads Way. The off-site flows will be limited to an appropriate rate with the additional flows stored on-site within an attenuation system. It will not be possible to make the connection for the surface water by gravity alone given the level of the site. This means that the surface water drainage will need to be pumped to the higher level using a small surface water pump and rising main.

2.19 The lowest flow rate safely sustainable with a surface water pump station is 2.0 l/s so this would be the target flow rate for the development. Attenuation features would also serve as emergency storage in the event of power loss or pump failure allowing time for repairs to be undertaken.

2.20 Overland flow routes have been considered and do not increase flood risk to the properties neighbouring the site or pose a flood risk to the proposed new dwellings.

2.21 Discussions have been undertaken with Southern Water, who have confirmed there is currently insufficient capacity within the existing public foul sewer for the new proposed surface water flows, however they do accept that the connection is a valid strategy subject to planning approval and upgrade works could be undertaken. An assessment of the necessary sewer upgrade works has been undertaken by the client and reveals that a 280m length of the existing 150mm diameter public foul sewer would need to be upgraded to a 225mm diameter sewer.

2.22 I believe that the current proposed surface water strategy, to attenuate flows and discharge them to the existing public sewer via a flow-controlled pump solution; does comply with the standard outlined within parts (v) and (vi) of 'Policy STR1' within the 'New Forest Local Plan Part 1' and demonstrates an appropriate solution in line with current SuDS guidelines.

3 Policy

3.1 Introduction

3.1.1 There are two documents that are referenced within the reason for refusal, one directly and one by association. I have attached these documents below and summarised the key elements within them.

3.2 Policy STR1 within the 'New Forest Local Plan Part 1'

Policy STR1: Achieving sustainable development

All new development will be expected to make a positive social, economic and environmental contribution to community and business life in the Plan Area by:

Meeting most development needs within settlement boundaries, in a manner that is appropriate for and proportionate to the nature and size of the settlement, and where there is or will be sufficient supporting infrastructure and services;

i. Ensuring that the housing needs of local communities are addressed by locating new residential development in sustainable and accessible locations, and ensuring that new development provides a mix of types of home by size, tenure and cost to help to address the full spectrum of local housing needs at all stages of life;

ii. Taking a context and landscape-led approach to the siting and design of development to deliver high quality design that maintains local distinctiveness, creates high quality new landscapes and townscapes, safeguards the Green Belt and AONB, sustains and enhances the heritage, scenic and amenity value of the Plan Area, and has appropriate regard to and the purposes of the adjoining New Forest National Park;

iii. Achieving an environmental net gain[17] and avoiding wherever possible or mitigating where necessary the direct and indirect impacts of development on the integrity of the New Forest, Solent, River Avon and other International Nature Conservation sites, and on other areas, species or habitats of nature conservation value;

iv. Ensuring development contributes to a diverse and thriving local economy providing an overall balance of uses, services and opportunities that are accessible by sustainable transport modes as well as by car, in order that reliance on the private car is minimised;

v. Ensuring communities and workers are safe and feel safe, and the risks to people, places and to the environment from potential hazards including pollution, flooding and climate change effects are minimised;

vi. Ensuring that new development is adaptable to the future needs of occupiers and future-proofed for climate change and innovations in transport and communications technology.

Fig. 1.0: Extract from NFDC Local Plan Part 1

3.2.1 It is considered that parts 'v' and 'vi' of Policy STR1 within the '*New Forest Local Plan Part 1: Planning Strategy 2020'* are most relevant to this reason for refusal as they address flood risk and climate change.

3.3 SuDS Hierarchy

3.3.1 The SuDS Hierarchy is outlined within 'Part H3' of the 'Government Building Regulations 2010' and breaks down as illustrated within the below diagram taken from the Southern Water 'Outline Guidelines for Sustainable Drainage Systems'. Only when one step on the SuDS hierarchy has been proven to be unviable may the next one be considered.

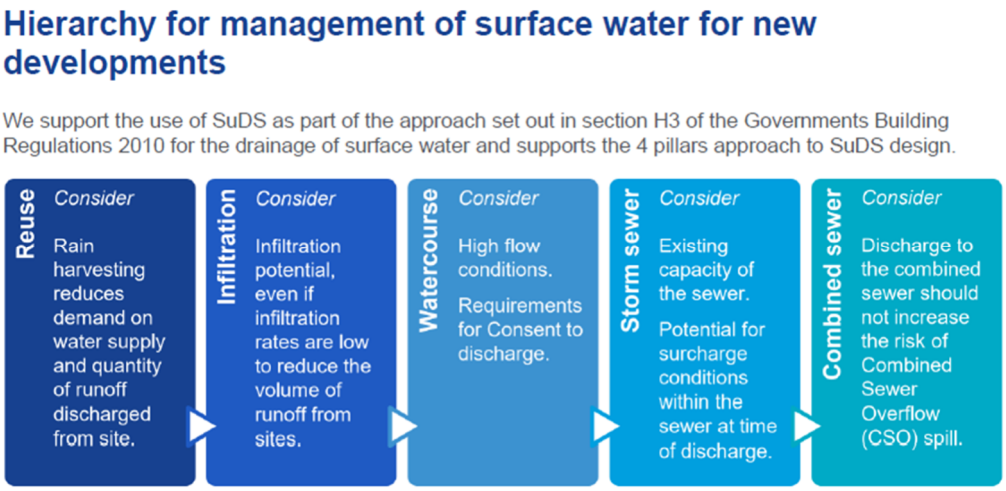


Fig 2.0: Extract from Building Regs Part H3@ SuDS Hierarchy

3.3.2 While the SuDS hierarchy consists of 4 main pillars, consideration can also be given to rainwater harvesting (reuse of rainwater for other purposes) which will help minimise the quantity of water discharging from site. It should be noted that depending on its intended use, storage provided by rainwater harvesting may be included in addition to that provided by the SuDS measures but could not be used to offset the attenuation or infiltration storage for the development. For example, if water butts were used to harvest surface water for garden watering, at times of the year when the rainfall is highest, such as during winter, the gardens will need less water and the RWH storage will be full more often and would likely not be available for use when a storm occurs.

3.3.3 Step 1 on the hierarchy is to manage all surface water drainage on-site using infiltration systems.

3.3.4 Step 2 is to discharge the surface water to a watercourse or drainage ditch. Attenuation and flow control measures are to be used to limit the discharge to an agreed flow rate.

3.3.5 Step 3 is to discharge the surface water to an existing surface water sewer. Attenuation and flow control measures are to be used to limit the discharge to an agreed flow rate.

3.3.6 Step 4 and the final step on the SuDS hierarchy is to discharge the surface water drainage into a combined sewer or foul sewer. Attenuation and flow control measures are to be used to limit the discharge to an agreed flow rate.

3.4 Planning Policy Guidelines (PPG) on Flood Risk and Coastal Changes

3.4.1 This government framework has been produced by the 'Department for Levelling up Housing' and the 'Ministry of Housing, Communities and Local Government'. The PPG outlines guidance to the local authorities (The Lead Local Flood Authorities or LLFAs) on how they should consider flood risk during the planning review process. This covers aspects such as Floor Risk Assessments, Design Considerations, the use of SuDS and developments within Flood Risk Zones. The PPG is intended to serve as guidelines to the LLFAs only and is not enacted as regulation that must be adhered to. Instead, it serves to inform the planning review process highlighting the aspects of flood risk that should be addressed.

4 Design Standards

4.1 Rainfall Modelling and Climate Change Allowance

4.1.1 I modelled and analysed the performance of the proposed surface water drainage systems using Micro Drainage Software which is an industry standard application, used in the design of both foul and surface water drainage systems.

4.1.2 In accordance with best practice guidelines and in particular CIRIA Documents C753, C697 and C687. The new surface water drainage systems have been designed using the following design return periods. It should be noted that these rates reflect the climate change allowances in place when the development first entered planning in 2021.

1 in 2 year with no climate change
1 in 30 year + 20% climate change
1 in 100 year + 40% climate change

4.1.3 FEH (Flood Estimation Handbook) rainfall data has been used within the design simulations which provides accurate rainfall estimation figures based on local rainfall data.

4.2 Infiltration Rates and Factors of Safety

4.2.1 The infiltration rates (the time taken for water to drain into the ground) used within the drainage analysis have been taken from site investigation findings produced by Geo-environmental. It is noted that in both the initial site investigations (conducted in April 2021 and June 2022) only one infiltration test was carried out per trial pit location (with the exception of one trial pit that conducted two) which is not compliant with the method outlined within BRE Digest 365. This document dictates that 3 No. tests must be carried out per location to assess the fall-off in infiltration as the ground becomes saturated. The lowest of the 3 No. test results is then used within any design analysis. In instances where only one test was undertaken the given results have been used to assess the consistency of the ground conditions and the viability of infiltration. These results would not be used for any final detailed design analysis.

4.2.2 Following the initial site investigations, an additional set of infiltration tests were conducted in strategic locations where infiltrations systems were to be used. These tests were carried out during the winter period of December 2022 to assess the ground conditions when they are most vulnerable due to the increased rainfall typically encountered during the winter months. These tests were carried out in compliance with BRE Digest 365, recording 3 No. results within each test pit.

4.2.3 Factors of safety have been included within the design analysis as outlined within table 25.2 within the 'CIRIA SuDS Manual' see Fig 3.0. Proposed ground levels were designed to manage and channel any potential surface water flooding away from the dwellings towards the access road and parking areas. While total catchments would exceed 1,000m², individual catchments for separate SuDS features will range from 100m² to 1,000m², so for the purposes of design and analysis a safety factor of 3.0 has been used to maximise the potential viability of infiltration.

TABLE 25.2 Suggested factors of safety, F, for use in hydraulic design of infiltration systems (designed using Bettess (1996). Note: not relevant for BRE method)

Size of area to be drained	Consequences of failure		
	No damage or inconvenience	Minor damage to external areas or inconvenience (eg surface water on car parking)	Damage to buildings or structures, or major inconvenience (eg flooding of roads)
< 100 m²	1.5	2	10
100–1000 m²	1.5	3	10
> 1000 m²	1.5	5	10

Fig 3.0: Extract from CIRIA SuDS Manual – Safety Factors in Hydraulic Design of Infiltration Systems

4.2.4 The 'Factor of Safety' impacts upon the infiltration rate within the design analysis, dividing it by the value of the safety factor. This allows for inconsistencies within the ground conditions and potential siltation within any SuDS features, impacting on their performance.

4.3 Half Drain Time

4.3.1 Any proposed infiltration feature will need to meet the requirements of the 24-hour half drain time as referenced in 'BRE Digest 365' and the 'Ciria SuDS Manual'. This dictates that the storage volume available within an infiltration system must be able to half empty via infiltration within a 24-hour period, following a peak storm event. This allows for a portion of the storage to be freed up again to accommodate new flows from a repeat storm event.

4.4 Allowance for Urban Creep

4.4.1 Due to the residential nature of the site, a 10% allowance has been added to the total roof areas for urban creep, increasing the overall run-off area for the surface water drainage. This will allow for any future expansions such as home extensions and/or garden landscaping which would contribute additional flows to the surface water drainage network.

4.4.2 An urban creep allowance has not been added to the area of the external surfaces or highway since there is no capacity to extend or increase the shared access road or parking areas.

4.5 SuDS Management Train

4.5.1 The 'SuDS Management Train', which is a basic SuDS principle, is applied when designing for infiltration systems should they be viable. In terms of the SuDS 'Management Train' the drainage strategy for the proposed development would seek to address the quality and quantity of run-off using the hierarchy points listed below.:

i) Prevention - to minimise the risk of pollution and introduce measures to cover maintenance of the drainage system for the lifetime of development.

ii) Source Control – Control and discharge of run-off at its source using infiltration measures to eliminate off-site surface water discharge. Where possible measures have been incorporated to integrate this with landscape features.

iii) Site control - The proposed surface water system separates the run-off from the roofs, road, and paved areas for each part of the development and deals with it at source via infiltration methods.

iv) Regional control - Management of run-off form more than one site at a time but in this is not applicable and so is covered by site control.

5 Existing Site

5.1 Site Location

Fig 4.0: Aerial image of site (Google Earth)

5.1.1 The site is located at Orchard Gate, Noads Way, Dibden Purlieu, SO45 4PD.

5.2 Flood Risk

5.2.1 The Environment Agency flood maps show that the site sits entirely within a Zone-1 'very Low' flood risk area for flooding from 'Rivers or the Sea'. The flood map for surface water does however show a localised area of 'Medium' to 'High Flood Risk' within the centre of the site, see Fig 5.0 below. Since there are no public surface water sewers, drainage ditches or watercourses in the local area this could be caused by surface run-off from the site itself collecting within an isolated low spot, which would be improved by the introduction of a new surface water drainage system to serve the site. This is supported by the pictures within section Fig 6.0, which show surface ponding collecting on the site.

Fig 5.0: UK Gov Flood Map for the site (showing localised flooding within the boundary)

5.3 Existing Ground Conditions and Infiltration Tests

5.3.1 Trial pits have been excavated across the site, the results of which can be seen in the three site investigations carried out by Geo-environmental. These investigations reveal the ground to be comprised of 'silty sandy clay' down to a depth of between 0.5 and 0.7m. The underlying soils are comprised of a 'clayey, gravelly sandy medium'. The ground make-up is consistent with and classed as 'River Terrace Deposits'.

5.3.2 Infiltration testing was carried out during each of the three site investigations, with the first two undertaken in April 2021 and June 2022; consistently recording results in the mid x10-6 m/s range which is considered unsuitable in most cases for infiltration. Some results did record a low x10-5 m/s result, however the infiltration tests carried out during both investigations were not repeated the necessary number of times to be consistent with the method outlined within BRE Digest 365. The rates could therefore be used as preliminary design guidance only; however, these rates can be used to demonstrate the consistency of the infiltration performance across the site.

5.3.3 The final round of infiltration tests, carried out during the winter period of December 2022, recorded two very low rates of infiltration within trial pits TP01 and TP02 (Both 1.7m deep). These pits were positioned to assess the performance of the proposed infiltration tanks. The investigation was not able to calculate any infiltration within trial pits TP03 and TP04 (Both 0.7m deep), since the tests both stalled and were not able to drain down to 75% within a 24-hour period. These pits were intended to assess the performance of permeable paving. The results were as follows:

- TP01 – 4.3 x 10-6 m/s or 0.01548 m/h (Lowest of the 3 No Tests)
- TP02 – 3.3 x 10-6 m/s or 0.01188 m/h (Lowest of the 3 No. Tests)
- TP03 and TP04 – Failed to record a stable infiltration rate

5.3.4 For comparison when designing an infiltration tank, we typically would want to see an infiltration rate in the range of x10-4 m/s which would be 100 times greater than an equivalent value in the x10-6 m/s range. For the design of permeable paving systems where the ratio between effective infiltration area and storage volume is much greater an infiltration rate in the x10-5 m/s range is considered optimum. In both cases, lower rates can be accommodated by sizing the infiltration systems appropriately providing that the proposed SuDS systems meet the necessary 24-hour half drain time requirement noted in Section 3.3.

5.4 Existing Site Photographs

5.4.1 Pictures taken on-site by a third party confirm that standing water is currently an issue for the site. This can be seen in the two images below. These images would appear to support the findings of the 3 No. site investigations, that a large amount of clay content makes up the ground and that little to no infiltration is being achieved within the shallower ground formation, despite the existing site being almost entirely unpaved surface.

Fig 6.0: Images of ponding at the site

5.5 Existing Public Foul and Surface Water Sewers

5.5.1 There are no public surface water sewers within the vicinity of the site. This has been confirmed via review of the Southern Water public sewer record drawings as well as via correspondence with Southern Water.

5.5.2 A network of 150mm diameter public foul water sewers runs within the highway in front of and around the site. This has been confirmed via review of the Southern Water public sewer record drawings as well as via correspondence with Southern Water.

5.6 Summary Notes:

5.6.1 The existing ground conditions have been shown via ground investigations and on-site testing to be generally unsuitable for infiltration. Some surface flooding would be expected due to the ground conditions and has been recorded on site.

5.6.2 No Public Surface Water or Combined Sewers serve the site with only Public Foul Water Sewers being available.

6 Detailed assessment of Infiltration Viability

6.1 Initial Drainage Scheme Concepts

6.1.1 Two separate drainage schemes were produced for the development, both utilising infiltration measures for the disposal and management of the Surface Water drainage, in line with the SuDS hierarchy outlined in Section 2.3. These schemes were both based on the results of the first two site investigations carried out by Geo-environmental in April 2021 and June 2022. Both investigations recorded infiltration rates ranging between a low x10-5 m/s to mid x 10-6 m/s. Each scheme reflected the proposed site layout for the development at that stage.

6.1.2 While both schemes did present a solution that would be viable, they were each reliant on a large amount of permeable paving (paved surfaces suitable for car parking etc which allows surface water to percolate into the ground below) which would work alongside additional SuDS measures such as infiltration tanks. The permeable paving would be used to manage the majority of the external surfaces while the roof run-off areas and the remaining external surfaces would be managed within the infiltration tanks.

6.1.3 Run-off areas were divided up appropriately to channel the majority of the surface water drainage into the infiltration systems that were able to utilise the higher rates of infiltration, maximising the efficiency of the SuDS where possible. Despite this, it was not possible to meet the 24-hour half drain time for all surface water SuDS features, even during the peak 1:30+ 20% storm event. To assist with this the tanks were slightly oversized to provide additional storage that could be utilised during a repeat storm event.

6.1.4 The first two drainage schemes can be seen on Calcinotto drawings, 114290-CAL-XX-XX-CA-D-003, 005, 006 and 007 Included within Appendix C.

6.2 Impact on Scheme from Wintertime Testing

6.2.1 The new infiltration testing carried out in December 2022 and discussed in section 4.3.3 recorded a dramatic drop in the amount of infiltration being achieved. This will be partly due to the tests being repeated within each trial pit, in accordance with the BRE Digest 365 Guidelines, but this will also be due to the wetter conditions encountered during the winter months. It is for this reason that the Lead Local Flood Authorities now request testing to be undertaken at this time.

6.2.2 The new results cut the infiltration rates that could be used in the design of the infiltration tanks and eliminated any possibility of infiltrating via permeable paving. This would make an infiltration only system unviable for the site.

6.3 Effectiveness of an optimised Infiltration System

6.3.1 To further assess the viability of an infiltration only SuDS solution I looked at how utilising more infiltration tanks would affect the overall performance of the system.

6.3.2 The first step to this exercise is to highlight where we can and where we cannot locate infiltration tanks to efficiently use the space that is available. Below ground infiltration measures must be positioned at least 5.0m away from any adjacent structure to minimise their impact on the foundations. The requirement can be relaxed for permeable paving which can in some cases be allowed to run directly up against structures. There are also several tree protection zones located around the site which will prohibit excavation works. The following image ‘Fig 7.0’ highlights exclusion areas in red. The remaining areas can be used to accommodate infiltration tanks.

Fig 7.0: Infiltration Tank Exclusion Zones

6.3.3 An assessment of the surface water run-off areas has been shown in the illustration below 'Fig 8.0'. External surfaces discharging to the drainage are shown in green and roof run-off areas are shown in red. An additional 10% has been added to the total roof area to account for Urban Creep, See Section 3.4.

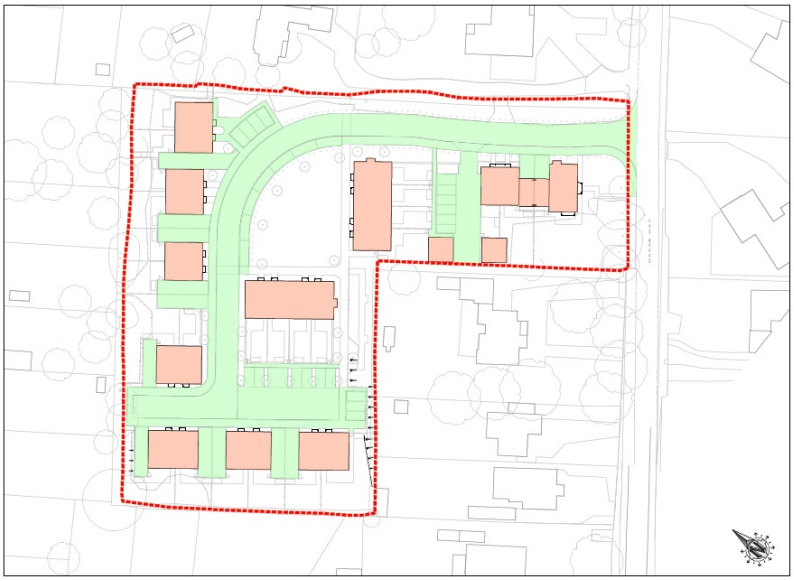


Fig 8.0: Proposed Surface Water Run-off Areas

6.3.4 Area Calculations:

- Total Site Area (Red Line Boundary) = 8,817.5m² or **0.882 ha**
- Total Roof Area Drained + 10% Urban Creep (Red Hatch) = 1,564.5m² or **0.156 ha**
- Total External Hard Surfaces Drained (Green Hatch) = 2,829.3m² or **0.283 ha**
- Total Area Drained = 4,393.8m² or **0.439 ha**

6.3.5 The image below 'Fig 9.0', shows where infiltration tanks can be located around the site. The 6 No. tanks shown have also been positioned and sized to avoid posing any conflict with the proposed foul water drainage system. Tank sizes have also been realistically optimised to allow adequate room for the connecting pipework and appropriate stand-off distances have been used between tanks.

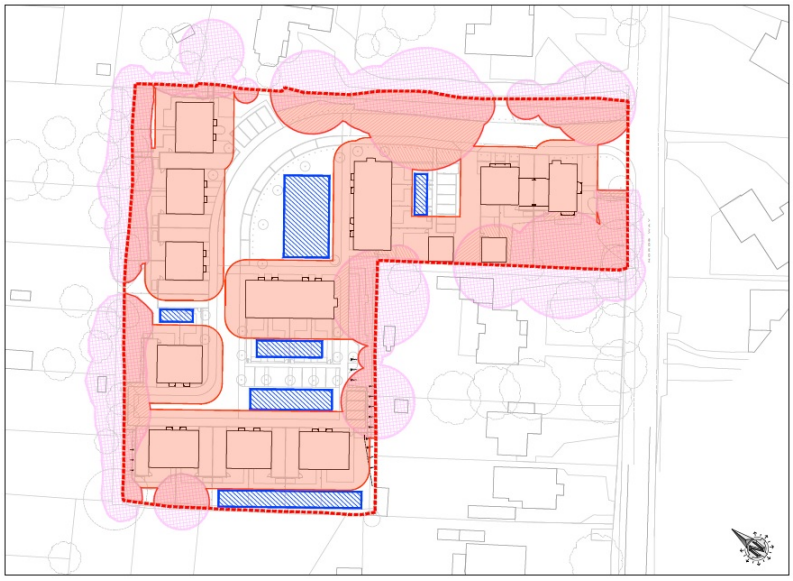


Fig 9.0: *Positions of Surface Water Infiltration Tanks Overlaid Over the Exclusion Plan.*

6.3.6 Finally, each of the 6 No. tanks has been assigned a reference (From A to F), so that they may be individually analysed based on their performance. These references are shown in 'Fig 10.0' below.

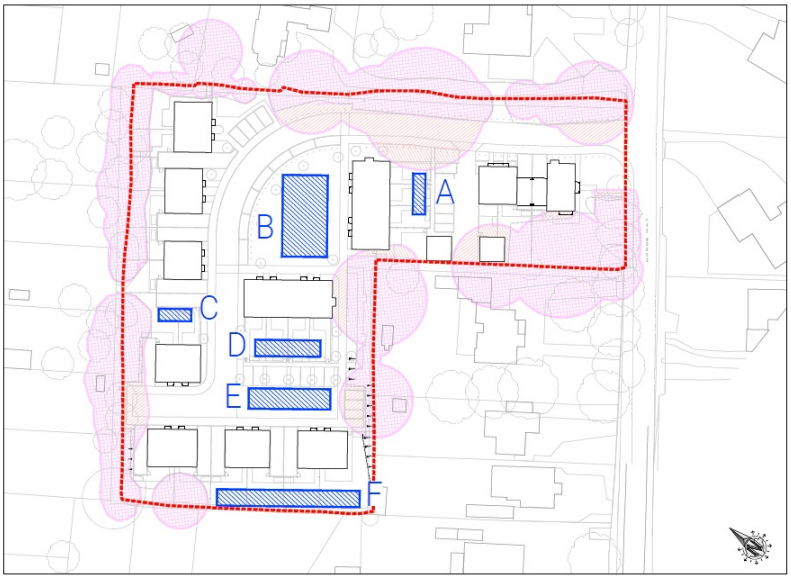


Fig 10.0*: Infiltration Tank Reference Plan*

6.3.7 Each of the tanks has been analysed using Micro Drainage Software to see how they would perform under a peak 1:30 +20% storm event and a peak 1:100 +40% storm event. The surface water run-off areas have been proportionally split between the tanks based on the base areas assuming an optimum distribution. This will give a very slight bias to the performance of the smaller infiltration tanks due to a more favourable volume to infiltration area ratio (once infiltration through the sides is factored in), but the overall results should be mostly consistent. Standard parameters have been used for each simulation which are listed below to keep results consistent. The infiltration rate used for each simulation is the higher of the two gathered from the December 2022 site investigation, again reflecting the optimal performance that could be ascribed to any of the individual tanks.

6.3.8 A breakdown of the results for each of the infiltration tanks has been summarised below. Each of the individual results that fail to meet the design standards has been highlighted in red for clarity.

6.3.9 Simulation Parameters:

- Infiltration rate to be used: 4.3 x 10-6 m/s = 0.0000043 m/s = 0.01548 m/h
- Safety Factor applied = 3.0
- C.V. Value = 1.0
- Rainfall Data = FEH
- Standard Cover Level = 40.000m AOD
- Standard Invert Level = 38.200m AOD

6.3.10 Results Summary – Infiltration Tank A:

- Tank Size: 35.0 x 4.0 x 0.8m deep / 140.0m² x 0.8m deep
- Run-off Area Drained: 0.106 ha

  Results for Peak 1:30y +20% Storm:
- Top Water Level = 38.775m AOD (0.575m deep)
- Peak Storm Duration = 10,080 min Summer (Longest Storm)
- Hald Drain Time = 2,778 mins / 1.92 Days (FAIL)

  Results for Peak 1:100y +40% Storm:
- Top Water level = 40.008m AOD (Full + 8.9m³ of Flooding)
- Peak Storm Duration = 10,080 min Summer (Longest Storm)
- Half Drain Time = 4,001 mins / 2.78 Days (FAIL)

6.3.11 Results Summary – Infiltration Tank B:

- Tank Size: 20.0 x 5.0 x 0.8m deep / 100.0m² x 0.8m deep
- Run-off Area Drained: 0.076 ha

  Results for Peak 1:30y +20% Storm:
- Top Water Level = 38.773m AOD (0.573m deep)
- Peak Storm Duration = 10,080 min Summer (Longest Storm)
- Hald Drain Time = 2,719 mins / 1.89 days (FAIL)

  Results for Peak 1:100y +40% Storm:
- Top Water level = 40.005m AOD (Full + 5.8m³ of Flooding)
- Peak Storm Duration = 10,080 min Summer (Longest Storm)
- Half Drain Time = 3,828 mins / 2.66 days (FAIL)

6.3.12 Results Summary – Infiltration Tank C:

- Tank Size: 16.0 x 4.0 x 0.8m deep / 64.0m² x 0.8m deep
- Run-off Area Drained: 0.048 ha

Results for Peak 1:30y +20% Storm:

- Top Water Level = 38.741m AOD (0.541m deep)
- Peak Storm Duration = 10,080 min Summer (Longest Storm)
- Hald Drain Time = 2,511 mins / 1.79 days (FAIL)

Results for Peak 1:100y +40% Storm:

- Top Water level = 39.822m AOD (Full, but Zero Flooding)
- Peak Storm Duration = 10,080 min Summer (Longest Storm)
- Half Drain Time = 3,462 mins / 3.04 days (FAIL)

6.3.13 Results Summary – Infiltration Tank D:

- Tank Size: 220.0 x 11.0 x 0.8m deep / 220.0m² x 0.8m deep
- Run-off Area Drained: 0.166 ha

Peak 1:30y +20% Storm:

- Top Water Level = 38.778m AOD (0.578m deep)
- Peak Storm Duration = 10,080 min Summer (Longest Storm)
- Hald Drain Time = 2,885 mins / 2.00 days (FAIL)

Peak 1:100y +40% Storm:

- Top Water level = 40.014m AOD (Full + 15.4m³ of Flooding)
- Peak Storm Duration = 10,080 min Summer (Longest Storm)
- Half Drain Time = 4,167 mins / 2.89 days (FAIL)

6.3.14 Results Summary – Infiltration Tank E:

- Tank Size: 9.0 x 3.0 x 0.8m deep / 27.0m² x 0.8m deep
- Run-off Area Drained: 0.020 ha

Peak 1:30y +20% Storm:

- Top Water Level = 38.723m AOD (0.523m deep)
- Peak Storm Duration = 10,080 min Summer (Longest Storm)
- Hald Drain Time = 2,233 mins / 1.55 days (FAIL)

Peak 1:100y +40% Storm:

- Top Water level = 38.982m AOD (0.782m deep)
- Peak Storm Duration = 10,080 min Summer (Longest Storm)
- Half Drain Time = 2,989 mins / 2.08 days (Fail)

6.3.15 Results Summary – Infiltration Tank F:

- Tank Size: 10.0 x 3.0 x 0.8m deep / 30.0m² x 0.8m deep
- Run-off Area Drained: 0.023 ha

Peak 1:30y +20% Storm:

- Top Water Level = 38.752m AOD (0.552m deep)
- Peak Storm Duration = 10,080 min Summer (Longest Storm)
- Hald Drain Time = 2,367 mins / 1.64 days (FAIL)

Peak 1:100y +40% Storm:

- Top Water level = 39.695m AOD (Full, but Zero Flooding)
- Peak Storm Duration = 10,080 min Summer (Longest Storm)
- Half Drain Time = 3,183 mins / 2.21 days (FAIL)

6.3.16 As can be seen in the results above, each of the tanks experienced a half drain time ranging between 1.5 and 2.0 days for the peak 1:30-year +20% event and 2.0 to 3.0 days for the peak 1:100-year +40% event. This fails to meet the 24-hour target for even the lesser of the two storm durations. It should also be noted that in every instance the worst-case storm was the 10,080 min event which was the longest storm run for each simulation. This demonstrates that the amount of infiltration being achieved is extremely low and the simulations were not able to peak within the set of storms analysed. This would prove most detrimental during repeat storm events where the amount of surface water run-off entering each of the infiltration tanks would be compounded.

6.3.17 Flooding was predicted for half of the 1:100-year +40% events which would total 30.1m³ of flooding for the combined system. This amount of flooding would likely prove problematic for a site of this size even if directed away from the dwellings.

6.4 Summary Notes:

6.4.1 An infiltration only solution has been demonstrated to be unviable for the development, even when designing to optimum parameters and standards. This is due to the low infiltration rates being achieved by the proposed infiltration tanks and the lack of any infiltration at shallower depths negating the use of permeable paving as an infiltration method.

7 Detailed Design of Proposed Strategy

7.1 Assessment of SuDS Hierarchy

7.1.1 The information provided within the site investigations and the analysis of an infiltration only solution demonstrate that Step 1 on the SuDS hierarchy (The management of surface water via infiltration, as outlined within Section 2.3) has been assessed and cannot be implemented in a manner that would adequately serve the development and minimise flood risk.

7.1.2 Step 2 on the SuDS hierarchy would be to discharge to a watercourse or drainage ditch. Review of the Environment Agency 'Statutory River Map', shown below in 6.1.3, demonstrates that there are no suitable assets within close proximity to the site. The closest would be a drainage ditch located 340m away to the southeast of the development. A new connection to this drainage ditch would be impractical given the urban nature of the surrounding area ruling this out as an option.

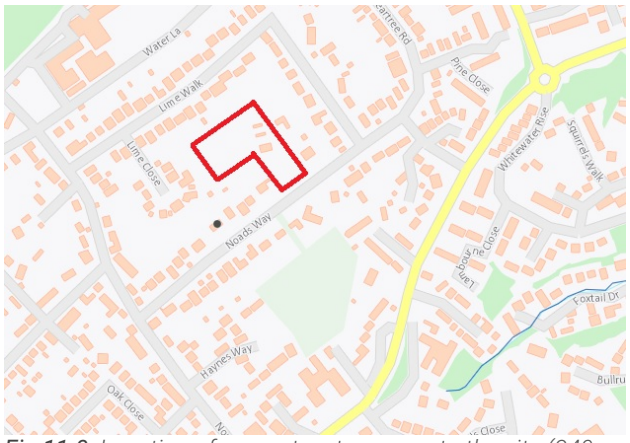


Fig 11.0: Location of nearest watercourse to the site (340m away)

7.1.3 Step 3 on the SuDS hierarchy would be a flow-controlled connection into an existing public surface water sewer. Review of the Southern Water Sewer Records plan shows that there are no surface water sewers within the vicinity of the site, making this option unviable. An extract of the sewer records plan is shown below in Fig 12.0 below.

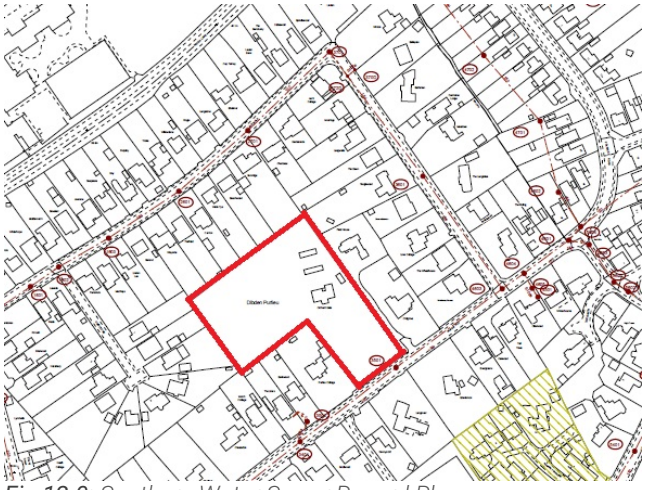


Fig 12.0: Southern Water Sewer Record Plan

7.1.4 The final step on the SuDS hierarchy, Step 4, would be to make a flow-controlled connection into a public combined sewer or foul water sewer. The Southern Water sewer records drawing, shown in Fig 12.0, confirms that there are no combined sewers in the area but there are public foul water sewers running within the public highways surrounding the site. The closest of which is a 150mm diameter sewer located within Noads Way immediately to the south of the site. This is to be the proposed discharge point for the development, subject to a Section 106 agreement with Southern Water.

7.2 Proposed Surface Water Solution

7.2.1 Taking into account the analysis and ground conditions illustrated within this Proof of Evidence, it is now proposed to discharge all surface water flows to the existing public foul sewer in Noads Way. The off-site flows will be limited to an appropriate rate with the additional flows stored on-site within an attenuation system. The existing public foul water sewer runs at only 1.5m in depth so it will not be possible to make the connection for the surface water by gravity alone given the level of the site and the infrastructure required for the on-site surface water drainage. This means that the surface water drainage will need to be pumped to the higher level using a small surface water pump and rising main (pressurised pipe) to enable the surface water run-off to be conveyed to the downstream gravity fed foul network.

7.2.2 The lowest flow rate safely sustainable with a surface water pump station is 2.0 l/s so this would be the target flow rate for the development.

7.2.3 Attenuation features would be sized to suit this flow rate and in the event of pump failure (note, two pumps are provided: A 'duty' and 'standby' pump), due to power loss or breakdown, the attenuation features would serve as emergency storage, allowing time for the pump station to be inspected and repaired. This would typically be checked for a 1:30 year + Climate Change 6-hour storm event, allowing for all flows to be contained within the system with no flooding, or minor flooding contained safely within isolated spots away from the occupied spaces.

7.2.4 The layout for this approach can be seen on drawing 114290-CAL-XX-XX-CA-D-004, Included within Appendix C.

7.3 Overland Flood Routes

7.3.1 The proposed site ground levels and 'Finish Floor Levels' have been set to contain any surface water flooding to isolated areas around the site, away from habitable spaces and neighbouring properties. This would contain any surface ponding to the access road and parking areas with some run-off leaving site via the new access. The on-site and off-site overland flood routes are shown in 'Fig 13.0'. Blue arrows showing the flow routes on-site and the red arrows showing the flow routes off-site.

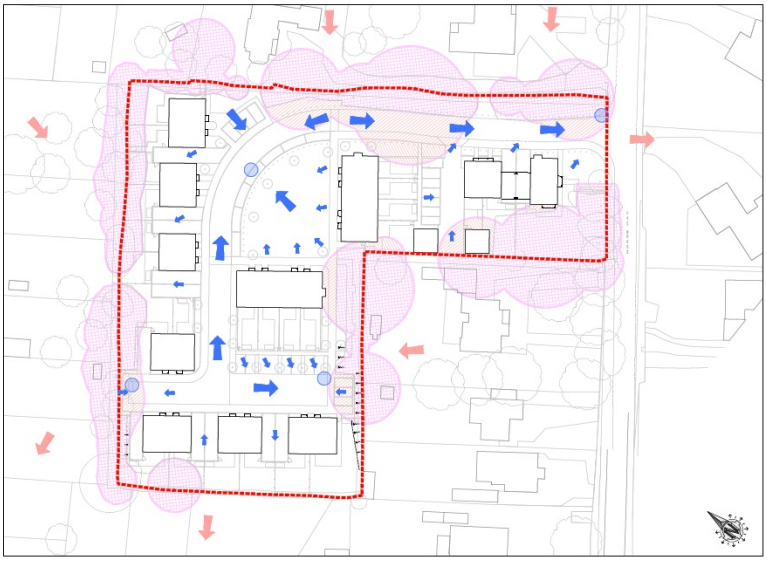


Fig 13.0: Overland Flood Plan

7.4 Consultation With Southern Water

7.4.1 A capacity check was submitted to Southern Water and an official response received in March 2023. Southern Water confirmed that there was adequate capacity within the existing public foul water sewer to accommodate the proposed foul water connection, but insufficient capacity to accommodate the 2.0 l/s flow rate from the proposed surface water connection.

7.4.2 A formal response was composed and e-mailed to Southern Water in April of 2023 requesting clarification on the certainty of the capacity check and outlining the approach taken to the SuDS hierarchy. The following response was received from Southern Water in early June 2023

7.4.3 *'As the development does not have existing connections and the previous use was agriculture and stables. Capacity assessment was undertaken to 2 l/s at MH SU41063501 and suggested insufficient capacity for these flows, additionally it was also assessed for max allowable surface water flows at the requested point of connection which resulted in the recommendation that there is insufficient capacity for any additional flows. Therefore, this application needs to be added to our growth scheme to improve capacity for surface water'.*

7.4.4 This response was followed up with an e-mail to Southern Water noting that the surface water connection was not currently viable, requesting clarification on the likelihood and potential timeline of the existing sewer network being upgraded. A response was then received from their Planning Department confirming their approach as below:

7.4.5 *'I can only advise that once planning permission has been granted, we will look to investigate the extent of reinforcement required to ensure the existing risk of flooding is not increased by a development, any works required as a result of this development will not address existing flooding issues in the catchment. As you will appreciate, we have a number of developments to design infrastructure for and we do not commence this process until planning permission has been granted, so we avoid expending resources unnecessarily as many developments do not gain planning permission and to expend resource in such circumstances is not a justifiable use of customer money'.*

7.4.6 A review has been undertaken to determine how much of the existing public foul water sewer would need to be upgraded to achieve the additional capacity required for the new surface water connection. This has determined that the existing sewer would need to be upgraded from a 150mm diameter sewer to a 225mm diameter sewer for a length of approximately 2800m from directly outside the site, westbound along Noads Way, where it meets North Road. At that point the existing foul sewer transitions to a 225mm diameter pipe. Any upgrade works would be done under an appropriate agreement with Southern Water and the new surface water connection from the development would be subject to a separate Section 106 application (Permission to connect and discharge into a public sewer system, under the Water Industry Act of 1991). An image showing the route of the proposed upgrade works is shown below in Fig 14.0. and the route is illustrated on Calcinotto drawing 114290-CAL-XX-XX-CA-D-015, included within Appendix C.

Fig 14.0: Possible route for a new 225mm dia foul sewer to connect to the downstream system,

7.5 Summary Notes:

7.5.1 The approach laid out within the SuDS hierarchy has been followed and has ruled out any alternative option to a flow-controlled discharge into the off-site public foul water sewer.

7.5.2 Overland flood routes have been considered and shown to not elevate flood risk.

7.5.3 A solution for the on-site surface water management has been explored and determined that a surface water pump station and attenuation system would be needed. Emergency storage would be provided within the system to reduce flood risk.

7.5.4 Negotiations have begun between the client and Southern Water, who have confirmed that they are happy with the proposed solution for the surface water drainage, but upgrade works would be required on the existing sewer network to free up the additional capacity needed.

7.5.5 The proposed design approach and the correspondence with Southern Water is summarised in a letter from Calcinotto to AJC Developments Ref: 114290/SWL/01 sent on the 11th of July 2023. The Letter to ADJ Developments is included within Appendix A (minus its own supplemental appendix). The correspondence with Southern Water is included within Appendix B.

8 Conclusion

8.1 The Proposed Design

8.1.1 The existing site currently experiences occasional flooding due to limited capacity to drain into the ground. The proposed development would assist in managing this problem and would result in reduced flood risk for the area.

8.1.2 An infiltration only solution is not achievable without increasing the on and off-site flood risk.

8.1.3 The SuDS Hierarchy has been adhered to with each step being given consideration.

8.1.4 The proposed off-site connection into the existing public foul water sewer has been assessed by Southern Water who have acknowledged the need to upgrade the existing foul sewer network to obtain the necessary capacity.

8.1.5 A practical solution to managing the surface water drainage on-site using a pumped attenuation system has been demonstrated. Flood risk can be mitigated by using the attenuation tank for emergency storage in the event of power failure or breakdown. The development will have a positive impact on flood risk as it would manage the surface water run-off that currently floods / ponds on-site.

8.1.6 An allowance for climate change has and will be included in all drainage calculations.

8.1.7 A 10% allowance has been added to the total roof areas for the development to account for 'Urban Creep'.

8.1.8 Overland flood routes have been examined and will not pose a risk to the proposed dwellings or the neighbouring sites.

8.1.9 I believe that the current proposed surface water strategy, to attenuate flows and discharge them to the existing public sewer via a flow-controlled pump solution; does comply with the standard outlined within parts (v) and (vi) of 'Policy STR1' within the 'New Forest Local Plan Part 1' and demonstrates an appropriate solution in line with current SuDS guidelines.

9 Reference Documents:

9.1.1 Ciria SuDS Manual 2015, Chapter 25, Infiltration: Design Methods
Page 553 – Table 25.2

9.1.2 BRE Digest 365 - Soakaway Design Guide
Page 3 – Soil Infiltration rate

9.1.3 Southern Water 'Outline Guidelines for Sustainable Drainage Systems'
Page 1 – Hierarchy for Management of Surface Water for New Developments

9.1.4 The Building Regulations Approved Document H
Page 39, Part H3 Rainwater Drainage - Requirement

9.1.5 Planning Policy Guidance (PPG) Flood Risk and Coastal Change
https://www.gov.uk/guidance/flood-risk-and-coastal-change#:~:text=In%20decision%2Dmaking%2C%20where%20necessary,development%20should%20not%20be%20allowed

9.1.6 Geo-environmental, Preliminary Information – Ref: GE19721/WH01/210421

9.1.7 Geo-environmental, Soakage Letter Report – Ref: GE20970/WH01/220630

9.1.8 Geo-environmental, Soakage Letter Report – Ref: GE19721/WP01/221219

9.1.9 Calcinotto Drawings:
114290-CAL-XX-XX-CA-D-003-(P1)-Drainage Scheme
114290-CAL-XX-XX-CA-D-004-(P1)-Drainage Strategy Plan
114290-CAL-XX-XX-CA-D-005-(P2)-Proposed Drainage 1-3
114290-CAL-XX-XX-CA-D-006-(P2)-Proposed Drainage 2-3
114290-CAL-XX-XX-CA-D-007-(P2)-Proposed Drainage 3-3
114290-CAL-XX-XX-CA-D-015-(P1)-Public Sewer Upgrade Plan

9.1.10 Calcinotto Calculations:
114290-CAL-XX-XX-CA-D-005 - SW Network Complete - 22-07-11
114290-CAL-XX-XX-CA-D-006 - Storage Estimate 2.0ls
114290 - Proof of Evidence Infiltration Assessment

9.1.11 Calcinotto Correspondence:
Letter to AJC Developments Ref: 114290/SWL/01 sent on the 11th of July 2023

Appendix A – Letter to AJC Developments

Our Ref: 114290/SWL/01
11th July 2023
Tarek Tabbah
AJC Group
Poole
Dorset
BH14 8HA

Dear Tarek

Re : Orchard Gate Development, Dibden Purlieu Surface Water Drainage

The following is a summary of the design approach, testing regime and Southern Water (water authority) discussions taken while undertaking the proposed drainage design for the Orchard Gate development, Dibden Perlieu, Hampshire.

A revised drainage strategy was submitted alongside a revised planning application ref 22/10813 in July 2022. An updated set of on-site infiltration tests were also undertaken by Geo-environmental Ltd covering more of the site. The results ranged from 2.6×10^{-5} to 2.0×10^{-6}. See supplemental appendix for 'Orchard Gate Site Investigation Report Extract, June 2022'. A design was produced utilising two large infiltration tanks and employing permeable paving for hardstands and parking areas across the site. This would optimise infiltration over a greater area, maximising its effectiveness. See supplemental appendix for Drawings '114290-CAL-XX-XX-CA-D-005, 006 and 007'. As with the initial scheme, the infiltration systems struggled to manage the surface water drainage due to the poor infiltration rates and failed to meet the 24-hour half drain time standard. This again required them to be oversized to accommodate repeat storms. Subsequently, surface run-off was conveyed to the permeable paving systems instead of the tanks where possible to reduce the amount of surface water entering the tank system. This is due to infiltration being more efficient within permeable paving as it has a greater surface area to volume ratio.

The LLFA require both infiltration testing and ground water monitoring to be undertaken within the winter months. to access site conditions during the most vulnerable period of the year. For this reason and due to the marginal performance of both drainage schemes already produced for the site, further testing was required to confirm the infiltration rates in key locations, also providing them in a form complaint with BRE Digest 365. Infiltration testing was also undertaken at shallower depths to determine the performance of the permeable paving systems.

The new site investigation tests were carried out in December 2022. See supplemental appendix for 'Orchard Gate Site Investigation Report Extract, December 2022'. The deeper infiltration tests recorded a further drop in the rates used to design the two tanks which would negatively impact their performance. The tests carried out at shallow depths to assess the performance of the permeable paving failed entirely and were unable to provide any infiltration rate. Ground water levels were not encountered during the investigation, however the infiltration rates recorded demonstrated that an infiltration only solution could not be achieved for the current site proposals. An alternative off-site connection would therefore be needed.

The alternative to on-site infiltration would be to discharge surface water run-off off-site to an appropriate existing public sewer within the vicinity of the site. However, public sewer records show that the only asset near to the site was a 150mm public foul water sewer in located within Nords Way: The public foul sewer runs approximately 1.5m in depth, measured to invert, and was previously used as the discharge point for the proposed foul water drainage from the development. No other public sewer assets run anywhere close to the site, and there are no drainage ditches or watercourses that could serve as an appropriate surface water outfall location. See supplemental appendix for the 'Southern Water Sewer Records Drawing'.

This would make a surface water connection to the public foul water sewer the only viable option for the development. Permission to connect would be subject to approval form Southern Water, who would

determine how much, if any, capacity was available within the existing public foul water sewer: network A revised drainage scheme was undertaken to illustrate the method required to make the positive connection into the foul water sewer. This utilised one of the tanks and some of the permeable paving for attenuation and used a pump station to lift and control the flows (as the invert of the receiving manhole was too high for a gravity system to work) that would then discharge to the public foul water sewer via a new lateral connection. A peak flow rate of 2.0 l/s was then proposed as it is typically the minimum flow rate that can be efficiently achieved using a surface water pump station. See supplemental appendix for drawing '114290-CAL-XX-XX-CA-D-004'.

A pre-application capacity check was submitted by AJC to Southern Water in February 2023 using the new attenuated flow control strategy as a basis. Southern Water responded in March 2023 confirming that they would accept the discharge for the foul drainage from the site but there was insufficient capacity within the existing public foul sewer for the proposed surface water connection, stating that the standard SuDS train should be applied to the site: The SuDS train is formed by the following steps, each of which must be ruled unviable before proceeding to the next.

- Surface water drainage to be disposed of on-site via infiltration systems – Unviable.
- Surface water drainage to discharge to a watercourse or drainage ditch – Unviable.
- Surface water to discharge to a public Surface Water Sewer at a controlled rate – Unviable.
- Surface water to discharge to a combined foul sewer at a controlled rate.

The response received from Southern Water is a standard refusal when requesting a surface water connection into a public foul water sewer, stating capacity as the reason. This is an important step as it logs the site in their system, assigning it a reference number and a Technical Advisor. This then enables the developer to enter detailed consultation with the Water Authority to discuss the drainage of the site and the potential use of public sewers to discharge. See supplemental appendix for the 'Southern Water Response Letter'.

Using the assigned application reference number 'DSA000020541' the Southern Water Technical Advisor was contacted via e-mail requesting a callback to discuss the site in more detail, this call was then received a few weeks later. The call was able to outline the problems with the site, highlighting how the SuDS train has been applied. The crucial factor would be how much capacity was available within the public foul sewer. The call was followed up with an e-mail outlining the points of the discussion and requesting a further review of the surface water connection based on the expanded context of the site, noting the proposed scheme and the methods used to minimise the surface water flow rate.

An updated response was received from Southern Water in early June 2023 stating:

'As the development does not have existing connections and the previous use was agriculture and stables. Capacity assessment was undertaken to 2 l/s at MH SU41063501 and suggested insufficient capacity for these flows, additionally it was also assessed for max allowable surface water flows at the requested point of connection which resulted in the recommendation that there is insufficient capacity for any additional flows. Therefore, this application needs to be added to our growth scheme to improve capacity for surface water'.

This response was followed up with an e-mail to Southern Water noting that the surface water connection was not currently viable but requesting clarification on the likelihood and potential timeline of the existing sewer network being upgraded. A response was then received from their Planning Department confirming their approach:

'I can only advise that once planning permission has been granted, we will look to investigate the extent of reinforcement required to ensure the existing risk of flooding is not increased by a development, any works required as a result of this development will not address existing flooding issues in the catchment. As you will appreciate, we have a number of developments to design infrastructure for and we do not commence this process until planning permission has been granted, so we avoid expending resources unnecessarily as many developments do not gain planning permission and to expend resource in such circumstances is not a justifiable use of customer money.'

We aim to provide infrastructure within 24 months of planning being granted or provide an alternative method of drainage should any required infrastructure not be in place by then. The developer will be asked to contribute to the costs of reinforcement via the New Infrastructure charging system details of which are available at:

Connection charging arrangements (southernwater.co.uk)'

See supplemental appendix for the 'E-mail correspondence with Southern Water'.

To conclude, the above narrative shows that all reasonable and practicable options have been duly explored for the discharge of surface water. A scheme of infiltration is considered unfeasible and direct connection to local sewerage network is required.

Yours sincerely

Signature redacted

Mark Dewson BEng(Hons) CEng MICE MCIHT
Director

07500 203867

Appendix B – Correspondence with Southern Water

from Southern Water

Tarek Tabbah
AJC Developments (South) Ltd
4 Joshuas Vista
202 Sandbanks Road
Poole
Dorset
BH14 8HA

Your ref

Our ref
DSA000020541

Date
21 March 2023

Contact
Tel 0330 303 0119

Dear Mr Tabbah,

Level 1 Capacity Check Enquiry: Orchard Gate, Noads Way, Diben Perlieu, Southampton, Hampshire, SO45 4PD.

We have completed the capacity check for the above development site and the results are as follows:

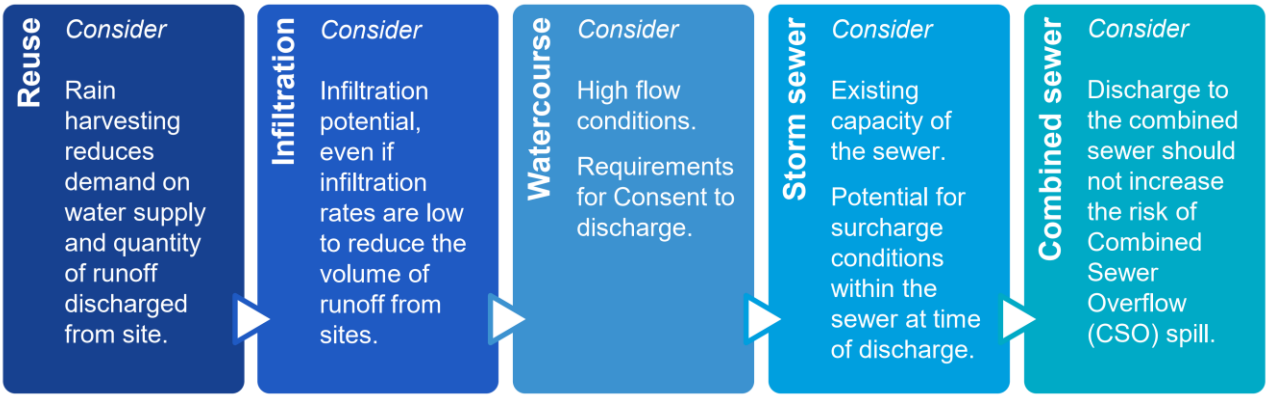
Foul Water

There is currently adequate capacity in the local sewerage network to accommodate a foul flow of **0.23 l/s** for the above development at manhole reference SU4106**3501**. Please note that no surface water flows (existing or proposed) can be accommodated within the existing foul sewerage system unless agreed by the Lead Local Flood Authority in consultation with Southern Water, after the hierarchy Part H3 of Building Regulations has been complied with.

Surface Water

There is currently inadequate capacity within the local sewerage network to accommodate a flow of **2 l/s** at manhole reference SU4106**3501**. Please note, there are no surface water sewers with sufficient capacity in the vicinity of the development site.

In situations where surface water is being considered for discharge to our network, we require the below hierarchy for surface water to be followed which is reflected in part H3 of the Building Regulations. Whilst reuse does not strictly form part of this hierarchy, Southern Water would encourage the consideration of reuse for new developments.



Guidance on Building Regulations is here: gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h

We would like to engage with you on the design for disposal of surface water, with a particular focus on the potential for incorporating Sustainable Drainage Systems (SuDS), for this development at the earliest opportunity and we recommend that civil engineers and landscape architects work together and with Southern Water. In many cases this may negate or reduce the need for network reinforcement and allow earlier completion of the development.

Where a surface water connection to the foul or combined sewer is being considered, this should be agreed by the Lead Local Flood Authority, in consultation with Southern Water.

Southern Water has a duty to provide Network capacity from the point of practical connection (point of equivalent or larger diameter pipe) funded by the New Infrastructure Charge.

Southern Water aim to provide this within 24 months following the date that planning has been granted for developments not identified as strategic sites in our current business plan. Strategic sites are larger developments and will often take longer than 24 months for a full solution to be provided.

New Infrastructure Charging

Please note as of 1st April 2018 we have moved to the “New Connections Services Charging Arrangements”. We understand that this may cause uncertainty for customers, particularly where they may have already committed to a development based on previous charging arrangements. We have worked with our stakeholders and Water UK to agree a set of principles by which we will base our charges. Please read through our new charging arrangement documents available at the following link: southernwater.co.uk/developing-building/connection-charging-arrangements

Alternatively, New Appointees and Variations (NAVs), also known as ‘inset’ companies, can provide new connection services or take ownership of the new water and wastewater connection infrastructure provided for a new development. NAVs are appointed by Ofwat and replace the

regional water company. It is for the developer to choose whether to use a NAV or the regional water company to supply services for new sites, according to certain legal criteria.

Connecting to our network

It should be noted that this information is only a hydraulic assessment of the existing sewerage network and does not grant approval for a connection to the public sewerage system. A formal Sewer Connection (S106) application is required to be completed and approved by Southern Water Services. To make an application visit: developerservices.southernwater.co.uk

Please note the information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

Should it be necessary to contact us please quote our above reference number relating to this application by email at southernwaterplanning@southernwater.co.uk

Yours sincerely,

Future Growth Planning Team
Developer Services

southernwater.co.uk/developing-building/planning-your-development

Gerry Bird

Subject: FW: Orchard Gate, Dibden Purlieu – Southern Water Ref: DSA000020541 / Calcinotto Ref: 114290

Good Morning Gerry,

I can only advise that once planning permission has been granted we will look to investigate the extent of reinforcement required to ensure the existing risk of flooding is not increased by a development, any works required as a result of this development will not address existing flooding issues in the catchment. As you will appreciate we have a number of developments to design infrastructure for and we do not commence this process until planning permission has been granted, so we avoid expending resources unnecessarily as many developments do not gain planning permission and to expend resource in such circumstances is not a justifiable use of customer money.

We aim to provide infrastructure within 24 months of planning being granted or provide an alternative method of drainage should any required infrastructure not be in place by then. The developer will be asked to contribute to the costs of reinforcement via the New Infrastructure charging system details of which are available at: Connection charging arrangements (southernwater.co.uk)

I hope the above explains the position but should you have any further questions please do not hesitate to contact me

Many Thanks,

Danni Tamplin
Future Growth Planner
Developer Services

southernwater.co.uk

From: Gerry Bird <g.bird@calcinotto.co.uk>
Sent: 08 June 2023 12:21
To: Yoganathan, Shanthya <Shanthya.Yoganathan@southernwater.co.uk>; Southern Water Planning <SouthernWaterPlanning@southernwater.co.uk>
Cc: Mark Dewson <m.dewson@calcinotto.co.uk>; Tarek - AJC Group <tarek.tabbah@ajcgroup.uk>
Subject: RE: Orchard Gate, Dibden Purlieu – Southern Water Ref: DSA000020541 / Calcinotto Ref: 114290

Shanthya

Thank you for your response. As you note, we have no existing flows known to currently leave the site, therefore we have no ability to reduce the existing load put upon the public foul sewer to free up capacity. If Southern Waters position is that the existing 150mm diameter public foul sewer in that area has been assessed to be at capacity, then we appreciate that its not possible to accept a new surface water discharge. However, the public sewers in this area are critical to the developability of the site and the current public foul

sewer is the only asset available. We have explored SuDS options and encountered problems with both the infiltration rates recorded and the ground water levels of the site.

We note that you have forwarded this application onto Southern Water Planning for review. Are they the team who would be responsible for assessing weather the public sewer is eligible for upgrade and if so, how long would this process typically take. For the time being we would like to keep our client informed of the options available and the actions being taken. Thank you again for your continued assistance.

Regards

Gerry Bird BSc
Civil Engineering Technical Manager

Calcinotto

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DDI +44 (0)1202 149532
g.bird@calcinotto.co.uk
www.calcinotto.co.uk

From: Yoganathan, Shanthya <Shanthya.Yoganathan@southernwater.co.uk>
Sent: Wednesday, June 7, 2023 2:42 PM
To: Gerry Bird <g.bird@calcinotto.co.uk>; Southern Water Planning <SouthernWaterPlanning@southernwater.co.uk>
Cc: Mark Dewson <m.dewson@calcinotto.co.uk>
Subject: Orchard Gate, Dibden Purlieu – Southern Water Ref: DSA000020541 / Calcinotto Ref: 114290

Good afternoon Gerry,

Thank you for your patience.

As the development does not have existing connections and the previous use was agriculture and stables. Capacity assessment was undertaken to 2 l/s at MH SU41063501 and suggested insufficient capacity for these flows, additionally it was also assessed for max allowable surface water flows at the requested point of connection which resulted in the recommendation that there is insufficient capacity for any additional flows. Therefore this application needs to be added to our growth scheme to improve capacity for surface water.

@Southern Water Planning – Can you please assess this application.

Kind regards,

Shanthya Yoganathan BEng (Hons)
Technical Coordinator Hampshire & IOW.
Developer Services

M. 07922861900
T. 03303030119
W. southernwater.co.uk

WATER for LIFE from Southern Water

From: Gerry Bird <g.bird@calcinotto.co.uk>
Sent: 28 April 2023 14:35
To: Yoganathan, Shanthya <Shanthya.Yoganathan@southernwater.co.uk>
Cc: Mark Dewson <m.dewson@calcinotto.co.uk>
Subject: DSA000021519 (113829) / DAS000020541 (114290) - Follow up E-mail and Technical Queries

Shanthya

Thank you for your call back yesterday to discuss our pre-application for, DAS000020541 (114290) Orchard Gate , Dibden Purlieu. This site have been complicated by problems with the surface water drainage. I have assembled an information pack for the site which is attached within a zip file and contain various elements to support our approach to the drainage solution.

We are looking to discharge the surface water drainage into the existing foul water sewer network. We appreciate that this is undesirable, but we see no other option and hope to find a compromise that would satisfy Southern Water as well as our clients. As is protocol, we have followed the SuDS train for the design of the surface water drainage ruling out one option before reviewing the next (1. Infiltration, 2. Watercourse, 3 SW Sewer and finally 4. Combined Sewer). While rainwater harvesting could be introduced it would not impact the flow rate leaving the site as any harvested water features would need to be kept separate from the attenuation features, on the assumption they would be filled during a rainfall event. We have also designed the drainage network to have as minimal an impact on the existing sewer network as possible. We hope that after reviewing the information attached and broken down below you will be able to grant preliminary permission for us to pursue this approach subject to the formal S106 application process.

Orchard Gate , Dibden Purlieu – Southern Water Ref: DAS000020541 / Calcinotto Ref: 114290
SuDS Train Assessment

1. Infiltration did seem viable for this site however the testing that was initially carried out recorded very marginal results ranging from low (-5s) to medium (-6s). we assembled a detailed drainage scheme for the site which included multiple elements of permeable paving and two large infiltration tanks. This solution struggled to achieve the necessary half drain times but was achievable with some surface flooding for the upper storm events. The local authority now requires wintertime infiltration testing and ground water monitoring for developments so this was undertaken starting in December of 2022. This investigation recorded a drop in the infiltration rates and was not able to achieve any infiltration within at shallower depth which would be used to engineer the permeable paving elements. In addition, the ground water levels rose high enough to rule out infiltration within the tanks. These results rule out the use of infiltration measures. The updated SI including the new infiltration results is included within the attached zip file.
2. No drainage ditches of watercourses run within the vicinity of the site.
3. There are no Public surface water sewers currently serving the site. The existing is mostly landscaped with isolated structures. It is assumed these structures drain to ground but would not have been designed to modern standards.
4. Having eliminated the first three options, we proposed to discharge the surface water via a flow-controlled outfall to the public foul water sewer. Our client has also investigated the viability of upgrading the existing public foul sewer to achieve more capacity and this would require chasing the line downstream a great distance making this option unfeasible. Please see supporting information with the attached zip file. A breakdown of this approach along with some queries and suggestions is listed below.

Proposed surface water strategy:

- It is now proposed to attenuate the surface flows on site and discharge them to the existing public foul sewer via a flow-controlled outfall which will be managed by a surface water pump station at a rate of 2.0 l/s.
- This flow rate has been determined since it is the minimum flow rate that can be reliably achieved by a surface water pump station.
- The proposed drainage scheme can be seen on drawing 114290-CAL-XX-XX-CA-D-004 included within the attached zip file.
- Would Southern Water be willing to accept this discharge on a preliminary basis subject to a formal Section 106 application?
- If not, are Southern Water able to provide any suggestion that would make this proposal more acceptable?

Thank you in advance for any assistance you can provide in progressing these two projects. Both have already gone through planning approval. Please feel free to contact me if you have any queries or wish to discuss any elements of these sites in more detail.

Regards

Gerry Bird BSc
Civil Engineering Technical Manager

Calcinotto

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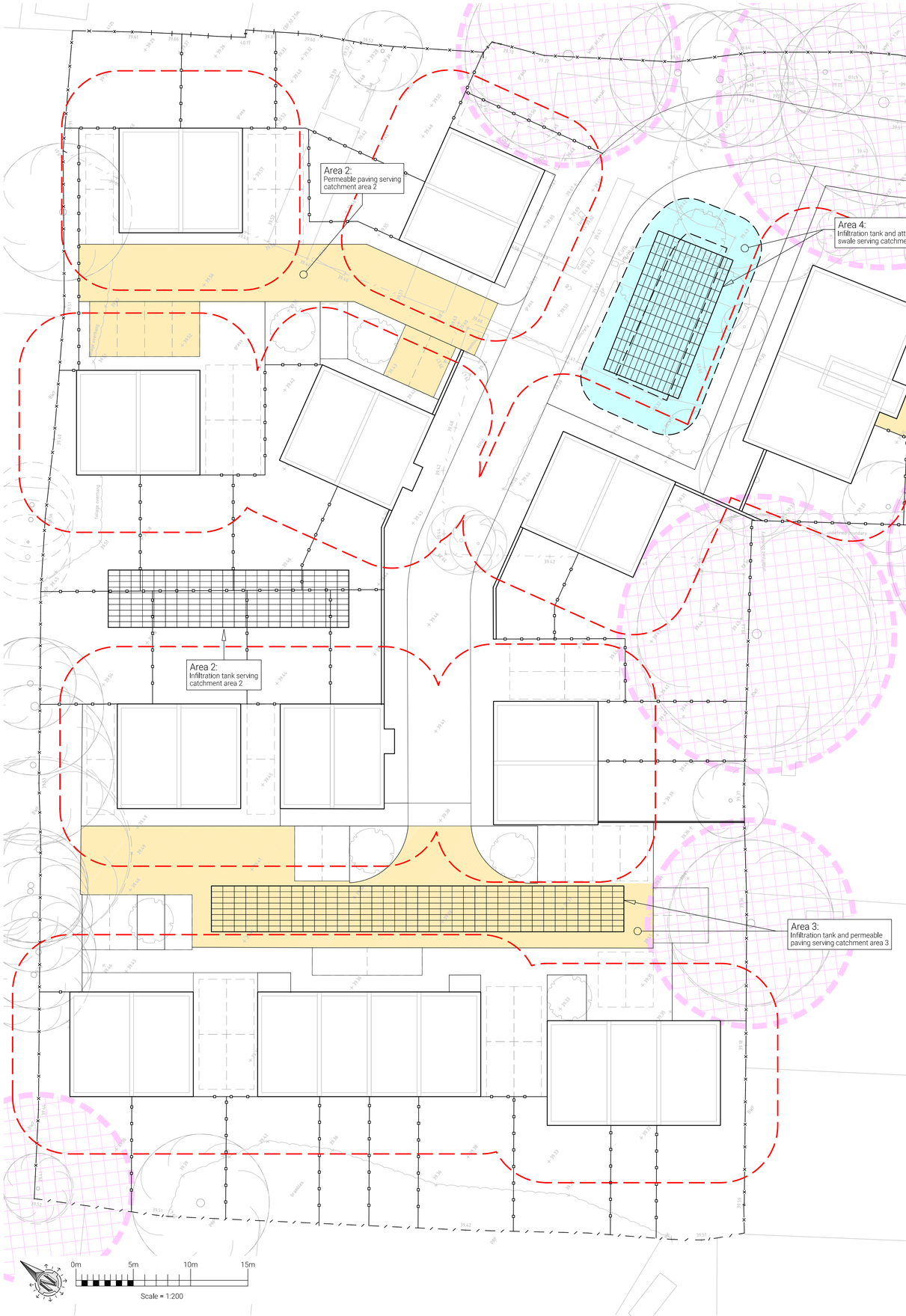
www.calcinotto.co.uk

Appendix C - Calcinotto Drawings



Notes:

1. This drawing is to be read in conjunction with all of the relevant architects, engineers and specialist sub-contractor drawings and specifications.
2. Any discrepancies between the engineers and the architects drawings to be referred to the architect before proceeding. Drawings must not be scaled.
3. All invert and cover levels have been assumed and are subject to detailed design and review as well as conformation of the proposed external ground levels and finish floor levels.
4. While neither of the 4 No. infiltration tanks strictly meet the 24 Hour half drain time requirement, each tank has an additional attenuation allowance in the form of either permeable paving or a swale, which can be utilised as storage during any repeat storm event.
5. A Safety factor of 3.0 has been used for the design which will allow for the risk of flooding to the roads and parking areas only. The proposed finish floor levels will therefore need to be kept at a higher level to the adjacent permeable paved areas which serve the infiltration tanks as these would be the initial flood locations during any exceedance event.
6. Additional on-site infiltration testing is recommended in the location of the 4 No. proposed infiltration tanks to help refine the efficiency of the design.
7. The viability of the surface water drainage design is subject to the discovery of groundwater on-site. It is highly recommended that a more robust ground investigation be carried out to determine if ground water will be an issue.

Legend

5.0m Offset Lines from Buildings
(Used to position the infiltration tanks)

- Proposed Surface Water Infiltration Tanks
- Proposed Permeable Block Paved Areas (Used for collection and attenuation only)
- Proposed Surface Water Swale (Used for attenuation only)
- Proposed Tree Protection Zones

Area 1 - Storage + Infiltration:

Catchment Area = 764m² (0.076 ha)
Infiltration Rate = 0.02376 m/h

Permeable Paving (Extra Storage Only)
Area = 358.0m²
- 60 Block
- 50 Stone Bed
- 350 (min) Permeable Sub-base
CL 39.250
IL 38.790

Infiltration Tank (Storage + Infiltration)
Tank Size =10.0 x 8.5 x 0.8m deep
CL 39.250
Top of Tank = 38.050
IL 37.250

Results:
Peak Storm Event = 1:100 year + 40%
Safety Factor Used = 3.0
Top Water Level = 37.996
Half Drain Time = 1,969 mins (32.8 hrs)

Area 2 - Storage + Infiltration:

Catchment Area = 1,040m² (0.104 ha)
Infiltration Rate = 0.036 m/h

Permeable Paving (Extra Storage Only)
Area = 252m²
- 60 Block
- 50 Stone Bed
- 350 (min) Permeable Sub-base
CL 39.450
IL 38.990

Infiltration Tank (Storage + Infiltration)
Tank Size = 21.0 x 5.0 x 0.8m deep
CL 39.450
Top of Tank = 38.250
IL 37.450

Results:
Peak Storm Event = 1:100 year + 40%
Safety Factor Used = 3.0
Top Water Level = 38.222
Half Drain Time = 1,506 mins (25.1 hrs)

Area 3 - Storage + Infiltration:

Catchment Area = 1,468m² (0.147 ha)
Infiltration Rate = 0.036 m/h

Permeable Paving (Extra Storage Only)
Area = 370.0m²
- 60 Block
- 50 Stone Bed
- 350 (min) Permeable Sub-base
CL 39.300
IL 38.840

Infiltration Tank (Storage + Infiltration)
Tank Size = 36.0 x 4.0 x 0.8m deep
CL 39.300
Top of Tank = 38.100
IL 37.300

Results:
Peak Storm Event = 1:100 year + 40%
Safety Factor Used = 3.0
Top Water Level = 38.846
Half Drain Time = 1,594 mins (26.6 hrs)

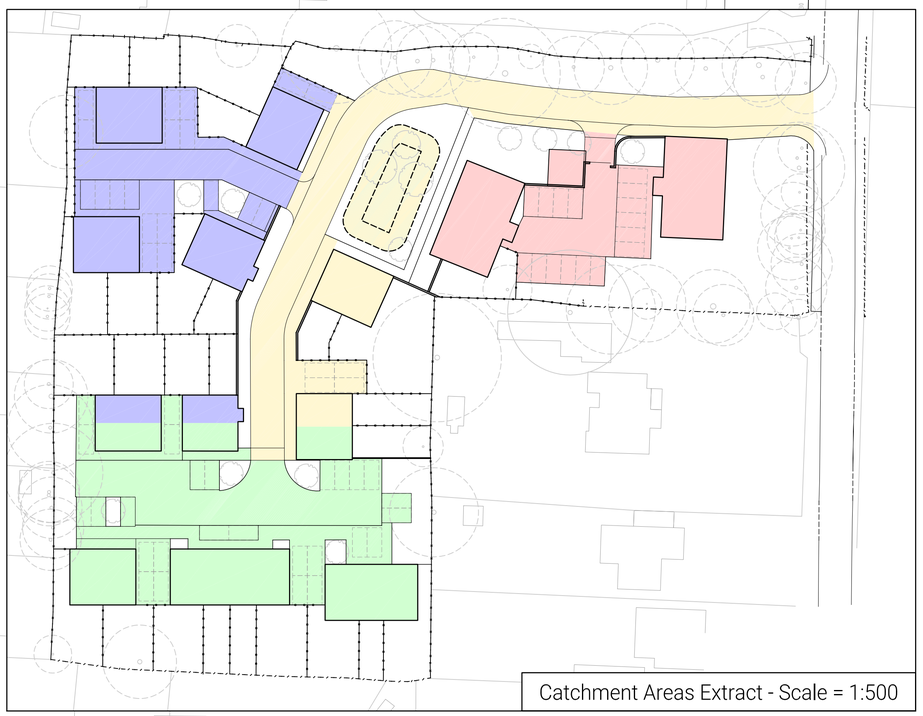
Area 4 - Storage + Infiltration:

Catchment Area = 1,350m² (0.135 ha)
Infiltration Rate = 0.036 m/h

Attenuation Swale (Extra Storage Only)
Area at Top (0.0m) = 204.0m²
Area at Base (-1.0m) = 65.0m²
Side slopes graded at 1:3
CL 39.250
IL 38.250

Infiltration Tank (Storage + Infiltration)
Tank Size = 13.0 x 7.0 x 1.2m deep
CL 39.250
Top of Tank = 37.850
IL 36.650

Results:
Peak Storm Event = 1:100 year + 40%
Safety Factor Used = 3.0
Top Water Level = 38.319
Half Drain Time = 2,166 mins (36.1 hrs)



Catchment Areas Extract - Scale = 1:500

Rev.	Date	Description
P1	06.05.21	Drawn - Preliminary Issue

Calcinotto
Jonsen House
43 Commercial Rd
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01202 237237
info@calcinotto.co.uk
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Client
AJC Homes

Project Title
Orchard Gate, Dibden Purlieu

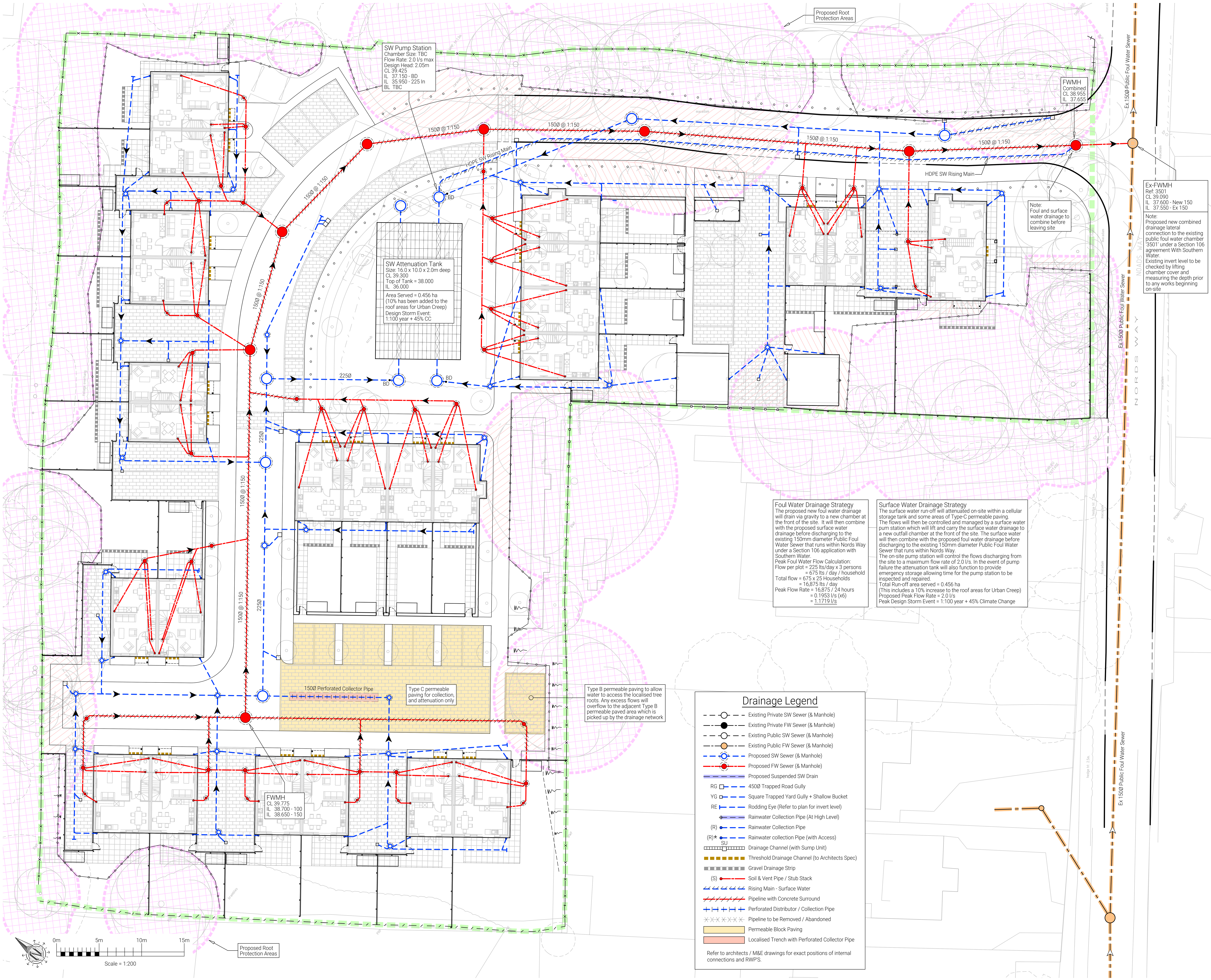
Drawing Title
Proposed Surface Water Drainage Strategy Drawing

Drawing Status
Planning

Originator No.	Rev by	Chk by	Scale
114290	GEB	GEB	1:200 @A1

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | NO.
114290-CAL-XX-XX-DR-D-003

Revision
P1



Foul Water Drainage Strategy

The proposed new foul water drainage will drain via gravity to a new chamber at the front of the site. It will then combine with the proposed surface water drainage before discharging to the existing 150mm diameter Public Foul Water Sewer that runs within Nords Way under a Section 106 application with Southern Water.

Peak Foul Water Flow Calculation:
Flow per plot = 225 lts/day x 3 persons
= 675 lts / day / household
Total flow = 675 x 25 Households
= 16,875 lts / day
Peak Flow Rate = 16,875 / 24 hours
= 0.1953 l/s (x6)
= 1.1719 l/s

Surface Water Drainage Strategy

The surface water run-off will attenuated on-site within a cellular storage tank and some areas of Type-C permeable paving.
The flows will then be controlled and managed by a surface water pum station which will lift and carry the surface water drainage to a new outfall chamber at the front of the site. The surface water will then combine with the proposed foul water drainage before discharging to the existing 150mm diameter Public Foul Water Sewer that runs within Nords Way.
The on-site pump station will control the flows discharging from the site to a maximum flow rate of 2.0 l/s. In the event of pump failure the attenuation tank will also function to provide emergency storage allowing time for the pump station to be inspected and repaired.
Total Run-off area served = 0.456 ha
(This includes a 10% increase to the roof areas for Urban Creep)
Proposed Peak Flow Rate = 2.0 l/s
Peak Design Storm Event = 1:100 year + 45% Climate Change

Drainage Legend

- Existing Private SW Sewer (& Manhole)
- Existing Private FW Sewer (& Manhole)
- Existing Public SW Sewer (& Manhole)
- Existing Public FW Sewer (& Manhole)
- Proposed SW Sewer (& Manhole)
- Proposed FW Sewer (& Manhole)
- Proposed Suspended SW Drain
- RG — 450Ø Trapped Road Gully
- YG — Square Trapped Yard Gully + Shallow Bucket
- RE — Rodding Eye (Refer to plan for invert level)
- Rainwater Collection Pipe (At High Level)
- (R) — Rainwater Collection Pipe
- (R)* — Rainwater collection Pipe (with Access)
- SU — Drainage Channel (with Sump Unit)
- Threshold Drainage Channel (to Architects Spec)
- Gravel Drainage Strip
- (S) — Soil & Vent Pipe / Stub Stack
- Rising Main - Surface Water
- Pipeline with Concrete Surround
- Perforated Distributor / Collection Pipe
- Pipeline to be Removed / Abandoned
- Permeable Block Paving
- Localised Trench with Perforated Collector Pipe

Refer to architects / M&E drawings for exact positions of internal connections and RWP'S.

Notes:

1. This drawing is to be read in conjunction with all of the relevant architects, engineers and specialist sub-contractor drawings and specifications.
2. Any discrepancies between the engineers and the architects drawings to be referred to the architect before proceeding. Drawings must not be scaled.
3. All private drainage is to be in accordance with BS EN 752-1-2-3-4, BS EN 1295-1, BS EN 1610 and all relevant sections of approved document H of the building regulations (2015 Edition).
4. All adoptable drainage is to be in accordance with 'Design and construction guidelines for foul & surface water sewers offered for adoption', where appropriate.
5. All materials for adoptable drainage are to be Kitemarked as appropriate.
6. All adoptable manhole covers and frames are to be 150mm deep minimum and the covers badged as appropriate i.e. 'FW' or 'SW'.
7. Pipework Type - Flexibly jointed extra strength vitrified clay, to BS EN 295-1, Hepworth 'Supersleve' or equivalent.
8. Pipework Type - Plastic i.e. PVC-U, to BS EN 1401-1 Osma or equivalent. (Private pipework to be type SN4 and all adoptable pipework to be type SN8.)
9. Precast concrete manholes and fittings shall be to BS 5911 parts 3 and 4 and BS EN 1917.
10. The rising main within the highway should be laid no closer than 1.0m from the kerb face. Minimum Cover, 1.2m in the road and 0.9m in the footpath.
11. The private rising main trench is to have a warning tape fitted. Allow for 1.0m of tape coiled inside the pump chamber at the upstream end.
12. Whenever pipework passes through foundations, walls or connects to manholes, flexible pipe joints are to be provided within 150mm of the face of the structure. 600mm pipe length to then be used to form a rocker pipe.
13. Whenever pipework passes through screen walls, footings or retaining walls, lintels are to be provided.
14. Where pipelines pass within 1.0m of buildings or walls the foundations are to be taken down below the bottom of the trench. Where pipelines are more than 1.0m away from foundations the trench shall be backfilled with concrete up to a point that meets a 45° angle line taken from the bottom corner of the nearest foundation.
15. The contractors attention is drawn to the need to ensure that any trenches excavated through previously compacted or filled areas, in particular under the building footprint and immediately around the outside, are re-compacted to ensure that localised differential settlement does not occur.
16. Where pipelines cross with less than 300mm of clearance, each is to be surrounded with grade ST4 mass concrete for a distance not less than 1.0m centered on the crossing point. The length of surround should be extended as necessary to within 150mm of the next nearest flexible joints.
17. For private drainage, concrete protection is to be provided where the effective cover to the crown of the pipe(s) is less than 1.2m in trafficked areas and 0.6m in soft landscaped or pedestrianised areas. (Applies during and after construction).
18. The contractor is to ensure that suitable protective measures are taken to ensure that the drainage pipework and fittings are not damaged by site traffic prior to any over-site filling operations being completed.
19. Chamber annotation references are as follows:

AC - Denotes a polypropylene or vitrified clay access chamber, depth not exceeding 600mm, diameter not exceeding 300mm.

IC - Denotes a polypropylene inspection chamber, depth not exceeding 3.0m, diameter not exceeding 600mm. Standard diameter 450mm unless specified otherwise.

MH - Denotes a manholes constructed from either brick, polypropylene or P.C.C. sections. Chamber depth to be in excess of 1.2m.

20. The top run of each private foul drainage network is to be laid to falls no slacker than 1:40. the head of each run is to be vented to atmosphere in accordance with approved document H.
21. All foul and surface water drainage pipelines are to be 100mm dia min and laid at a gradient no slacker than 1:80, unless stated otherwise.
22. The contractor is to ensure that all pipework connections are arranged to direct flows down or into the main channel in the direction of the main flow. Any oblique or perpendicular chamber connections are to be directed into the mainline channel via appropriate benching. All chambers must include a connection via the main channel to ensure that a flush through is achieved.
23. The contractor is to ensure that when preformed polypropylene manhole bases are used, they are orientated such that the main flow is directed through the main channel of the base. This should be achieved by using long radius bends outside of the manhole when necessary.
24. Where new connections are to be made into existing manholes or sewers, all invert levels, pipe orientation and sizes should be checked on-site prior to the commencement of the works, with any variance reported to the engineer once identified. Where new connections are to be made either on or off-site, the contractor is to check the line and level of any existing services / mains, to ensure that no clashes exist prior to the works commencing.
25. Any and all new connections into a public sewer are to be inspected by the local water authority and carried out fully in accordance with their requirements. The contractor is to allow for obtaining the appropriate `Section Applications' as well as paying all necessary fees.
26. The contractor is to allow for obtaining the appropriate road opening licence's from the local highway authority and paying all necessary fees. All reinstatement works within the public highway are to be carried out in accordance with the requirements of the local highway authority.
27. Package pumping station(s) to be 'a specialist design element'. For installation guidance refer to manufacturer's specification. Any vent pipes to be taken to a position agreed with the architect. A three phase electricity supply is required to provide power to the pumping station control panel. The control panel, if external, is to be located inside a kiosk within close proximity of the pumping station. If internally located within a building, the control panel may be positioned on a wall. An informative notice plaque should be located on or near the control panel stating 'in the event of the alarm sounding or warning light flashing please contact the number below 'insert contact telephone number'.
28. Drainage channel(s) to be 'Aco' or equivalent. For installation guidance refer to the manufacturer's specification. Refer to landscape architects details for surface treatments around units where applicable. All drainage channels are to be constructed with in-built falls where possible. Relevant units are to be incorporated to provide the necessary length of channel gradient from the head of the run to the sump unit.
29. Permeable paving surface finish 'to the architects spec'. Any alteration to the extents of the permeable paving may have an adverse affect upon the Surface water drainage design and must therefore be discussed with the engineer.
30. Modular crate attenuation tank system(s) to be 'Wavin Aquacell' or 'Polypipe Polystorm'. Any other system offered will need to be provided with a separate warranty for design and installation.

Note:
The proposed foul and surface water drainage strategy is subject to approval by Southern Water

Rev.	Date	Description
P1	10.02.23	Drawn

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Jonsen House
43 Commercial Rd
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01202 237237
info@calcinotto.co.uk
www.calcinotto.co.uk

Client
AJC Homes

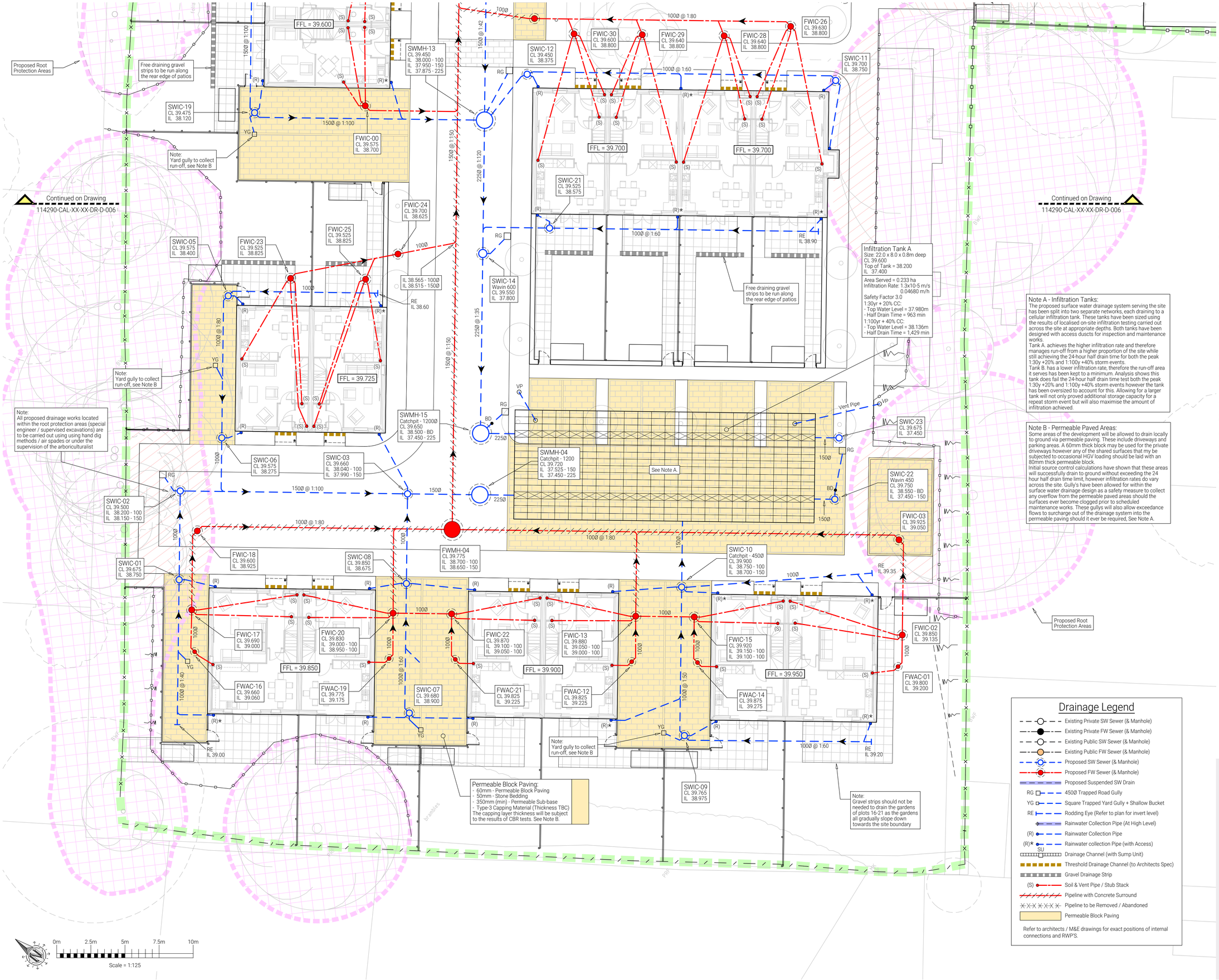
Project Title
Orchard Gate, Dibden Purlieu

Drawing Title
Proposed Drainage Strategy Drawing

Drawing Status
For Approval

Originator No.	Rev by	Chk by	Scale
114290	GEB	GEB	1:200 @A1

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | NO.	Revision
114290-CAL-XX-XX-DR-D-004	P1



Notes:

1. This drawing is to be read in conjunction with all of the relevant architects, engineers and specialist sub-contractor drawings and specifications.
2. Any discrepancies between the engineers and the architects drawings to be referred to the architect before proceeding. Drawings must not be scaled.
3. All private drainage is to be in accordance with BS EN 752-1-2-3-4, BS EN 1295-1, BS EN 1610 and all relevant sections of approved document H of the building regulations (2015 Edition).
4. All adoptable drainage is to be in accordance with 'Design and construction guidelines for foul & surface water sewers offered for adoption', where appropriate.
5. Pipework Type - Plastic i.e. PVC-U, to BS EN 1401-1 Osma or equivalent. (Private pipework to be type SN4 and all adoptable pipework to be type SN8.)
6. Precast concrete manholes and fittings shall be to BS 5911 parts 3 and 4 and BS EN 1917.
7. Whenever pipework passes through foundations, walls or connects to manholes, flexible pipe joints are to be provided within 150mm of the face of the structure. 600mm pipe length to then be used to form a rocker pipe.
8. Whenever pipework passes through screen walls, footings or retaining walls, lintels are to be provided.
9. Where pipelines pass within 1.0m of buildings or walls the foundations are to be taken down below the bottom of the trench. Where pipelines are more than 1.0m away from foundations the trench shall be backfilled with concrete up to a point that meets a 45° angle line taken from the bottom corner of the nearest foundation.
10. Where pipelines cross with less than 300mm of clearance, each is to be surrounded with grade ST4 mass concrete for a distance not less than 1.0m centered on the crossing point. The length of surround should be extended as necessary to within 150mm of the next nearest flexible joints.
11. For private drainage, concrete protection is to be provided where the effective cover to the crown of the pipe(s) is less than 1.2m in trafficked areas and 0.6m in soft landscaped or pedestrianised areas. (Applies during and after construction).
12. The contractor is to ensure that suitable protective measures are taken to ensure that the drainage pipework and fittings are not damaged by site traffic prior to any over-site filling operations being completed.
13. Chamber annotation references are as follows:

AC - Denotes a polypropylene or vitrified clay access chamber, depth not exceeding 600mm, diameter not exceeding 300mm.
IC - Denotes a polypropylene inspection chamber, depth not exceeding 3.0m, diameter not exceeding 600mm. Standard diameter 450mm unless specified otherwise.
MH - Denotes a manholes constructed from either brick, polypropylene or P.C.C. sections. Chamber depth to be in excess of 1.2m.

14. The top run of each private foul drainage network is to be laid to falls no slacker than 1:40. the head of each run is to be vented to atmosphere in accordance with approved document H.
15. All foul and surface water drainage pipelines are to be 100mm dia min and laid at a gradient no slacker than 1:80, unless stated otherwise.
16. The contractor is to ensure that all pipework connections are arranged to direct flows down or into the main channel in the direction of the main flow. Any oblique or perpendicular chamber connections are to be directed into the mainline channel via appropriate benching. All chambers must include a connection via the main channel to ensure that a flush through is achieved.
17. The contractor is to ensure that when preformed polypropylene manhole bases are used, they are orientated such that the main flow is directed through the main channel of the base. This should be achieved by using long radius bends outside of the manhole when necessary.
18. Where new connections are to be made into existing manholes or sewers, all invert levels, pipe orientation and sizes should be checked on-site prior to the commencement of the works, with any variance reported to the engineer once identified. Where new connections are to be made either on or off-site, the contractor is to check the line and level of any existing services / mains, to ensure that no clashes exist prior to the works commencing.
19. Any and all new connections into a public sewer are to be inspected by the local water authority and carried out fully in accordance with their requirements. The contractor is to allow for obtaining the appropriate 'Section Agreements' as well as paying all necessary fees.
20. The contractor is to allow for obtaining the appropriate road opening licence's from the local highway authority and paying all necessary fees. All reinstatement works within the public highway are to be carried out in accordance with the requirements of the local highway authority.
21. Permeable paving surface finish 'to the architects spec'. Any alteration to the extents of the permeable paving may have an adverse affect upon the Surface water drainage design and must therefore be discussed with the engineer.
22. Modular crate soakaway system(s) to be 'Wavin Aquacell' or 'Polypipe Polystorm'. Any other system offered will need to be provided with a separate warranty for design and installation.

Note A - Infiltration Tanks:

The proposed surface water drainage system serving the site has been split into two separate networks, each draining to a cellular infiltration tank. These tanks have been sized using the results of localised on-site infiltration testing carried out across the site at appropriate depths. Both tanks have been designed with access dusts for inspection and maintenance works.
Tank A. achieves the higher infiltration rate and therefore manages run-off from a higher proportion of the site while still achieving the 24-hour half drain time for both the peak 1:30yr +20% and 1:100y +40% storm events.
Tank B. has a lower infiltration rate, therefore the run-off area it serves has been kept to a minimum. Analysis shows this tank does fail the 24-hour half drain time test both the peak 1:30yr +20% and 1:100y +40% storm events however the tank has been oversized to account for this. Allowing for a larger tank will not only proved additional storage capacity for a repeat storm event but will also maximise the amount of infiltration achieved.

Note B - Permeable Paved Areas:

Some areas of the development will be allowed to drain locally to ground via permeable paving. These include driveways and parking areas. A 60mm thick block may be used for the private driveways however any of the shared surfaces that my be subjected to occasional HGV loading should be laid with an 80mm thick permeable block.
Initial source control calculations have shown that these areas will successfully drain to ground without exceeding the 24 hour half drain time limit, however infiltration rates do vary across the site. Gully's have been allowed for within the surface water drainage design as a safety measure to collect any overflow from the permeable paved areas should the surfaces ever become clogged prior to scheduled maintenance works. These gullys will also allow exceedance flows to surcharge out of the drainage system into the permeable paving should it ever be required, See Note A.

Note:
The proposed surface water drainage measures have been designed to manage a peak 1:100 year +40% climate change storm event.

Drainage Legend

- Existing Private SW Sewer (& Manhole)
- Existing Private FW Sewer (& Manhole)
- Existing Public SW Sewer (& Manhole)
- Existing Public FW Sewer (& Manhole)
- Proposed SW Sewer (& Manhole)
- Proposed FW Sewer (& Manhole)
- Proposed Suspended SW Drain
- RG — 450Ø Trapped Road Gully
- YG — Square Trapped Yard Gully + Shallow Bucket
- RE — Rodding Eye (Refer to plan for invert level)
- Rainwater Collection Pipe (At High Level)
- (R) — Rainwater Collection Pipe
- (R)* — Rainwater collection Pipe (with Access)
- SU — Drainage Channel (with Sump Unit)
- Threshold Drainage Channel (to Architects Spec)
- Gravel Drainage Strip
- (S) — Soil & Vent Pipe / Stub Stack
- Pipeline with Concrete Surround
- Pipeline to be Removed / Abandoned
- Permeable Block Paving

Refer to architects / M&E drawings for exact positions of internal connections and RWP'S.

Rev.	Date	Description
P2	12.07.22	Site plan and building layouts updated. Drainage revised following the results of on-site infiltration testing - Issued for Planning
P1	21.06.22	Drawn - Preliminary Issue

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Client
AJC Homes

Project Title
Orchard Gate, Dibden Purlieu

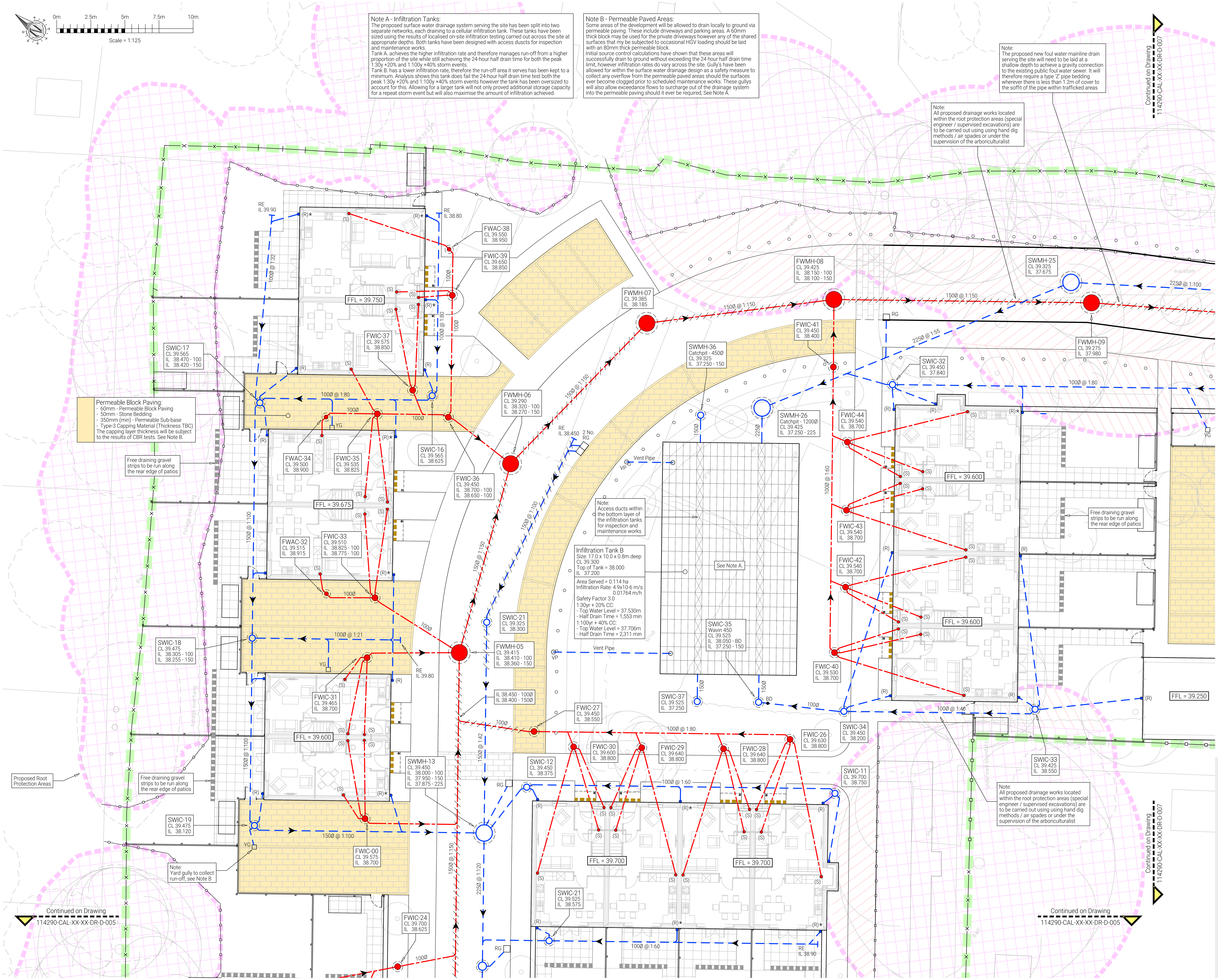
Drawing Title
Proposed Drainage Layout Drawings Sheet 1 of 3

Drawing Status
Planning

Originator No.	Rev by	Chk by	Scale
114290	GEB	GEB	1:125 @A1

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | NO.
114290-CAL-XX-XX-DR-D-005

Revision
P2



0m 2.5m 5m 7.5m 10m
Scale = 1:125
Note A - Infiltration Tanks:
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Tank B. has a lower infiltration rate, therefore the run-off area it serves has been kept to a minimum. Analysis shows this tank does fail the 24-hour half drain time test both the peak 1:30y +20% and 1:100y +40% storm events however the tank has been oversized to account for this. Allowing for a larger tank will not only proved additional storage capacity for a repeat storm event but will also maximise the amount of infiltration achieved.
Note B - Permeable Paved Areas:
Some areas of the development will be allowed to drain locally to ground via permeable paving. These include driveways and parking areas. A 60mm thick block may be used for the private driveways however any of the shared surfaces that my be subjected to occasional HGV loading should be laid with an 80mm thick permeable block.
Initial source control calculations have shown that these areas will successfully drain to ground without exceeding the 24 hour half drain time limit, however infiltration rates do vary across the site. Gully's have been allowed for within the surface water drainage design as a safety measure to collect any overflow from the permeable paved areas should the surfaces ever become clogged prior to scheduled maintenance works. These gullys will also allow exceedance flows to surcharge out of the drainage system into the permeable paving should it ever be required, See Note A.
Note:
The proposed new foul water mainline drain serving the site will need to be laid at a shallow depth to achieve a gravity connection to the existing public foul water sewer. It will therefore require a type 'Z' pipe bedding wherever there is less than 1.2m of cover to the soffit of the pipe within trafficked areas
Note:
All proposed drainage works located within the root protection areas (special engineer / supervised excavations) are to be carried out using hand dig methods / air spades or under the supervision of the arboriculturalist
Continued on Drawing
114290-CAL-XX-XX-DR-D-007
Permeable Block Paving:
- 60mm - Permeable Block Paving
- 50mm - Stone Bedding
- 350mm (min) - Permeable Sub-base
- Type-3 Capping Material (Thickness TBC)
The capping layer thickness will be subject to the results of CBR tests. See Note B.
Free draining gravel strips to be run along the rear edge of patios
Note:
Access ducts within the bottom layer of the infiltration tanks for inspection and maintenance works
Infiltration Tank B
Size: 17.0 x 10.0 x 0.8m deep
CL 39.300
Top of Tank = 38.000
IL 37.200
Area Served = 0.114 ha
Infiltration Rate: 4.9x10-6 m/s
0.01764 m/h
Safety Factor 3.0
1:30yr + 20% CC:
- Top Water Level = 37.530m
- Half Drain Time = 1,553 min
1:100yr + 40% CC:
- Top Water Level = 37.706m
- Half Drain Time = 2,311 min
See Note A
Vent Pipe
FFL = 39.750
FFL = 39.675
FFL = 39.600
FFL = 39.700
FFL = 39.250
Proposed Root Protection Areas
Note:
Yard gully to collect run-off, see Note B
Continued on Drawing
114290-CAL-XX-XX-DR-D-005
Note:
All proposed drainage works located within the root protection areas (special engineer / supervised excavations) are to be carried out using hand dig methods / air spades or under the supervision of the arboriculturalist
Continued on Drawing
114290-CAL-XX-XX-DR-D-005
Continued on Drawing
114290-CAL-XX-XX-DR-D-007

Notes:

1. This drawing is to be read in conjunction with all of the relevant architects, engineers and specialist sub-contractor drawings and specifications.
2. Any discrepancies between the engineers and the architects drawings to be referred to the architect before proceeding. Drawings must not be scaled.
3. All private drainage is to be in accordance with BS EN 752-1-2-3-4, BS EN 1295-1, BS EN 1610 and all relevant sections of approved document H of the building regulations (2015 Edition).
4. All adoptable drainage is to be in accordance with 'Design and construction guidelines for foul & surface water sewers offered for adoption', where appropriate.
5. Pipework Type - Plastic i.e. PVC-U, to BS EN 1401-1 Osma or equivalent. (Private pipework to be type SN4 and all adoptable pipework to be type SN8.)
6. Precast concrete manholes and fittings shall be to BS 5911 parts 3 and 4 and BS EN 1917.
7. Whenever pipework passes through foundations, walls or connects to manholes, flexible pipe joints are to be provided within 150mm of the face of the structure. 600mm pipe length to then be used to form a rocker pipe.
8. Whenever pipework passes through screen walls, footings or retaining walls, lintels are to be provided.
9. Where pipelines pass within 1.0m of buildings or walls the foundations are to be taken down below the bottom of the trench. Where pipelines are more than 1.0m away from foundations the trench shall be backfilled with concrete up to a point that meets a 45° angle line taken from the bottom corner of the nearest foundation.
10. Where pipelines cross with less than 300mm of clearance, each is to be surrounded with grade ST4 mass concrete for a distance not less than 1.0m centered on the crossing point. The length of surround should be extended as necessary to within 150mm of the next nearest flexible joints.
11. For private drainage, concrete protection is to be provided where the effective cover to the crown of the pipe(s) is less than 1.2m in trafficked areas and 0.6m in soft landscaped or pedestrianised areas. (Applies during and after construction).
12. The contractor is to ensure that suitable protective measures are taken to ensure that the drainage pipework and fittings are not damaged by site traffic prior to any over-site filling operations being completed.
13. Chamber annotation references are as follows:

AC - Denotes a polypropylene or vitrified clay access chamber, depth not exceeding 600mm, diameter not exceeding 300mm.

IC - Denotes a polypropylene inspection chamber, depth not exceeding 3.0m, diameter not exceeding 600mm. Standard diameter 450mm unless specified otherwise.

MH - Denotes a manholes constructed from either brick, polypropylene or P.C.C. sections. Chamber depth to be in excess of 1.2m.

14. The top run of each private foul drainage network is to be laid to falls no slacker than 1:40. the head of each run is to be vented to atmosphere in accordance with approved document H.
15. All foul and surface water drainage pipelines are to be 100mm dia min and laid at a gradient no slacker than 1:80, unless stated otherwise.
16. The contractor is to ensure that all pipework connections are arranged to direct flows down or into the main channel in the direction of the main flow. Any oblique or perpendicular chamber connections are to be directed into the mainline channel via appropriate benching. All chambers must include a connection via the main channel to ensure that a flush through is achieved.
17. The contractor is to ensure that when preformed polypropylene manhole bases are used, they are orientated such that the main flow is directed through the main channel of the base. This should be achieved by using long radius bends outside of the manhole when necessary.
18. Where new connections are to be made into existing manholes or sewers, all invert levels, pipe orientation and sizes should be checked on-site prior to the commencement of the works, with any variance reported to the engineer once identified. Where new connections are to be made either on or off-site, the contractor is to check the line and level of any existing services / mains, to ensure that no clashes exist prior to the works commencing.
19. Any and all new connections into a public sewer are to be inspected by the local water authority and carried out fully in accordance with their requirements. The contractor is to allow for obtaining the appropriate `Section Agreements' as well as paying all necessary fees.
20. The contractor is to allow for obtaining the appropriate road opening licence's from the local highway authority and paying all necessary fees. All reinstatement works within the public highway are to be carried out in accordance with the requirements of the local highway authority.
21. Permeable paving surface finish 'to the architects spec'. Any alteration to the extents of the permeable paving may have an adverse affect upon the Surface water drainage design and must therefore be discussed with the engineer.
22. Modular crate soakaway system(s) to be 'Wavin Aquacell' or 'Polypipe Polystorm'. Any other system offered will need to be provided with a separate warranty for design and installation.

Note:
The proposed surface water drainage measures have been designed to manage a peak 1:100 year +40% climate change storm event.

Rev.	Date	Description
P2	12.07.22	Site plan and building layouts updated. Drainage revised following the results of on-site infiltration testing - Issued for Planning
P1	21.06.22	Drawn - Preliminary Issue

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Client
AJC Homes

Project Title
Orchard Gate, Dibden Purlieu

Drawing Title
Proposed Drainage
Layout Drawings
Sheet 2 of 3

Drawing Status
Planning

Originator No.	Rev by	Chk by	Scale
114290	GEB	GEB	1:125 @A1

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | NO.	Revision
114290-CAL-XX-XX-DR-D-006	P2

0m 2.5m 5m 7.5m 10m

Scale = 1:125

Note:
The proposed new foul water mainline drain serving the site will need to be laid at a shallow depth to achieve a gravity connection to the existing public foul water sewer. It will therefore require a type 'Z' pipe bedding wherever there is less than 1.2m of cover to the soffit of the pipe within trafficked areas

Note:
All proposed drainage works located within the root protection areas (special engineer / supervised excavations) are to be carried out using using hand dig methods / air spades or under the supervision of the arboriculturalist

Continued on Drawing 114290-CAL-XX-XX-DR-D-006

Proposed Root Protection Areas

Note A - Infiltration Tanks:

The proposed surface water drainage system serving the site has been split into two separate networks, each draining to a cellular infiltration tank. These tanks have been sized using the results of localised on-site infiltration testing carried out across the site at appropriate depths. Both tanks have been designed with access dusts for inspection and maintenance works.
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Note B - Permeable Paved Areas:

Some areas of the development will be allowed to drain locally to ground via permeable paving. These include driveways and parking areas. A 60mm thick block may be used for the private driveways however any of the shared surfaces that my be subjected to occasional HGV loading should be laid with an 80mm thick permeable block.
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FWMH-08
CL 39.425
IL 38.150 - 100
IL 38.100 - 150

SWMH-25
CL 39.325
IL 37.675

IL 38.080 - 100Ø
IL 37.955 - 225Ø

FWMH-10
CL 39.090
IL 37.830
IL 37.780

SWMH-24
CL 39.000
IL 38.100 - 150
IL 38.025 - 225

FWMH-11
CL 38.955
IL 37.655

150Ø @ 1:150
225Ø @ 1:100
225Ø @ 1:55
100Ø @ 1:80
100Ø @ 1:40
100Ø @ 1:22
100Ø @ 1:60

FWIC-41
CL 39.450
IL 38.400

FWMH-09
CL 39.275
IL 37.980

SWIC-31
CL 39.225
IL 38.195

SWIC-32
CL 39.450
IL 37.840

FWIC-45
CL 39.325
IL 38.500

FWIC-46
CL 39.250
IL 38.500

SWIC-28
CL 39.225
IL 38.275 - 100
IL 38.225 - 100

SWIC-27
CL 39.450
IL 38.450

FWIC-44
CL 39.540
IL 38.700

FWIC-43
CL 39.540
IL 38.700

FWIC-42
CL 39.540
IL 38.700

FWIC-40
CL 39.530
IL 38.700

FWIC-48
CL 39.200
IL 38.500

FWAC-47
CL 39.235
IL 38.635

SWIC-29
CL 39.240
IL 38.425

SWIC-30
CL 39.220
IL 38.425

FWIC-26
CL 39.630
IL 38.800

SWIC-11
CL 39.700
IL 38.750

FFL = 39.600
FFL = 39.400
FFL = 39.250

Free draining gravel strips to be run along the rear edge of patios

Surface water downpipe to be diverted across at high level to the rear garden of Plot 03. before dropping down to ground

Permeable Block Paving:
- 60mm - Permeable Block Paving
- 50mm - Stone Bedding
- 350mm (min) - Permeable Sub-base
- Type-3 Capping Material (Thickness TBC)

The capping layer thickness will be subject to the results of CBR tests. See Note B.

Note:
All threshold drains to have open ends allowing them to free drain to adjacent landscaping

RE IL 38.65

RE IL 38.90

Note:
Yard gully to collect run-off, see Note B

Infiltration Tank A
Size: 22.0 x 8.0 x 0.8m deep
CL 39.600

Ex 1500 Public Foul Water Sewer

Note:
Proposed new adoptable lateral connection to the existing public foul water chamber '3501' under a Section 106 agreement With Southern Water

Ex-FWMH
Ref: 3501
CL 39.090
IL 37.600 - New 150
IL 37.550 - Ex 150

Existing invert level to be checked by lifting chamber cover and measuring the depth prior to any works beginning on-site

NORDS WAY

Drainage Legend

- Existing Private SW Sewer (& Manhole)
- Existing Private FW Sewer (& Manhole)
- Existing Public SW Sewer (& Manhole)
- Existing Public FW Sewer (& Manhole)
- Proposed SW Sewer (& Manhole)
- Proposed FW Sewer (& Manhole)
- Proposed Suspended SW Drain
- RG 450Ø Trapped Road Gully
- YG Square Trapped Yard Gully + Shallow Bucket
- RE Rodding Eye (Refer to plan for invert level)
- Rainwater Collection Pipe (At High Level)
- (R) Rainwater Collection Pipe
- (R)* Rainwater collection Pipe (with Access)
- SU Drainage Channel (with Sump Unit)
- Threshold Drainage Channel (to Architects Spec)
- Gravel Drainage Strip
- (S) Soil & Vent Pipe / Stub Stack
- Pipeline with Concrete Surround
- Pipeline to be Removed / Abandoned
- Permeable Block Paving

Refer to architects / M&E drawings for exact positions of internal connections and RWP'S.

Notes:

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7. Whenever pipework passes through foundations, walls or connects to manholes, flexible pipe joints are to be provided within 150mm of the face of the structure. 600mm pipe length to then be used to form a rocker pipe.
8. Whenever pipework passes through screen walls, footings or retaining walls, lintels are to be provided.
9. Where pipelines pass within 1.0m of buildings or walls the foundations are to be taken down below the bottom of the trench. Where pipelines are more than 1.0m away from foundations the trench shall be backfilled with concrete up to a point that meets a 45° angle line taken from the bottom corner of the nearest foundation.
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Note:
The proposed surface water drainage measures have been designed to manage a peak 1:100 year +40% climate change storm event.

Rev.	Date	Description
P2	12.07.22	Site plan and building layouts updated. Drainage revised following the results of on-site infiltration testing - Issued for Planning
P1	21.06.22	Drawn - Preliminary Issue

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Client
AJC Homes

Project Title
Orchard Gate, Dibden Purlieu

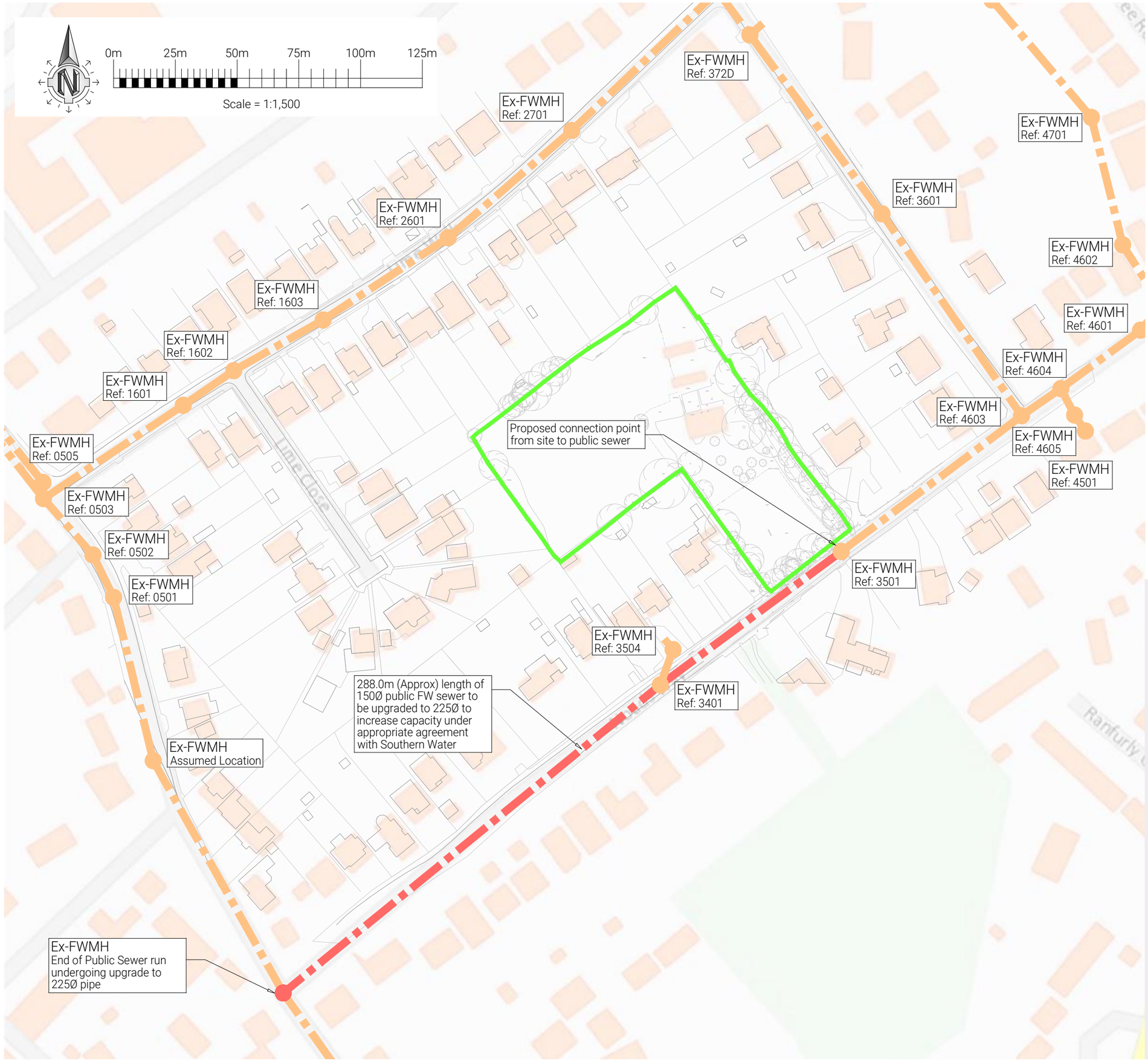
Drawing Title
Proposed Drainage Layout Drawings Sheet 3 of 3

Drawing Status
Planning

Originator No.	Rev by	Chk by	Scale
114290	GEB	GEB	1:125 @A1

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | NO. — Revision

114290-CAL-XX-XX-DR-D-007 — P2



Notes:

1. This drawing is to be read in conjunction with all of the relevant architects, engineers and specialist sub-contractor drawings and specifications.
2. Any discrepancies between the engineers and the architects drawings to be referred to the architect before proceeding. Drawings must not be scaled.

Drainage Legend

- Proposed Site Boundary
- Existing FW Sewer
- Existing FW Sewer To Be Upgraded to 225Ø

Rev.	Date	Description
P1	31.08.23	Drawn - Issued for Approval

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Client
AJC Homes

Project Title
Orchard Gate, Dibden Purlieu

Drawing Title
Public Sewer Upgrade Plan

Drawing Status
For Approval

Originator No.	Rev by	Chk by	Scale
114290	PJ	GEB	1:1500 @A1

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | NO.
11XXXX-CAL-00-XX-DR-D-015

Revision
P1