



RIDGE

FLOOD RISK ASSESSMENT AND
DRAINAGE STRATEGY
FORMER DAIRY CREST DEPOT

VIVID HOMES

July 2022



FORMER DAIRY CREST DEPOT Vivid Homes

July 2022

Prepared for

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CONTENTS

1. INTRODUCTION	7
1.1. Appointment and Brief	7
1.2. Aims and Objectives	7
1.3. Limitations	8
2. PROJECT BACKGROUND	10
2.1. Site Location and Existing Land Use	10
2.2. Topography	10
2.3. Proposed Development	10
3. FLOOD RISK STATEMENT	13
3.1. Sources of Information	13
3.2. Hydrological Features	13
3.3. Historic Flooding	13
3.4. Potential Sources of Flooding	13
3.5. Summary	21
4. CLIMATE CHANGE	23
4.1. Anticipated Development Lifecycle	23
4.2. Climate Change Allowances	23
4.3. Impacts on Flood Risk	23
4.4. Impacts on Proposed Surface Water Drainage Design	23
5. POLICY CONSTRAINTS AND IMPLICATIONS FOR THE DEVELOPMENT	25
5.1. Sequential Test	25
5.2. Flood Risk Vulnerability	25
5.3. Flood Zone Compatibility	26
5.4. Functional Floodplain	27
5.5. Off-site Impact	27
5.6. Safe Access and Egress	27
5.7. Local Plan Requirements	27
6. PROPOSED FLOOD MITIGATION AND MANAGEMENT MEASURES	30
6.1. Siting of the Built Development	30
6.2. Elevation of the Development Platform	30
6.3. External Ground Levels	30
7. SURFACE WATER DRAINAGE STATEMENT	32
7.1. Drainage hierarchy	32
7.2. SuDS Management Train	32
7.3. Contributing Areas	32
7.4. Allowance for Climate Change	32
7.5. Allowance for Creep	32

7.6.	Proposed Drainage	33
7.7.	Designing for Exceedance	33
7.8.	Water Quality	34
7.9.	Existing Networks	34
7.10.	Required Maintenance Schedule	35
8.	FOUL WATER DRAINAGE	37
8.1.	Existing Network	37
8.2.	Proposed Drainage	37
9.	CONCLUSION	39

APPENDICES

Appendix A Existing Site Plan & Surveys
Appendix B Proposed Site Plan
Appendix C Sewer Records
Appendix D Proposed Drainage Strategy
Appendix E Surface Water Calculation

SECTION 01

INTRODUCTION

1. INTRODUCTION

1.1. Appointment and Brief

This flood risk assessment (FRA) and drainage strategy has been prepared on behalf of the Vivid Homes for the re-development of the Former Dairy Crest Depot site for up to 72 dwellings, Dunsbury Way, Havant, PO9 5AX (hereby referred to as the application site).

The purpose of this document is:

- To determine and outline potential sources of flooding at the application site,
- Establish how flood risk will be managed throughout the lifetime of the proposed development, taking into account the potential for climate change.
- Confirm how surface water needs to be managed.

1.2. Aims and Objectives

It is intended to follow the procedures and guidance's outlined within BS 8533 (2017) and CIRIA C624 (2004) in the preparation of this document.

In following this guidance, it is intended to undertake a Level 1 & 2 flood risk study. The three incremental levels of detail are as follows:

Level 01 – Flood Risk Screening Study

This level of study is typically sufficient to inform initial development feasibility where site massing and end-use are unknown or used to determine the detailed scope for future detailed assessments.

At this stage, we would look to:

- Obtain and review the most up-to-date local flood risk information, including the Preliminary Flood Risk Assessment (PFRA), Strategic Flood Risk Assessment (SFRA) and Surface Water Management Plan (SWMP) for the area of interest.
- Review the Environment Agency's online flood risk mapping and data for the site.
- Review applicable Planning Policy for the site.
- Undertake an initial liaison with the Local Sewerage Undertaker.
- Undertake an initial consultation with the Lead Local Flood Authority (LLFA) and Environment Agency.

Level 02 – Outline Flood Risk Assessment / Flood Risk Statement

This level of study aims to go into further detail with respect to the flood risk at the site and specifically its impact on the proposed scheme. Identifying whether flood risk mitigation would be required and outlining how this will (or has) been incorporated within the proposals.

Typically, this level of study would be sufficient for most sites up to and including those categorised within Flood Zone FZ2.

At this stage, we would look to:

- Engage with the Environment Agency, LLFA and Statutory Sewerage Undertaker.
- Undertake a desktop assessment of pre-and post-development flood risk at the site from all possible sources (i.e., fluvial, tidal, groundwater, sewers, overland and artificial sources).
- Outline the Sequential and Exception Test requirements, in accordance with the NPPF.
- Identify the impact of flood risk on the proposed scheme and make recommendations / identify how these risks have or will be incorporated to the satisfaction of the NPPF.

Level 03 – Detailed Flood Risk Assessment

This level of study is often only required for sites with the most complex flood risk, typically categorised as being predominantly within Flood Zones FZ3A and FZ3B, or sites of a strategic nature or scale.

As part of the detailed analysis, hydraulic flood modelling and simulations are often required.

At this stage, we would look to:

- Undertake the Sequential and Exception tests for the proposed development (if required), in accordance with Environment Agency guidance.

- The Sequential Test will comparatively assess the flood risks present at the site against other similar sites within the area and establish whether any residual flood risks can be mitigated.

- If it is considered that the use of another site is not possible then an Exception Test will be undertaken to establish how flood risk will be safely managed throughout the lifetime of the development and demonstrate that the sustainability and community benefits of the development will outweigh the flood risk.

1.3. Limitations

The purpose of this report is outlined in Section 1.2, together with those related matters specifically referred to therein and it is not intended to be used for any other purposes. The report is for the sole benefit and may only be relied upon by the addressee, to whom we will owe a duty of care. The report and any part of it are confidential to the addressee and should not be disclosed to any third party for any purpose, without the prior written consent of Ridge and Partners LLP as to the form and context of such disclosure. The granting of such consent shall not entitle the third party to place reliance on the report, nor shall it confer any third-party rights pursuant to the Contracts (Rights of Third Parties) Act. The report may not be assigned to any third party.

SECTION 02

PROJECT BACKGROUND

2. PROJECT BACKGROUND

2.1. Site Location and Existing Land Use

The application site is bounded by Fulflood Road towards North and Dunsbury Way towards West. On the East, a private garage is present, and, on the South, the site is lined with various trees.

The site is a brownfield. Currently, the site has access from Dunsbury Way and Fulflood Road.



Figure 1: Site Location Plan

The Ordnance Survey (OS) grid reference for the application site is approximately SU 71312 08228 with Easting and Northing of 471312 E, 108228 N, and the nearest postcode is PO9 5AX. The site area is circa 0.58 Hectares.

2.2. Topography

The site predominantly slopes from East to West from an elevation of circa 18m AOD down to circa 16m AOD with an approximate gradient of 1 in 2.5. However, on the North-South slope, the site slopes from an elevation of circa 17m AOD down to circa 16 m AOD with an approximate gradient of 1 in 1.25. See the topographical survey in the appendices.

2.3. Proposed Development

The proposal includes the redevelopment of the Former Dairy Crest site for up to 72 dwellings units on the land of Dunsbury Way. The site includes Car park provisions, short-stay cycle parking and a bin store area.



Figure 2: Proposed Site layout

SECTION 03

FLOOD RISK STATEMENT

3. FLOOD RISK STATEMENT

3.1. Sources of Information

Information relating to the flood risk at the site at the time of writing has been obtained from:

The Environment Agency (EA) website.

Partnership for Urban South Hampshire Strategic Flood Risk Assessment (February 2016)

Havant Borough Core Strategy (March 2016)

Hampshire County Council Preliminary Flood Risk Assessment (PFRA) (April 2011)

Hampshire County Council Local Flood Risk Management (LFRMS) (October 2020)

Hampshire County Council Surface Water Management Plan (August 2012)

3.2. Hydrological Features

The tributary of River Hermitage is adjacent to the site, which has been classified as the main river by Environmental Agency.

3.3. Historic Flooding

There have been no reports of historic flooding around this site.

3.4. Potential Sources of Flooding

An assessment of flood risk to the site from potential sources is set out as follows:

Fluvial Flooding

Fluvial flooding occurs when excessive rainfall over an extended period causes a river to exceed its capacity. It can also be caused by heavy snowmelt and ice.

Based upon EA mapping, the site is situated within Flood Zone 1 and therefore at a low probability of flooding from Main Rivers and the sea.

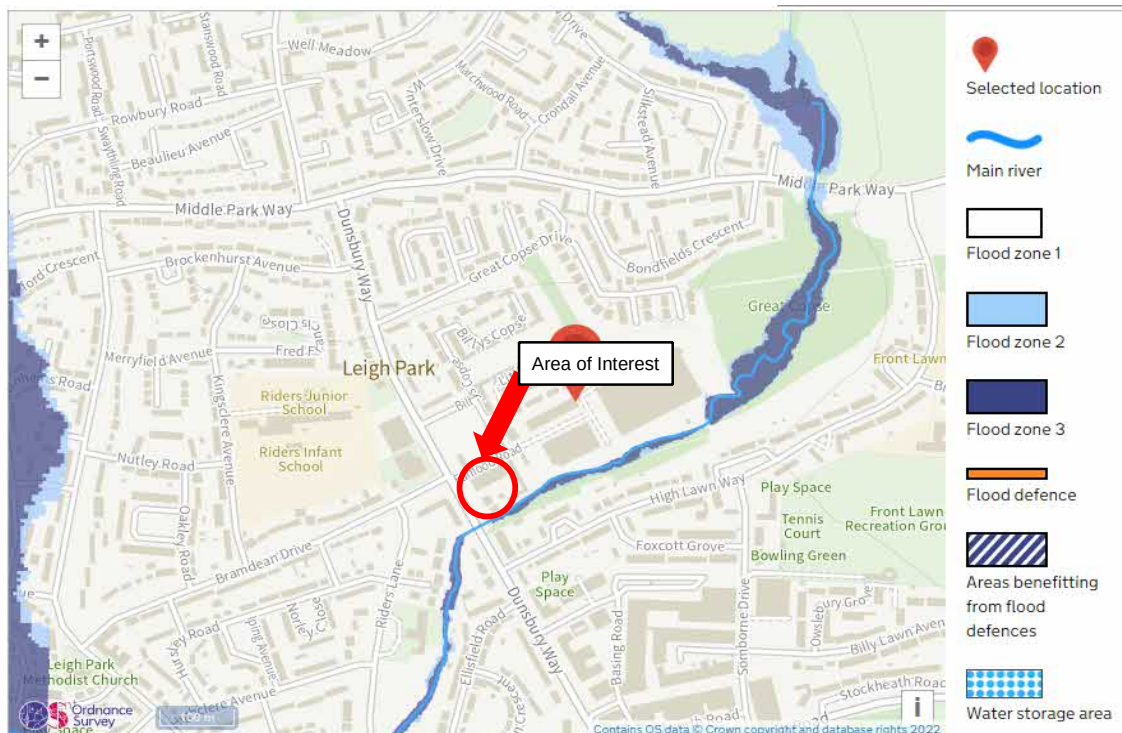


Figure 3: EA mapping extract showing flood zone classifications.

The definition of EA flood zones is provided within the National Planning Policy Framework (NPPF) and its associated Planning Practice Guidance (PPG) Table 1 (Flood Zones) and summarised below:

Flood Zone 1 (Low Probability)

Land which could be at risk of flooding from fluvial or tidal flood events with less than 0.1 % (1:1000 year) annual probability of occurrence and therefore considered to be at 'low probability' of flooding.

Flood Zone 2 (Medium Probability)

Land which could be at risk of flooding with an annual probability of occurrence between 1% (1:100 year) and 0.1% (1:1000 year) from fluvial sources and between 0.5% (1:200 year) and 0.1% (1:1000 year) from tidal sources and therefore considered to be at 'medium probability' of flooding.

Flood Zone 3A (High Probability)

Land which could be at risk of flooding with an annual probability of occurrence greater than 1% (1:100 year) from fluvial sources and greater than 0.5% (1:200 year) from tidal sources and therefore considered to be at 'high probability' of flooding.

Flood Zone 3B (Functional Floodplain)

Land where water has to flow or be stored in times of flood. Local Planning Authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain in agreement with the Environment Agency. However, in general it is defined as land that would flood with an annual probability of 5 % (1:20 year) or greater.

Furthermore, in assessing the flood zoning, the protection afforded by any flood defence structures or strategic flood management measures is not taken into account by the EA.

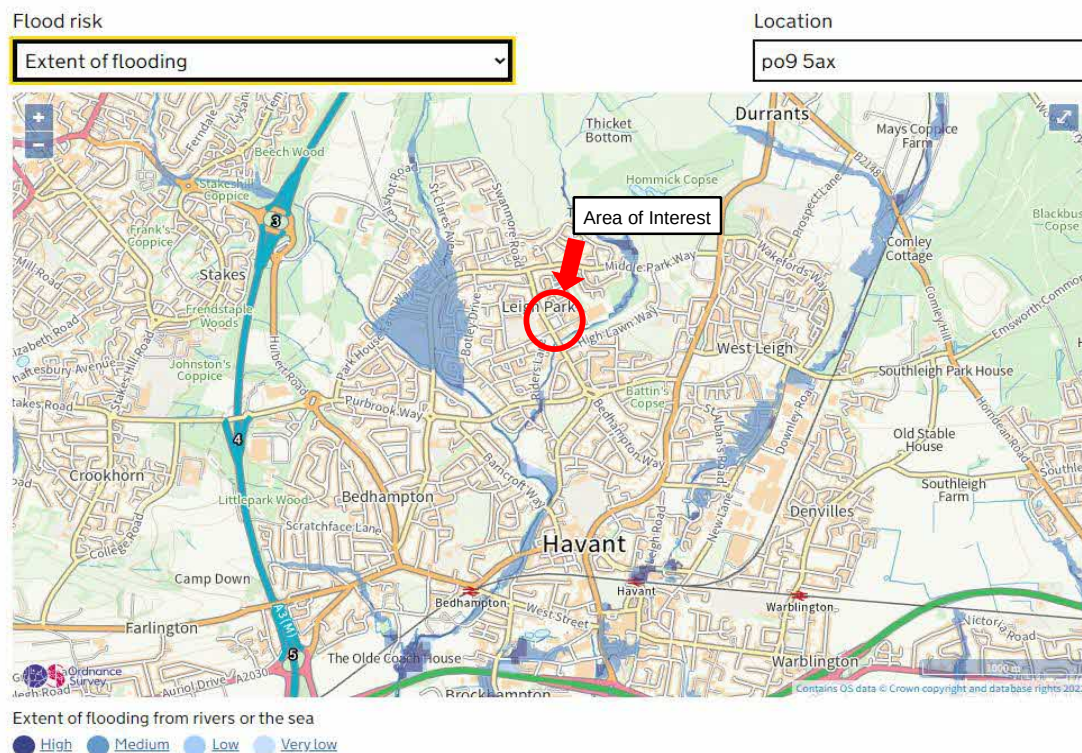


Figure 4: EA mapping extents showing the extent of flooding from rivers or the Sea

With the foregoing in consideration, the site is deemed to be at **low risk of flooding due to flooding from rivers or the sea.**

Failure (Breaching) of Flood Defences and Management Measures

Based upon EA mapping, the site does not benefit from, nor rely upon, the presence of formal raised flood defences and therefore corresponding flood risk to the site due to defence failure (breach) is negligible.

With the foregoing in consideration, the site is deemed to be at **low risk of flooding due to the failure of flood defences and management measures.**

Reservoirs

Based upon EA mapping, the site does not lie within an area denoted as being at risk of flooding in the event of a significant breach (failure) of raised reservoir embankments.

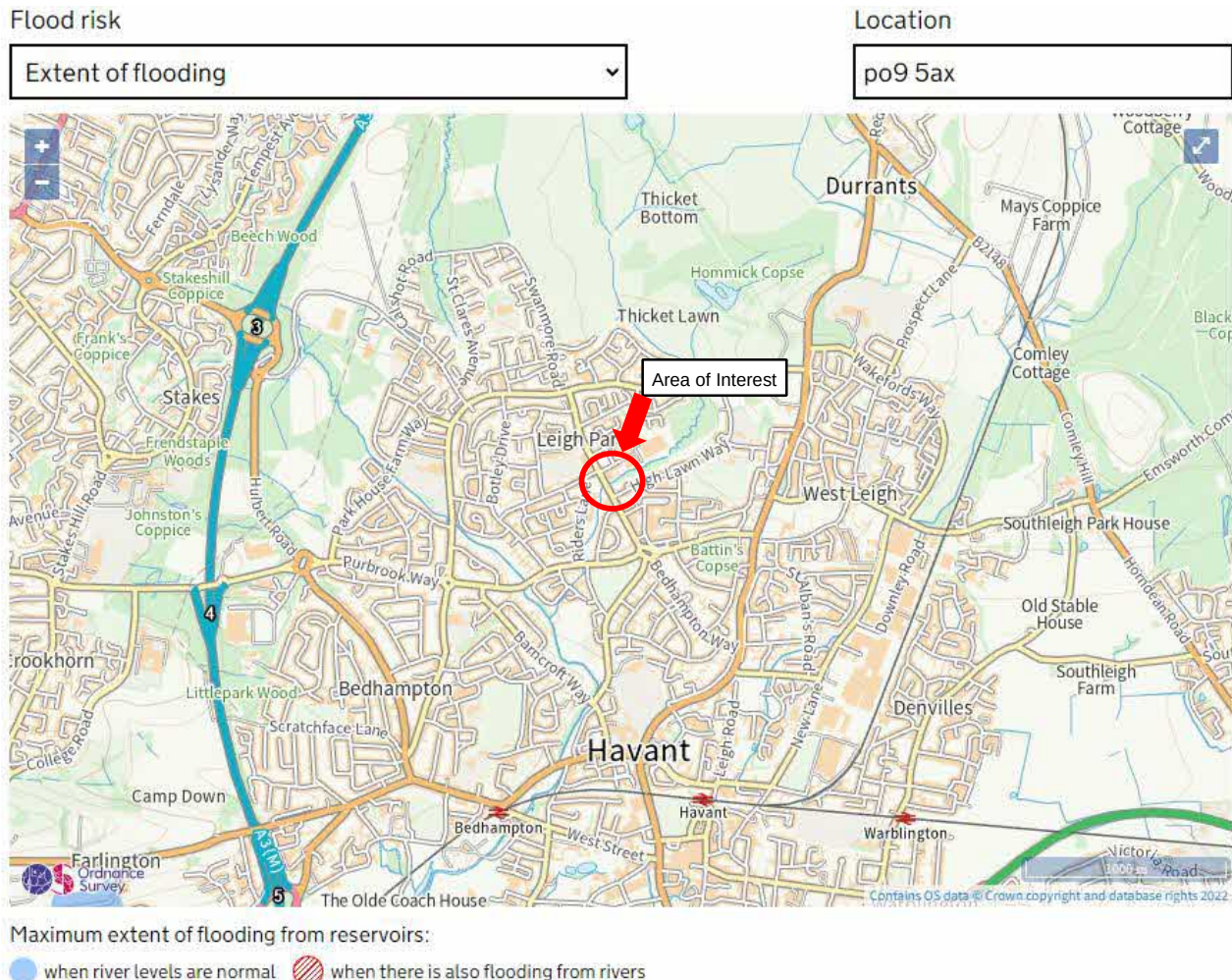


Figure 5: EA mapping extract showing maximum extent of flooding from reservoirs in blue.

With the foregoing in consideration, the site is deemed to be at **no risk of flooding from Reservoirs.**

Canals and Artificial Water Bodies

There are no canals present within the vicinity of the site. However, there are tributaries of the River Hermitage adjacent to the proposed site. Therefore, this source poses no flood risk to the development.

With the foregoing in consideration, the site is deemed to be at **low risk of flooding from Canals and Artificial Water Bodies.**

Groundwater Flooding

Groundwater flooding is defined as flooding caused by the emergence of water originating from subsurface strata, with the most common forms being:

A rise in groundwater from unconfined permeable soils (such as chalk), shallow perched water tables after periods of heavy rainfall; or

A rise in groundwater in unconsolidated permeable superficial deposits, which are in hydraulic continuity with local river levels and where the hydraulic gradient of the water table is low.

A review of British Geological Society (BGS) mapping suggests that the site is made up of London Clay Formation- Clay, silt and sand (Bedrock) and Head- Clay, silt, sand and gravel (Superficial Deposits).

The presence of groundwater between bedrock and superficial deposit increases the risk of groundwater flooding.

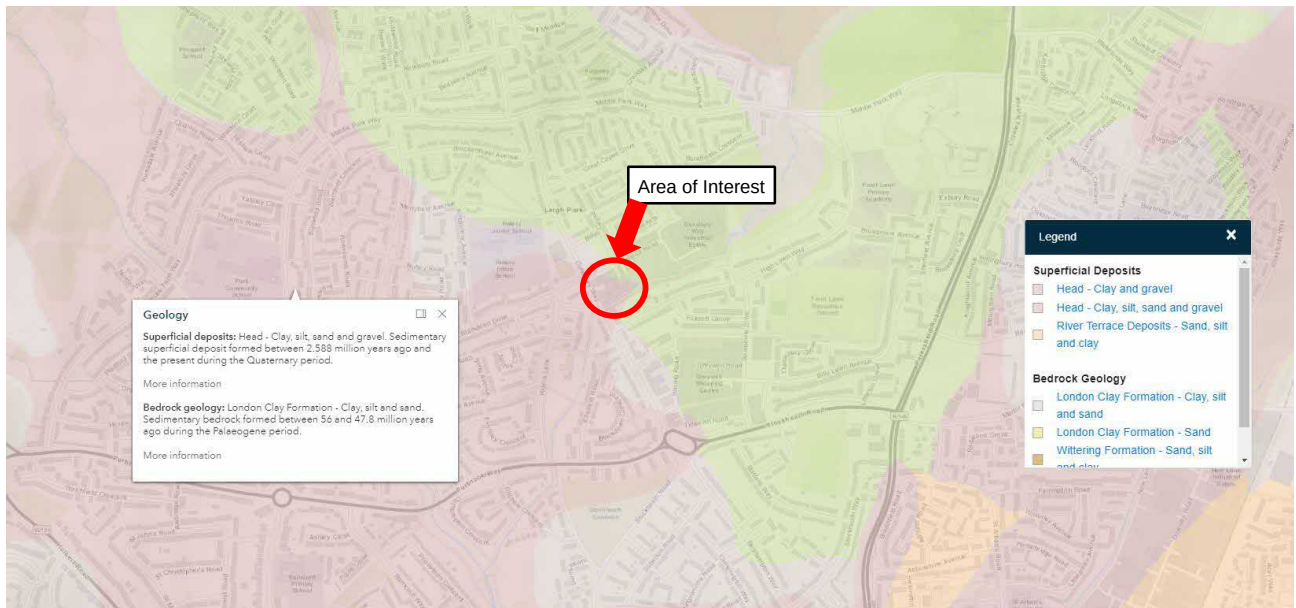


Figure 6: Presence of London Clay formation and Head

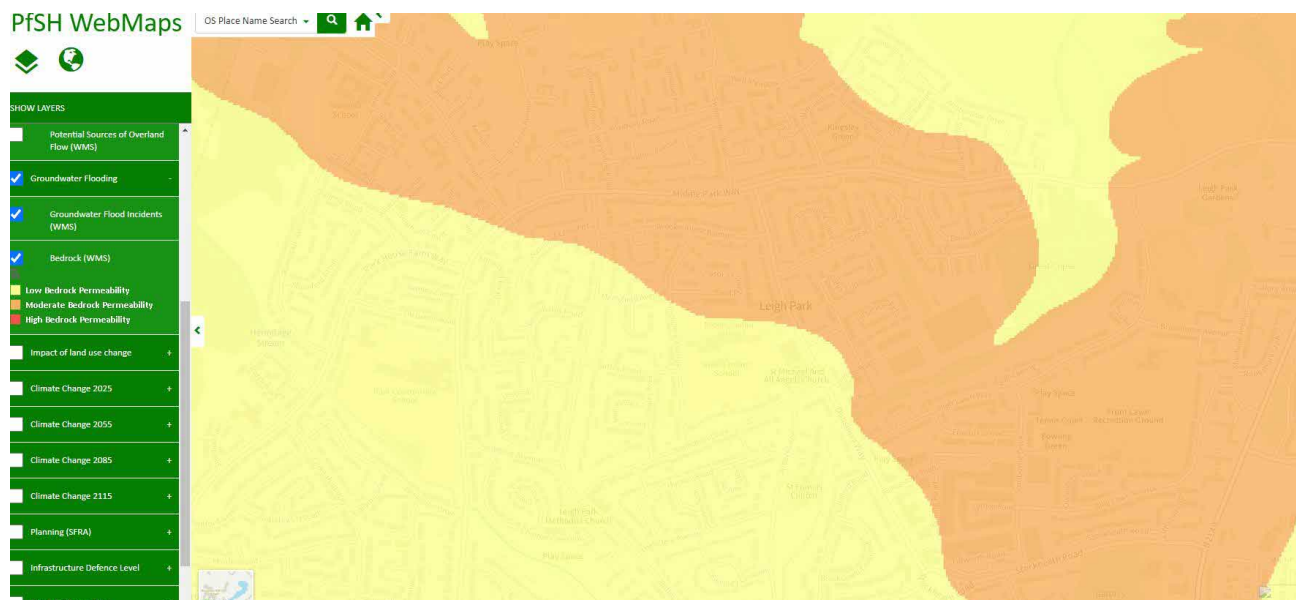


Figure 7: Groundwater permeability level

With the foregoing in consideration, the site is deemed to be at **medium risk of groundwater flooding**, unless further intrusive site investigation identifies evidence to the contrary, such as perched water or similar.

Sewers and Artificial Drainage Systems

South Hampshire Integrated Water Management Strategy suggest that the age, capacity, and condition of the existing sewers, particularly in Portsmouth where surface water drains into a combined sewer, often lead to incidents of hydraulic overload. The Southern Water network adjacent to the site is not combined, therefore the risk of flooding is low.

At the time of writing this report, Southern Water has been requested for a sewer flooding record within the area of Havant Borough Council.

With the foregoing in consideration, the site is deemed to be at **low risk of sewer flooding**.

Failure of Utilities Infrastructure

It should be noted that water mains burst, and failure of sewerage infrastructure could inherently pose a residual risk to any site.

The site is not located near a public sewer pumping station. Therefore, the risk of utilities failure is considered minimal.



Figure 8: Existing sewer records within the area of the proposed site.

Assuming an adequate provision of buffer zones to allow overland flow paths along proposed infrastructure routes to be safeguarded, and accommodation of any sewer easements within the future development layout. sewerage infrastructures are not deemed to pose a significant flood risk to the site.

With the foregoing in consideration, the site is deemed to be at **low risk of flooding due to the failure of utilities infrastructure**.

Tidal Flooding

The closest watercourse is the tributary of River Hermitage, which runs adjacent to the site. This tributary is not tidal. Therefore, the risk of tidal flooding to the site is considered negligible.

With the foregoing in consideration, the site is deemed to be at **low risk of tidal flooding**.

Surface Water Flooding

Portsmouth City Council flooding map shows that the area has a risk of low surface water flooding.

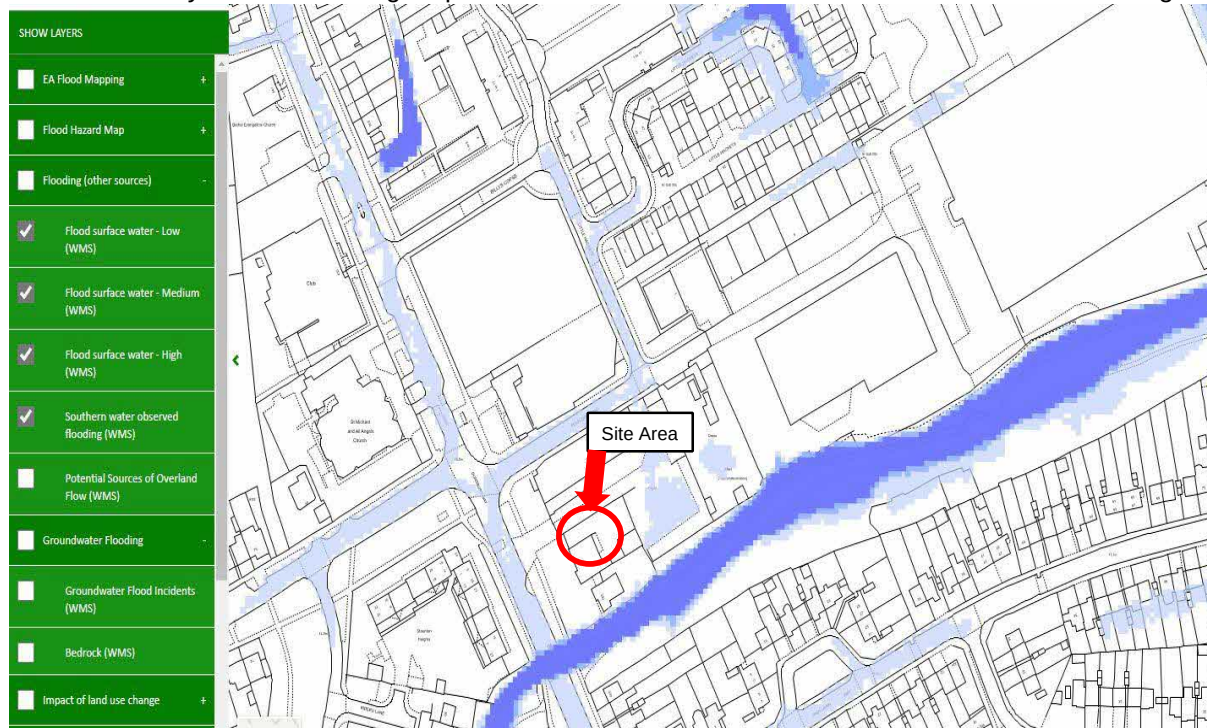


Figure 9: Surface water flooding within the area.



Figure 10: - Extract from EA mapping showing surface water flood risk extents.

Flood risk

High risk: depth

Location

po9 5ax



Figure 11: Extract from EA mapping showing anticipated flood depths during the 'High' 1:30 (3.3%) AEP rainfall event.

Flood risk

Medium risk: depth

Location

po9 5ax

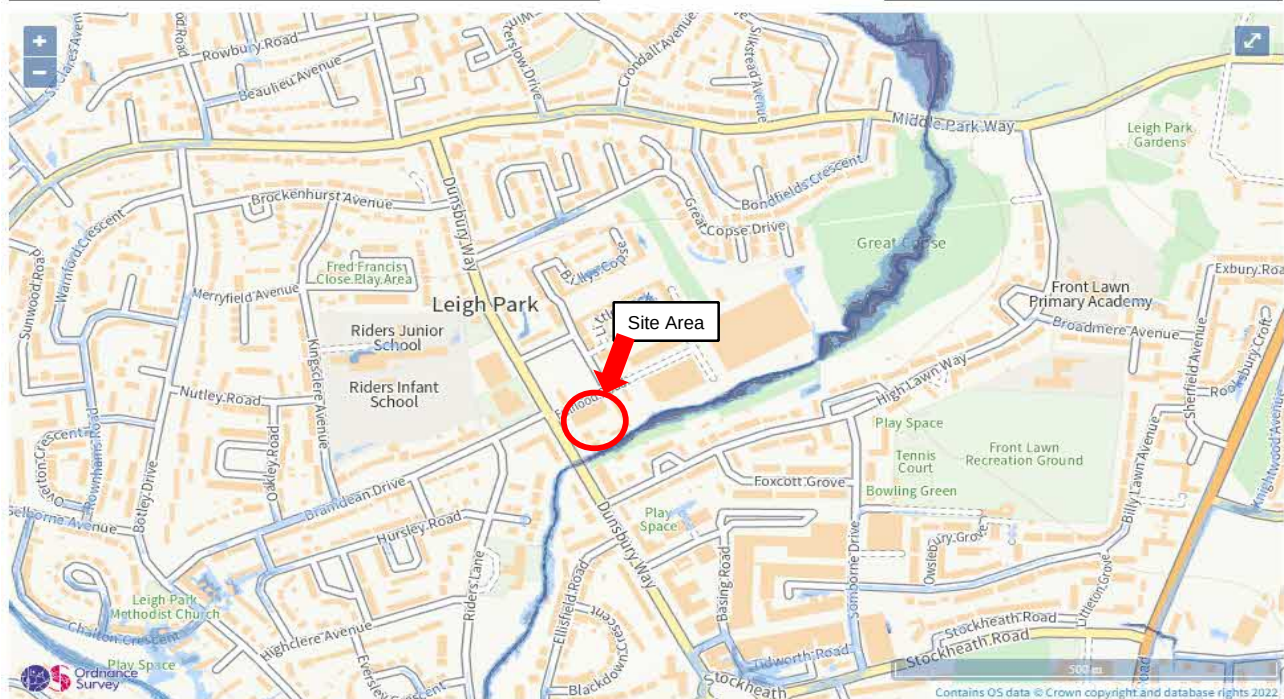


Figure 12: Extract from EA mapping showing anticipated flood depths during the 'Medium' 1:100 (1%) to 1:30 (3.3%) AEP rainfall event.



Figure 13: Extract from EA mapping showing anticipated flood depths during the 'Low' 1:1000 (0.1%) to 1:100 (1%) AEP rainfall event.

This is suggestive that the majority of the site is not subject to flood risk due to surface water, with evidence to suggest that very localised flooding below 300 mm would be exhibited on the site during the 'Low' 1:1000 (0.1%) to 1:100 (1%) AEP rainfall events, as would be expected for such an extreme rainfall event.

This is likely to be directly attributable to the presence of Clay, Silt and sand (London Clay Formation) on the existing site causing natural 'ponding' of surface water.

With this in consideration, EA mapping suggests the site is deemed to be at a low risk of flooding from surface water generated off-site and conveyed onto the site.

It can also be determined that no accounts need to be made within the future Surface Water Drainage Strategy for additional off-site flow contributions, with existing areas of ponding on the site likely eliminated in the proposed development via the provision of appropriate new surface water drainage.

With the foregoing in consideration, the site is deemed to be at **low risk of surface water flooding**.

Overland Flow

Based upon the topography of the site and surrounding area, there is limited potential for surface water from off-site areas to progress overland toward the site, which is reinforced by the interrogation of EA mapping. With this proposed development, there won't be a significant change in the impermeable area compared to before.

With the foregoing in consideration, the site is deemed to be at **low risk of flooding due to overland surface water flows**.

3.5. Summary

FLOODING SOURCE	RISK
Fluvial Flooding	Low
Failure (Breaching) of Flood Defences and Management Measures	Low
Reservoirs	Low
Canals and Artificial Water Bodies	Low
Groundwater Flooding	Medium
Sewers and Artificial Drainage Systems	Low
Failure of Utility Infrastructure	Low
Tidal Flooding	Low
Surface Water Flooding	Low
Overland Flow	Low

SECTION 04

CLIMATE CHANGE

4. CLIMATE CHANGE

4.1. Anticipated Development Lifecycle

In accordance with the PPG, NPPF and best practices, a 100-year development lifecycle has been assumed for the proposed redevelopment of the site for predominantly educational end-use.

4.2. Climate Change Allowances

EA guidance “Flood Risk Assessments: Climate Change Allowances” (2016) outlines the required climate change allowances to be adopted when interrogating existing flood data and for use in the design of future surface water drainage systems.

Table 2 of the same document also outlines that a 40 % climate change allowance should be adopted for all peak rainfall intensities for the purposes of new surface water drainage design. This again assumes the ‘upper end’ value and a 100-year development lifecycle.

A climate change allowance of 35% has and will be adopted in the interrogation of peak river flow allowances, in accordance with Table 1.

4.3. Impacts on Flood Risk

SFRA and EA mapping confirm the site remains unaffected by fluvial flooding up to and including the 1% (1:100 year) AEP event, including an allowance for climate change.

Detailed EA mapping has also been interrogated within Section 3 with regard to the area of the site subject to Flood Zone 1 conditions, considering an appropriate climate change allowance.

4.4. Impacts on Proposed Surface Water Drainage Design

The impact of climate change over the lifetime of the development will be taken into account within the assessment of post-development surface water runoff and subsequent design of surface water drainage systems for the proposed site.

SECTION 05

POLICY CONSTRAINTS AND IMPLICATIONS TO THE DEVELOPMENT

5. POLICY CONSTRAINTS AND IMPLICATIONS FOR THE DEVELOPMENT

5.1. Sequential Test

The Sequential Test as outlined within the NPPF gives preference to locating new development in areas at THE lowest risk of flooding (i.e., Flood Zone 1) and requires developers to

“...demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed”

Whilst it is ultimately the responsibility of the Local Planning Authority to undertake this test, the principle of siting proposed educational development on this site has already been firmly established.

Similarly, redevelopment of a site which is almost wholly situated within Flood Zone 1 and where all future proposed built development can be sited within Flood Zone 1, should easily satisfy the requirements of the Sequential Test as no reasonably available alternative sites, at a lower risk of flooding, are expected to be identified.

With the foregoing in consideration, it is likely that the requirements of the sequential test would be satisfied.

5.2. Flood Risk Vulnerability

PPG Table 2: Flood Risk Vulnerability Classification (summarised below), identifies that the proposed development is considered as a **‘More Vulnerable’** use.

CLASSIFICATION	EXAMPLES OF USE
Essential Infrastructure	Essential transport infrastructure (including mass evacuation routes which has to cross the area at risk. Essential utility infrastructure which has to be located within a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. Wind turbines.
Highly Vulnerable	Police and ambulance stations; fire stations and command centre telecommunications installations required to be operational during flooding. Emergency dispersal points. Basement dwellings. Caravans, mobile homes and park homes intended for permanent residential use. Installations requiring hazardous substances consent.
More Vulnerable	Hospitals. Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. Buildings used for dwelling houses , student halls of residence, drinking establishments, nightclubs and hotels. Non-residential uses for health services, nurseries, and educational establishments. Landfill and sites used for waste management facilities for hazardous waste.

	Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	Police, ambulance and fire stations which are not required operational during flooding. Buildings used for shops, financial, professional and other services: restaurants, cafes and hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in the 'more vulnerable' class and assembly and leisure. Land and buildings used for agriculture and forestry. Waste treatment (excl. landfill and hazardous waste facilities). Minerals working and processing (except for sand and gravel working). Water treatment works which do not need to remain operation during times of flood. Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
Water-Compatible Development	Flood control infrastructure. Water transmission infrastructure and pumping stations. Sewage transmission infrastructure and pumping stations. Sand and gravel working. Docks, marinas and wharves. Navigation facilities. Ministry of Defence installations. Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. Water-based recreation (excluding sleeping accommodation). Lifeguard and coastguard stations. Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. Essential ancillary sleeping or residential accommodation for sites required by uses in this category, subject to a specific warning and evacuation plan.

5.3. Flood Zone Compatibility

PPG Table 3: Flood Risk Vulnerability and Flood Zone Compatibility (summarised below), confirms that the site is appropriate for 'Highly Vulnerable' uses in Flood Zone 1 without the need for application of the Exception Test.

FLOOD ZONE	ESSENTIAL INFRASTRUCTURE	HIGHLY VULNERABLE	MORE VULNERABLE	LESS VULNERABLE	WATER COMPATIBLE
Zone 1	Permitted	Permitted	<u>Permitted</u>	Permitted	Permitted
Zone 2	Permitted	Exception Test Required	Permitted	Permitted	Permitted

Zone 3A	Exception Test Required	Not Permitted	Exception Test Required	Permitted	Permitted
Zone 3B	Exception Test Required	Not Permitted	Not Permitted	Not Permitted	Permitted

5.4. Functional Floodplain

The site is not located within an area designated as a functional floodplain (Zone 3B) and therefore no constraints apply to the proposed development.

5.5. Off-site Impact

The proposed redevelopment of the site will not increase the risk of flooding elsewhere (off-site).

Furthermore, in the event of excessive rainfall, surface water run-off generated from the proposed development will be managed on-site in a sustainable manner with the help of a surface water packaged pump station and geo-cellular storage tank, then no detrimental off-site impact is anticipated.

5.6. Safe Access and Egress

Safe (dry) access and egress via Dunsbury Way and Fulflood Road are maintained on the site for well beyond the 1% (1:100 year) + climate change fluvial event and therefore the associated requirements of the NPPF and PPG are satisfied.

5.7. Local Plan Requirements

Havant Borough Council Core Strategy Local Plan 2011 sets out that:

Policy CS15 Flood and Coastal Erosion Risk

Development in areas at risk of flooding now and in the future as identified on the latest Environment Agency flood risk maps and Strategic Flood Risk Assessment climate change maps will only be permitted where:

1. It meets the sequential and exception test (where required) in relation to PPS25.
2. The site is located in a low hazard area as defined in the Strategic Flood Risk Assessment.
3. A site-specific flood risk assessment demonstrates that the development will be safe, including the access, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
4. The scheme incorporates flood protection, flood resilience and resistance measures appropriate to the character and biodiversity of the area and the specific requirements of the site.
5. Appropriate flood warning and evacuation plans are in place.
6. New site drainage systems are designed taking account of events which exceed the normal design standard.

All development will be required to ensure that there is no net increase in surface water runoff. Priority should be given to incorporating Sustainable Drainage Systems (SuDS) to manage surface water drainage, unless it is proven that SuDS are not appropriate. Where SuDS are provided arrangements must be put in place for their whole life management and maintenance.

The council will work with partners to implement the Coastal Policy Zones in the North Solent Shoreline Management Plan to ensure that development avoids areas at risk from coastal erosion and coastal flooding and that areas required to offset coastal squeeze and prevent habitat fragmentation, to allow species to adapt to climate change, are identified and protected from development.

Compliance Summary

In order to comply with Policy CS 15, the following steps will be taken:

- As the proposed development is located within Flood Zone 1, a Sequential Test is not required
- Containing the entirety of the surface water runoff from the proposed development within the boundary of the site, mitigating the risk of causing flooding to the surrounding areas
- Incorporating the SuDS features as a method of containing and storing surface water run-off.
- Ensuring the futureproofing of the design by allowing for climate change when calculating required storage volumes.

SECTION 06

PROPOSED FLOOD MITIGATION AND MANAGEMENT MEASURES

6. PROPOSED FLOOD MITIGATION AND MANAGEMENT MEASURES

6.1. Siting of the Built Development

As the proposed building is located within Flood Zone 1, there is no need to consider alternative locations or designate areas for flood compensation.

The site slopes towards the south-west and the proposed building are towards the left side of the site, care should be taken to intercept any overland flow water travelling towards the building from the east to west. See the topographical survey in the appendices.

6.2. Elevation of the Development Platform

In accordance with Building Regulations, it is recommended that finished ground floor levels be set a minimum of 150 mm above immediately adjacent ground levels for all proposed buildings, with the exception of level thresholds at access points.

6.3. External Ground Levels

It is considered that no significant criteria need to be adopted for the setting of external ground levels, assuming these will not be significantly reduced from existing, as above.

It is recommended that external levels are graded away from the building to further reduce the risk of flooding from overland flow.

SECTION 07

SURFACE WATER DRAINAGE

STATEMENT

7. SURFACE WATER DRAINAGE STATEMENT

7.1. Drainage hierarchy

Current guidance states that a hierarchy of potential methods for discharging surface water from development must be followed:

- i. A soakaway or another adequate infiltration system; or where this is not practical
- ii. A watercourse or where this is not practicable
- iii. A sewer.

The Environment Agency and relevant Government Legislation require that the surface water strategies for new development are in line with sustainable development through the use of Sustainable Drainage Systems (SuDS).

Without mitigation and consideration, the proposed redevelopment of the site could lead to an unacceptable increase in the rate and volume of surface water generated from the site.

To comply with current guidance and best practice, sustainable drainage systems (SuDS) will be required to be implemented in order to manage the volume, rate and quality of surface water discharged off-site.

7.2. SuDS Management Train

In accordance with the discharge hierarchy, the surface water generated by the proposed development will discharge to attenuation. The presence of high groundwater within the site area makes it unsuitable for infiltration.

The surface water will be discharged to the nearest watercourse adjacent to the proposed development area. In an event, where the surface water discharge to the watercourse is not possible. It will be discharged to the nearest public sewer. This would be subject to a S106 agreement with Southern Water.

7.3. Contributing Areas

There is a significant increase in permeable across the site compared to the existing site.

Table 1 – Catchment Area Summary

	PERMEABLE SURFACE (M2)	IMPERMEABLE SURFACE (M2)
Existing	289 (6%)	4824 (94%)
Proposed	1519(30%)	3594(70%)
Change	1230 (24%)	-1230 (-24%)

As can be seen within the previous table, there is an increase in the permeable area by 24%. Therefore, the risk of surface water flooding lowers the risk of surface water flooding during high-intensity rainfall.

7.4. Allowance for Climate Change

Table 2 (Peak Rainfall Intensity Allowance in Small and Urban Catchments) of Environment Agency (2019) Flood Risk Assessments: Climate Change Allowances confirms the climate change allowance of 40% should be adopted for the Application Site, assuming a lifespan of 100 years.

7.5. Allowance for Creep

The proposed residential dwelling will have a creep allowance of 10% included in the design.

7.6. Proposed Drainage

The drainage strategy report prepared in 2018 showed that out of 241m³, 67m³ of attenuation will be above ground (designed for the 1 in 100-year event plus 40 % allowance for climate change) and 168m³ will be below surface level (designed for the 1 in 30-year event plus 40 % allowance for climate change). Also, the rate of greenfield run-off calculated was 7.4l/s.

However, the drainage strategy has been re-assessed. The surface water will be discharged to the nearest watercourse (a tributary of River Hermitage).

The surface water will be collected via permeable paving and then discharged to the cellular tank. The thickness of the permeable paving is 100mm.

The size of the geo-cellular storage tank is 254.4m³ (effective storage 241.7m³) and will be placed below the ground level.

A hydro-brake will be placed to restrict the flow rate at 1.8l/s. Based on the restricted flow rate; the proposed geo-cellular tank will have 4% of storage left after the worst critical storm event.

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Region 7	1.8	1.8	1.6	4.2	5.9

Figure 14: Runoff calculation

Rainwater collected through the roof using rainwater pipes will be stored in the storage tank.

The surface water drainage layout is provided in **Appendix D**, at the rear of this report.

7.7. Designing for Exceedance

The proposed site levels are to provide a slope away from the proposed building. The proposed site levels are also to be designed in such a way that any exceedance flows across the site into the adjacent watercourse. This will not cause an increase in risk to people or property.

7.8. Water Quality

It is proposed that the new buildings will utilise flow paths through a short-piped network to an attenuation prior to discharge to the watercourse. The attenuation facility will have a Catchpit immediately upstream to improve water quality.

A petrol interceptor or other form of proprietary treatment is proposed.

Subsequently the vulnerability of water quality within the downstream watercourse is considered to be low.

7.9. Existing Networks

Drainage survey where existing private surface water networks exist, these will be CCTV surveyed and removed if there are no proposed live connections.

Where there are live connections that need to be maintained the connections will be diverted where necessary as shown on the proposed diversion drawings and build over agreement to be put in place.

7.10. Required Maintenance Schedule

To ensure the long-term performance of the proposed DS, the onsite drainage system will be owned and maintained by the Vivid Homes in accordance with the indicative schedule below. However, at the detailed drainage design stage, a full management and maintenance plan detailing best practice system maintenance regimes and proprietary manufacturer requirements and lifecycle management, in accordance with the CIRIA SuDS Manual will need to be produced.

Table 2 – Maintenance Schedule

ELEMENT / DRAINAGE COMPONENT	OWNERSHIP ADOPTION	/ MAINTENANCE REQUIREMENTS
Geo-cellular Attenuation Tank	Site Operator / MC	To be monitored for silt build-up and cleaned as required using suction methods, ensuring no solid material passes through the outlet. Monitored the general condition of the tank and system generally, to suit the manufacturer's guidance, checking for leaks and displacement of 'cells'. Inspection annually and before / after extreme storm events.
Flow Restriction Device & Chamber	Site Operator / MC	To be monitored for silt build-up and cleaned as required using suction methods. Check function of flow restriction componentry to suit manufacturer's guidance. Inspection annually and before / after extreme storm events.
Rainwater Pipes	Site Operator / MC	Clearance of leaves/debris from guttering and hopper inlets. Rodding points provided to clear blockages via conventional rodding methods. Inspection annually and before / after extreme storm events.
Permeable Paving	Site Operator / MC	Non-aggressive brushing of the whole surface (avoiding disruption of the jointing material, with suction rates adjusted, based on a trial), either manually or mechanically carried out annually. Top up of the gritstone may be required after cleaning. Weed control – excessive weed growth can be managed by localised spot-treatment with weed killers, in accordance with suppliers' recommendations. Inspection annually.
Catchpit Manholes	Site Operator / MC	To be monitored for silt build-up and cleaned as required using suction methods. Inspection annually and before / after extreme storm events.
Soil Vent Piles / "Stub Stacks"	Site Operator / MC	Rodding points to be provided to clear blockages via conventional rodding methods. Inspection annually.
Gullies (Internal & External)	Site Operator / MC	To be monitored for silt build-up and cleaned as required. Where provided, ensure air traps are primed and sealed to prevent smells. Inspection quarterly.

SECTION 08

FOUL WATER DRAINAGE

8. FOUL WATER DRAINAGE

8.1. Existing Network

- 8.1.1 The existing building is well served by public sewer to both the north and west of the development. It is understood the previous use of the site had existing connections to the public foul sewer which will now be redundant.
- 8.1.2 There is an existing Southern Water 225 $\varnothing$ Vitrified Clay (VC) foul water sewer to the north of the site, a 225 $\varnothing$ VC foul water sewer to the west of the site and a 300 $\varnothing$ VC foul water sewer to the south of the site.

8.2. Proposed Drainage

- 8.1.3 The foul water generated from the proposed development is proposed to discharge into the existing Southern Water foul water manhole. This is subject to network capacity and a S106 agreement with Southern Water. However, capacity is not expected to be an issue due to the size of the receiving network.
- 8.1.4 All foul water drainage will be designed and constructed in accordance with the Building Regulations Part H and it is intended to connect to new foul water drains constructed as part of the construction phase.
- 8.1.5 Primary foul runs have been preliminarily sized as 150 mm diameter.
- 8.1.6 Please refer to the drainage strategy drawing within the appendices for the proposed location of the connection points and proposed layout.

SECTION 09 CONCLUSION

9. CONCLUSION

Ridge and Partners LLP have been appointed by Vivid Homes to prepare a Flood Risk Assessment and Drainage Strategy to support the planning application for the proposed redevelopment on the ground of the Former Dairy Crest Depot site, Dunsbury Way, Havant, PO9 5AX

Flood risk has been assessed in line with BS 8533 (2017) and CIRIA C624 (2004), taking into account national and local planning policy and guidance to consider all potential sources of flooding to the site.

Based upon current information provided by the EA, the entirety of the site is demonstrated to be at a low probability of flooding (Flood Zone 1) from fluvial sources.

Flood risk to the site from other potential sources such as surface water, sewers and infrastructure are also all considered low, with no significant flood risks identified. However, the risk of groundwater flooding is medium.

The product 4 consists of a Detailed Flood Risk Assessment Map, including flood zones, defences and storage areas, areas benefiting from defences, statutory main river designations, historic flood event outlines and more detailed information from hydraulic models (including model extents and 2D flood level data for specific points) has been requested to Environmental agency at the time of writing this report.

The site has no recorded history of flooding from fluvial or other sources based upon research of published documents. However, the record of sewer flooding within the area has been requested with Southern Water at the time of writing this report.

Development of the site which is entirely within Flood Zone 1 with appropriate mitigation measures as outlined within this document, should readily satisfy the requirements of the Sequential Test as no reasonably available alternative sites, at a lower risk of flooding are expected to be identified. There is no requirement for the proposed development to be subject to the Exception Test.

On the previous report, the greenfield run-off rate was restricted to 7.4l/s. However, after re-assessing the model on Info drainage, the greenfield run-off rate was re-calculated to 1.8l/s for the proposed impermeable areas and as such is the proposed discharge rate from the site.

The proposed attenuation will be placed below the ground level. The surface water from the parking area will be drained with the help of permeable paving onto the geo-cellular tank.

The size of the proposed geo-cellular tank is 241m³ and the thickness of permeable paving is 100mm.

A hydro-brake will be placed to restrict the flow rate at 1.8l/s.

The proposed geo-cellular tank will have 4% of storage left after the worst critical storm event when the flow is restricted to 1.8l/s. Refer to Appendix E for a detailed surface water calculation.

The foul water generated from the property is proposed to discharge into the existing Southern Water manhole. S106 agreement to be put in place to connect the pipe on to the existing Southern Water manhole.

The technical assessment of flood risk presented within this document demonstrates that the immediate and residual flood risks over the lifetime of the development are readily manageable and the redevelopment proposals are deemed acceptable in terms of flood risk throughout their lifetime, without increasing flood risk elsewhere.

APPENDIX A

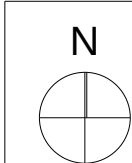
EXISTING SITE PLAN / SURVEY



Site Location Plan

1:1250

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revisions & notes: A 19.10.2018 LMW Issued to JLL

0

100mm @A2

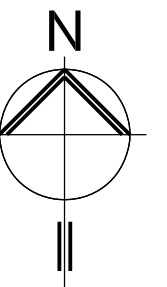
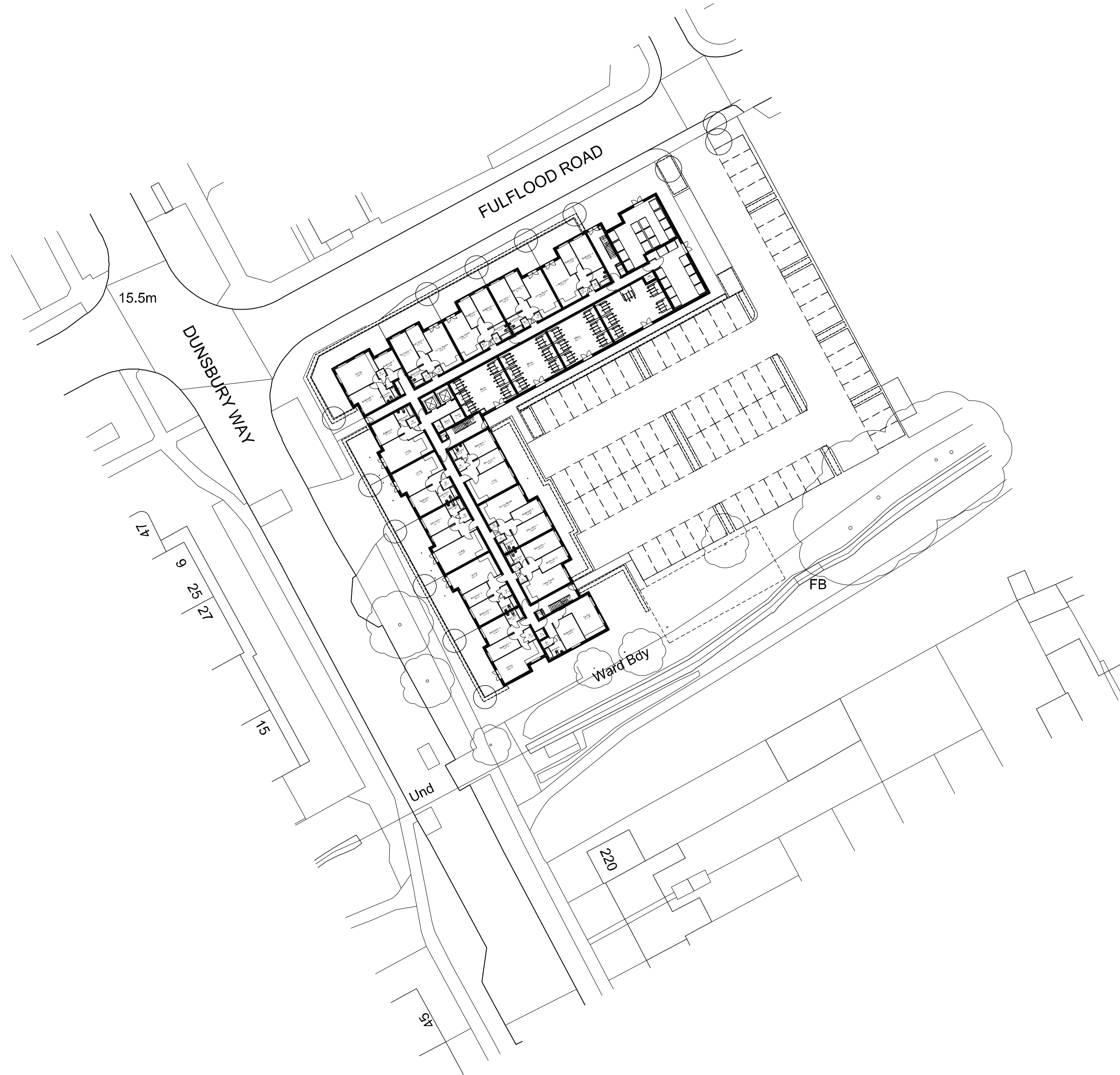
Note: All dimensions to be checked on site by the contractor before fabrication and erection. Figured dimensions to be taken in preference to scaled dimensions. This drawing is the copyright of the architects and must not be reproduced or used without their express consent, except for the purposes of a planning application. Electronic issue of this drawing to be confirmed by paper hard copy only.

project: The Southern Cooperative
Conversion
222-224 Dunsbury Way
PO9 5BQ
drawing name: Site Location Plan
status: PLANNING
date: February 2018
scale: 1:1250
drawn: LMW

pwparchitects
61 South Street, Havant, Hampshire PO9 1BZ
t: 023 9248 2494 f: 023 9248 1152
e: design@pwp-architects.com w: www.pwp-architects.com
Project No. **5264** drawing No. **1100** rev **A**

APPENDIX B

PROPOSED SITE PLAN



APPENDIX C

SEWER RECORDS

108385



SU7108SW

Date: 11/05/2017

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474550

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape		Node	Cover	Invert	Size	Material	Shape		Node	Cover	Invert	Size	Material	Shape		Node	Cover	Invert	Size	Material	Shape
0101X	14.21	12.87	225	VC	CIRC		3351X	17.47	15.09	225	VC	CIRC														
0152X	14.07		225	VC	CIRC		3353X	17.62	15.28	225	VC	CIRC														
0153X	14.19	12.68	225	VC	CIRC		3354X	17.38	14.85	375	CP	CIRC														
1051X	15.17	13.3	225	VC	CIRC		4101X			225	UNK	CIRC														
1052X	15.21	12.18	225	VC	CIRC		4102X	16.45	14.2	225	VC	CIRC														
1101X	15.1		225	VC	CIRC		4150X	16.52	14.87	300	VC	CIRC														
1150X	15.03	13.16	225	VC	CIRC		4151X	17.27	15.47	300	VC	CIRC														
1250X	15.29	13.26	225	VC	CIRC		4152X	17.98	15.99	225	VC	CIRC														
1251X			225	VC	CIRC		4201X	16.2		300	VC	CIRC														
1252X	15.13	13.63	225	VC	CIRC		4202X	16.36		300	VC	CIRC														
1350X	18.93	16.4	450	CP	CIRC		4203X	17.14	14.75	225	VC	CIRC														
2006X			100	VC	CIRC		4301X	16.44	13.06	300	VC	CIRC														
210DX			UNK	UNK	CIRC		5100X	17.88		225	VC	CIRC														
2150X	15.15	13.44	225	VC	CIRC		5200X	17.66		225	VC	CIRC														
2151X	13.05	11.305	225	VC	CIRC		5250X	18.7		225	VC	CIRC														
2152X	13.4		225	VC	CIRC		5300X	17.61		300	VC	CIRC														
2153X	13.55		225	VC	CIRC																					
2153X	13.55	11.96	225	VC	CIRC																					
2154X	13.72	12.275	150	VC	CIRC																					
2201X	15.29		225	VC	CIRC																					
2201X	15.29	13.15	225	VC	CIRC																					
2202X	15.99	13.29	225	VC	CIRC																					
220DX			225	VC	CIRC																					
2250X	15.61	13.71	225	VC	CIRC																					
2251X	15.82	13.66	450	CP	CIRC																					
2252X	15.2	13.35	450	CP	CIRC																					
2253X	15.38	13.48	375	CP	CIRC																					
2301X	17.75		225	VC	CIRC																					
2303X	17.59	15.255	150	VC	CIRC																					
2304X	18.1	14.92	150	VC	CIRC																					
2305X	17.6	14.66	225	VC	CIRC																					
2350X	17.19	14.58	450	CP	CIRC																					
2351X	17.78	16.22	300	CP	CIRC																					
2352X	18.31	16.1	300	CP	CIRC																					
2353X	17.61	15.55	300	CP	CIRC																					
2354X	17.56	15.46	375	CP	CIRC																					
3101X	14.62	12.25	300	VC	CIRC																					
3102X	15.49	12.16	300	VC	CIRC																					
3103X	14.78	12.37	300	VC	CIRC																					
3104X			UNK	VC	CIRC																					
3105X			100	PF	CIRC																					
3150X	16.01		300	VC	CIRC																					
3201X	15.27	12.54	300	VC	CIRC																					
3202X	15.8	12.73	300	VC	CIRC																					
3203X	15.68	14.19	225	VC	CIRC																					
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3306X	17.43	14.58	150	VC	CIRC																					
3307X	16.44	14.405	150	VC	CIRC																					
3308X			UNK	UNK	CIRC																					
3309X			UNK	UNK	CIRC																					
330DX			UNK	UNK	CIRC																					
3310X			UNK	UNK	CIRC																					
3311X			UNK	UNK	CIRC																					
3312X			UNK	UNK	CIRC																					
3313X			UNK	UNK	CIRC																					
3314X			UNK	UNK	CIRC																					
3350X	17.47	15.53	225	VC	CIRC																					

LINE STYLES / COLOURS	MATERIALS	LEGEND - SEWERS
Brown Foul Foul Syphon Sewer Foul Vacuum Main Foul Rising Main	AK Alkathene BAC Bonded Asbestos Cement BRC Brick (Common) BRE Brick (Engineering) CC Concrete Box Culvert CI Cast Iron CO Concrete (In-Situ) CP Concrete (Pre-Cast) CSB Concrete Segments (bolted) CSU Concrete Segments (unbolted) DI Ductile Iron GRC Glass Reinforced Concrete GRP Glass Reinforced Plastic MAC Masonry in regular Courses MAR Masonry in random Courses PE Polyethylene PF Pitch Fibre PP Polypropylene PVC Polyvinyl Chloride RPM Reinforced Plastic Matrix SI Spun Iron ST Steel VC Vitrified Clay XXX Other ZZZ Unknown	Washout (SW) Manhole (F&C) Lamp hole (SW) Lamp hole (F&C) Pumping Station (SW) Pumping Station (F&C) Side entry manhole (SW) Side entry Manhole (F&C) Blind shaft (SW) Blind shaft (F&C) Ejector station (SW) Ejector station (F&C) Waterlight door (SW) Waterlight door (F&C) Flushing ch. Mn-e (SW) Flushing ch. No-e (SW) Flushing ch. No-e (F&C) Demarcation Chamber Washout (SW) Washout (F&C) Rodding Eye (SW) Rodding Eye (F&C) Gauging point (SW) Gauging point (F&C) Intercept chamber (SW) Intercept chamber (F&C) Storm Tank (SW) Storm Tank (F&C) Vortex chamber (SW) Vortex chamber (F&C) Label ellipse Dummy/S24 manhole Outfall Penstock chamber Damboards Storm Overflow Backdrop manhole Other (s) Other Change in sewer (s) Change in sewer Reflux valve Flap valve Cascade Anode Valve Closed Valve Air Valve Hatch box (SW) Hatch box (F&C) Direction arrow Emptying valve Catchpit Soakaway Inlet Balancing Pond Wastewater treatment works Marine treatment works Outfall headworks Vent Vent column Tidal storage tank Blank end Head of Public Sewer Micro Pumping Station
Dark Blue Sludge Sewer Catchment Section 104 Area		
Purple Surface Water Surface Water Rising Main		
Light Blue Private Access Shaft Decommissioned		
Orange Building Over Agreement Area		
Yellow Private Access Shaft Decommissioned		
Green Access Shaft Decommissioned		

Drawn by:	yadavs	
Title:	244215_Fullood Road, Havant	
Date:	11/05/2017	

APPENDIX D

PROPOSED DRAINAGE STRATEGY



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- HGP DWG No. (DATED 22/04/2022)

SURVEY REFERENCE:

- DIGITAL TERRAIN SURVEYS LLP DWG No. DTS280417-5W1 (DATED APRIL 2017)

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LEGEND

- PROPOSED PRIVATE FOUL DRAIN
- PROPOSED PRIVATE S.W. DRAIN
- PROPOSED 1200mm $\varnothing$ MANHOLE
- PROPOSED PRIVATE MANHOLE/INSPECTION CHAMBER depth > 600mm - 450mm $\varnothing$ (SEE PLAN FOR TYPE)
- PROPOSED PERMEABLE PAVING
- PROPOSED GEOCELLULAR STORAGE
- HYDROCARBON INCEPTOR
- PROPOSED HEADWALL
- SLOPE

P02	UPDATED CLIENT DETAILS	14/07/2022	BT
P01	LATEST ARCHITECT LAYOUT	07/06/2022	RML
	PRELIMINARY ISSUE	05/05/2022	JM
REV	DESCRIPTION	DATE	DRAWN

ORIGINATOR:

RIDGE

PARTNERSHIP HOUSE
MOORSIDE ROAD
WINCHESTER
SO23 7RX

TEL: 01962 834400
WWW.RIDGE.CO.UK

CLIENT:

VIVID

IN ASSOCIATION WITH:

PROJECT:
DAIRY CREST DEPOT

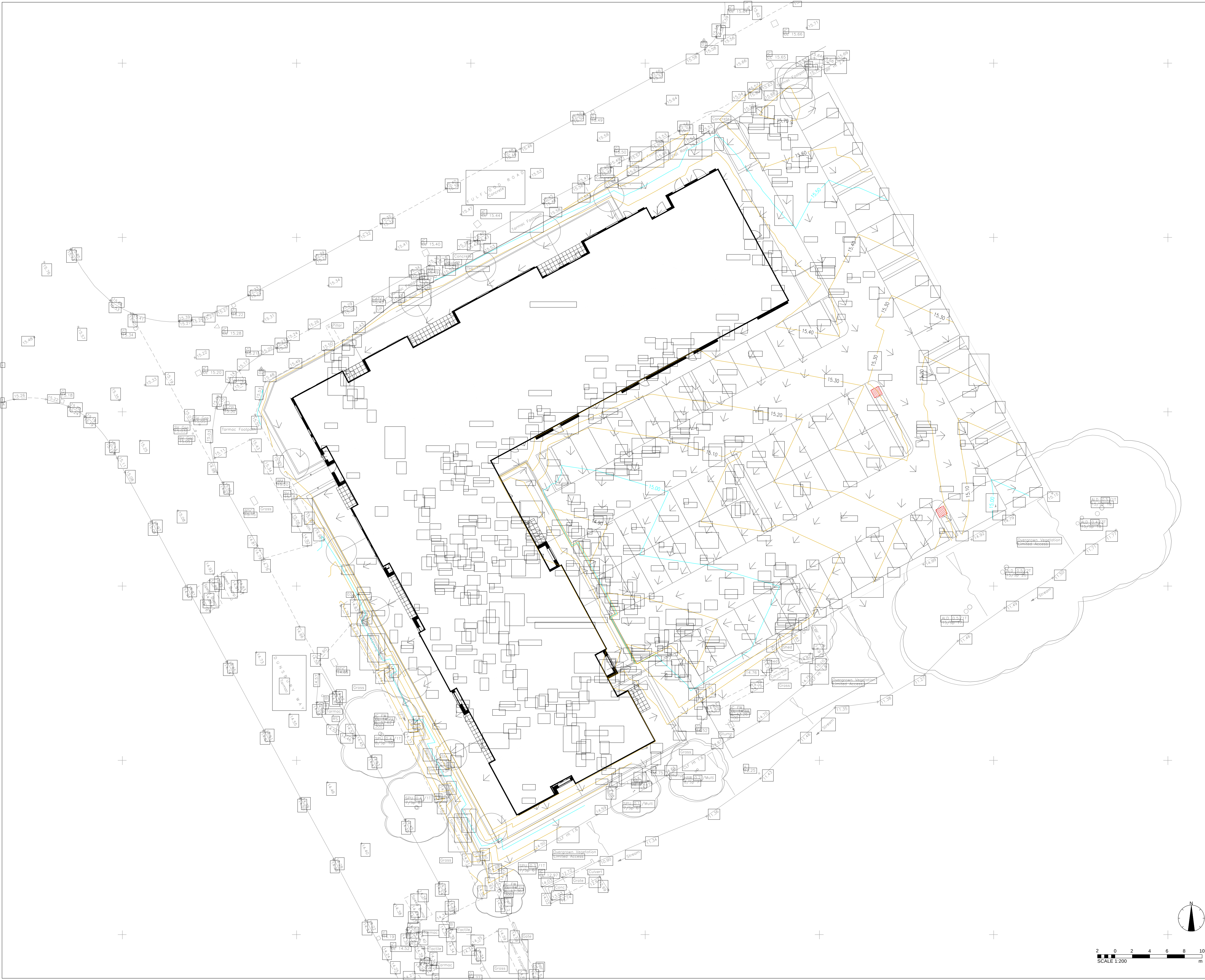
TITLE:
PROPOSED DRAINAGE STRATEGY

TECH:	CSE:	ICSE:	SCALE: 1:200	@ A1
JM			INITIAL ISSUE: 05/05/2022	

STATUS:

PRELIMINARY

DRAWING No:	PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
	5018335	RDG	XX	ST	DR	C	0500	P02



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EXTERNAL REFERENCES:

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- DIGITAL TERRAIN SURVEYS LLP DWG No. DTS280417-5W1 (DATED APRIL 2017)

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LEGEND

- EXCEEDENCE FLOW ROUTE ARROW
- MAJOR CONTOUR
- MINOR CONTOUR

P02	UPDATED CLIENT DETAILS	14/07/2022	BT
P01	LATEST ARCHITECT LAYOUT	07/06/2022	RML
	PRELIMINARY ISSUE	05/05/2022	JM
REV	DESCRIPTION	DATE	DRAWN

ORIGINATOR:

PARTNERSHIP HOUSE
MOORSIDE ROAD
WINCHESTER
SO23 7RX

TEL: 01962 834400
WWW.RIDGE.CO.UK

CLIENT:

IN ASSOCIATION WITH:

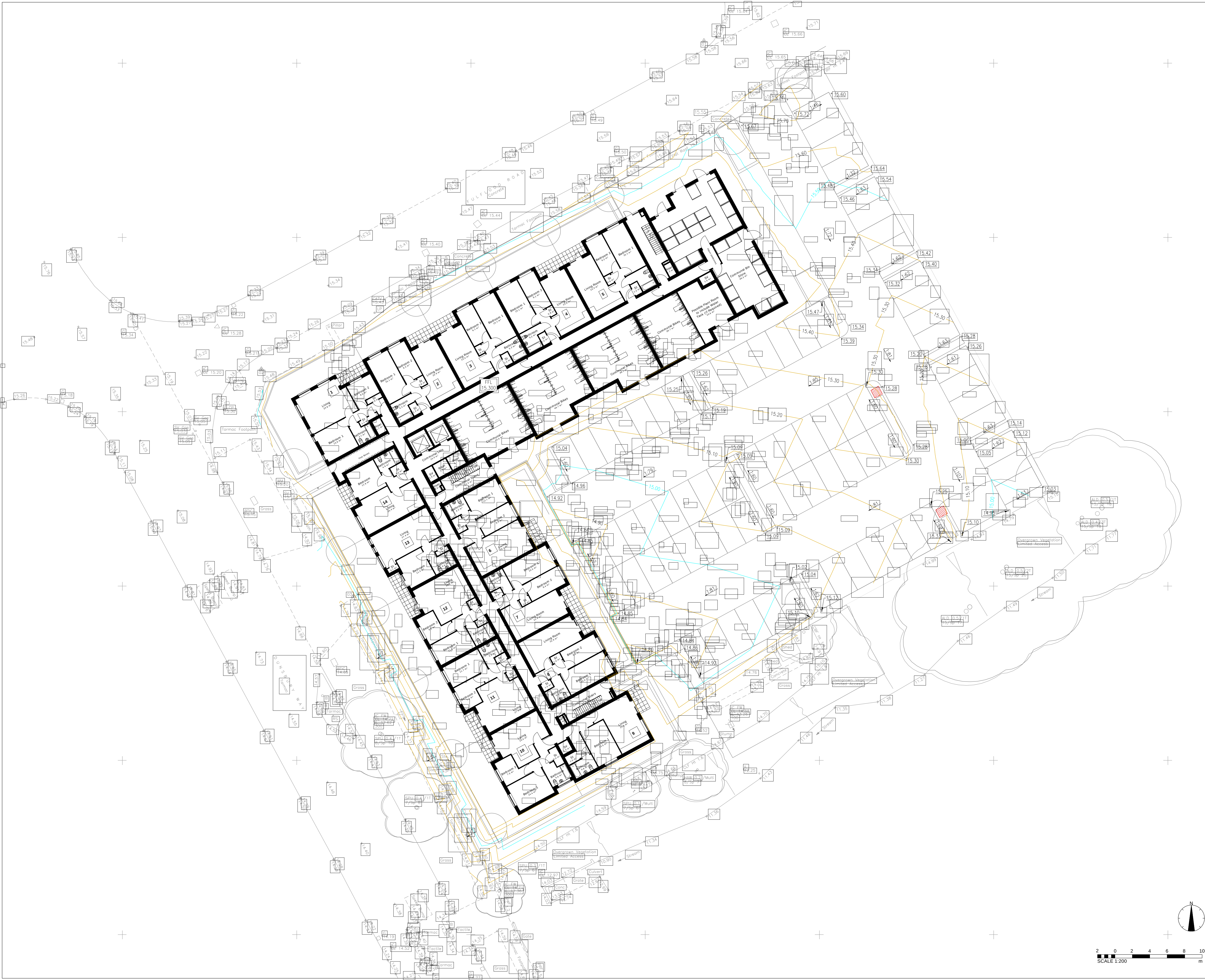
PROJECT:
DAIRY CREST DEPOT

TITLE:
**PROPOSED EXCEEDENCE
FLOW LAYOUT**

TECH:	CSE:	ICSE:	SCALE:	@
JM			1:200	A1
			INITIAL ISSUE:	05/05/2022

STATUS:
PRELIMINARY

DRAWING No:	PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
	5018335	RDG	XX	ST	DR	C	0501	P02



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CDM REGULATIONS 2015
SIGNIFICANT OR NON-OBVIOUS RISKS AND RISKS WHICH ARE DIFFICULT TO MANAGE ARE IDENTIFIED ON THIS DRAWING USING THE FOLLOWING SYMBOL IDENTIFIED TO THE RIGHT WITH BRIEF ACCOMPANYING TEXT. FOR FURTHER DETAILS OF THE RISKS IDENTIFIED BY DESIGNERS, REFERENCE SHOULD BE MADE TO CDM HAZARD REGISTER.

EXTERNAL REFERENCES:

THIS INFORMATION & RIDGE & PARTNERS LLP CIVILS 3D MODEL & ASSOCIATED 3D OUTPUTS ARE BASED UPON THE FOLLOWING INFORMATION FROM THE DESIGN TEAM

ARCHITECT REFERENCE:
• HGP DWG No. (DATED 22/04/2022)

SURVEY REFERENCE:
• DIGITAL TERRAIN SURVEYS LLP DWG No. DT280417-5W1 (DATED APRIL 2017)

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THIS INFORMATION IS CURRENT PRIOR TO CONSTRUCTION

LEGEND	
	EXISTING LEVEL
	PROPOSED LEVEL
	PROPOSED SLOPE
	MAJOR CONTOUR
	MINOR CONTOUR

P02	UPDATED CLIENT DETAILS	14/07/2022	BT
P01	LATEST ARCHITECT LAYOUT	07/06/2022	RML
	PRELIMINARY ISSUE	05/05/2022	JM
REV	DESCRIPTION	DATE	DRAWN

ORIGINATOR:

PARTNERSHIP HOUSE
MOORSIDE ROAD
WINCHESTER
SO23 7RX

TEL: 01962 834400
WWW.RIDGE.CO.UK

CLIENT:

IN ASSOCIATION WITH:

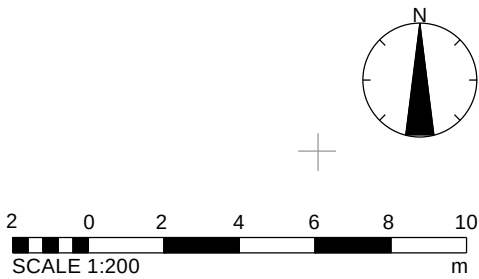
PROJECT:
DAIRY CREST DEPOT

TITLE:
PROPOSED LEVEL STRATEGY

TECH:	CSE:	ICSE:	SCALE: 1:200	@ A1
JM			INITIAL ISSUE: 05/05/2022	

STATUS:
PRELIMINARY

DRAWING No:							
PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
5018335	RDG	XX	ST	DR	C	1100	P02



APPENDIX E

SURFACE WATER CALCULATION

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
	Ridge:		
Report Details: Type: Inflow Summary Storm Phase: Phase			



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Building pt 1	SW1		Time of Concentration	0.093	100	0	100	0.093
Building pt 2	SW2		Time of Concentration	0.063	100	0	100	0.063
Parking 1_1	PP 1_1		Time of Concentration	0.009	100	0	100	0.009
Parking 1_2	PP 1_2		Time of Concentration	0.009	100	0	100	0.009
Parking 2_1	Cellular Storage		Time of Concentration	0.018	100	0	100	0.018
Parking 2_2	Cellular Storage		Time of Concentration	0.019	100	0	100	0.019
Parking 3_1	PP 3_1		Time of Concentration	0.007	100	0	100	0.007
Parking 3_2	SW6		Time of Concentration	0.009	100	0	100	0.009
Parking 4_1	PP 4_1		Time of Concentration	0.004	100	0	100	0.004
Parking 4_2	PP 4_2		Time of Concentration	0.005	100	0	100	0.005
Parking 4_3	PP 4_3		Time of Concentration	0.005	100	0	100	0.005
Parking 4_4	PP 4_4		Time of Concentration	0.005	100	0	100	0.005
Parking 4_5	PP 4_5		Time of Concentration	0.005	100	0	100	0.005
Road	Cellular Storage		Time of Concentration	0.080	100	0	100	0.080
TOTAL		0.0		0.333				0.333

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022			RIDGE
	Designed by: BT	Checked by: TC	Approved By:	
Report Details: Type: Network Design Criteria Storm Phase: Phase	Ridge:			

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Level	Level Inverts
Min. Cover Depth (m)	1.200
Min. Slope (1:x)	500.00
Max. Slope (1:x)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Manhole Options

Apply Offset	☐
Synchronise Manhole Invert Levels	☒

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022			RIDGE
	Designed by: BT	Checked by: TC	Approved By:	
	Report Details: Type: Outfall Details Storm Phase: Phase			
Ridge:				

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
SW8	Free Discharge		

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022			RIDGE
	Designed by: BT	Checked by: TC	Approved By:	
	Report Title: Rainfall Analysis Criteria			

Runoff Type	Dynamic
Output Interval (mins)	1
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FSR	Type: FSR
-----	-----------

Region	England and Wales
M5-60 (mm)	19.5
Ratio R	0.349
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0
30.0	0
100.0	0
100.0	40

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Ridge:		

RIDGE



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW1	FSR: 1 years: +0 %: 15 mins: Winter	14.947	14.522	14.570	0.049	12.1	0.055	0.000	11.7	6.003	OK
SW2	FSR: 1 years: +0 %: 15 mins: Winter	14.856	14.360	14.412	0.053	8.3	0.060	0.000	8.2	4.096	OK
SW6	FSR: 1 years: +0 %: 360 mins: Winter	15.239	13.400	13.606	0.206	1.8	0.233	0.000	1.8	57.523	Surcharged
SW7	FSR: 1 years: +0 %: 360 mins: Winter	15.130	13.250	13.279	0.029	1.8	0.033	0.000	1.8	57.481	OK
SW8	FSR: 1 years: +0 %: 360 mins: Winter		0.000	13.060	0.028	1.8			1.8	57.481	OK
SW3	FSR: 1 years: +0 %: 30 mins: Winter	15.448	14.750	14.768	0.018	0.8	0.021	0.000	0.8	0.767	OK
SW4	FSR: 1 years: +0 %: 30 mins: Winter	15.282	14.250	14.270	0.020	1.3	0.022	0.000	1.3	1.153	OK
SW5	FSR: 1 years: +0 %: 120 mins: Winter	15.157	14.250	14.258	0.008	0.2	0.009	0.000	0.2	1.085	OK

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Ridge:		

RIDGE



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW1	FSR: 30 years: +0 %: 15 mins: Winter	14.947	14.522	14.601	0.080	29.7	0.090	0.000	29.4	15.093	OK
SW2	FSR: 30 years: +0 %: 15 mins: Winter	14.856	14.360	14.450	0.091	20.6	0.103	0.000	20.3	10.244	OK
SW6	FSR: 30 years: +0 %: 480 mins: Winter	15.239	13.400	13.797	0.397	1.8	0.449	0.000	1.8	91.848	Surcharged
SW7	FSR: 30 years: +0 %: 60 mins: Winter	15.130	13.250	13.279	0.029	1.8	0.033	0.000	1.8	10.893	OK
SW8	FSR: 30 years: +0 %: 60 mins: Winter		0.000	13.060	0.028	1.8			1.8	10.893	OK
SW3	FSR: 30 years: +0 %: 15 mins: Winter	15.448	14.750	14.783	0.033	2.7	0.037	0.000	2.7	1.365	OK
SW4	FSR: 30 years: +0 %: 15 mins: Winter	15.282	14.250	14.286	0.036	4.1	0.041	0.000	4.1	2.059	OK
SW5	FSR: 30 years: +0 %: 60 mins: Winter	15.157	14.250	14.264	0.014	0.6	0.016	0.000	0.6	1.800	OK

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Ridge:		

RIDGE



FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW1	FSR: 100 years: +0 %: 15 mins: Winter	14.947	14.522	14.616	0.094	39.5	0.107	0.000	39.6	19.618	OK
SW2	FSR: 100 years: +0 %: 15 mins: Winter	14.856	14.360	14.470	0.111	26.6	0.125	0.000	26.6	13.387	OK
SW6	FSR: 100 years: +0 %: 480 mins: Winter	15.239	13.400	13.915	0.515	1.8	0.582	0.000	1.8	87.477	Surcharged
SW7	FSR: 100 years: +0 %: 60 mins: Summer	15.130	13.250	13.279	0.029	1.8	0.033	0.000	1.8	10.953	OK
SW8	FSR: 100 years: +0 %: 60 mins: Summer		0.000	13.060	0.028	1.8			1.8	10.953	OK
SW3	FSR: 100 years: +0 %: 15 mins: Winter	15.448	14.750	14.788	0.038	3.6	0.044	0.000	3.6	1.814	OK
SW4	FSR: 100 years: +0 %: 15 mins: Winter	15.282	14.250	14.293	0.043	5.5	0.049	0.000	5.5	2.732	OK
SW5	FSR: 100 years: +0 %: 60 mins: Winter	15.157	14.250	14.266	0.016	0.9	0.019	0.000	0.9	2.445	OK

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Ridge:		

RIDGE



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW1	FSR: 100 years: +40 %: 15 mins: Winter	14.947	14.522	14.638	0.117	56.1	0.132	0.000	55.9	27.551	OK
SW2	FSR: 100 years: +40 %: 15 mins: Winter	14.856	14.360	14.556	0.197	36.9	0.223	0.000	31.6	19.252	Flood Risk
SW6	FSR: 100 years: +40 %: 960 mins: Winter	15.239	13.400	14.132	0.732	1.8	0.828	0.000	1.8	178.474	Surcharged
SW7	FSR: 100 years: +40 %: 60 mins: Winter	15.130	13.250	13.279	0.029	1.8	0.033	0.000	1.8	10.432	OK
SW8	FSR: 100 years: +40 %: 60 mins: Winter		0.000	13.060	0.028	1.8			1.8	10.432	OK
SW3	FSR: 100 years: +40 %: 15 mins: Winter	15.448	14.750	14.798	0.048	5.3	0.054	0.000	5.3	2.606	OK
SW4	FSR: 100 years: +40 %: 15 mins: Winter	15.282	14.250	14.304	0.054	8.0	0.061	0.000	8.0	3.924	OK
SW5	FSR: 100 years: +40 %: 30 mins: Winter	15.157	14.250	14.269	0.019	1.3	0.022	0.000	1.3	2.105	OK

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Ridge:		

RIDGE



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Cellular Storage	FSR: 1 years: +0 %: 360 mins: Winter	13.607	13.607	0.107	0.107	7.1	39.169	0.000	0.000	1.8	55.821	201	84	OK
PP 2_1	FSR: 1 years: +0 %: 15 mins: Summer	14.578	14.559	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000		100	OK
PP 2_2	FSR: 1 years: +0 %: 15 mins: Summer	14.812	14.793	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000		100	OK
PP 3_1	FSR: 1 years: +0 %: 30 mins: Winter	14.526	14.455	0.021	0.016	0.7	0.370	0.000	0.000	0.5	0.507	13	94	OK
PP 3_2	FSR: 1 years: +0 %: 15 mins: Summer	14.809	14.737	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000		100	OK
PP 4_1	FSR: 1 years: +0 %: 60 mins: Winter	14.791	14.663	0.050	0.006	0.3	0.296	0.000	0.000	0.1	0.328	42	86	OK
PP 4_2	FSR: 1 years: +0 %: 120 mins: Winter	14.937	14.770	0.052	0.005	0.2	0.398	0.000	0.000	0.1	0.590	52	86	OK
PP 4_3	FSR: 1 years: +0 %: 15 mins: Winter	15.047	14.912	0.022	0.010	0.7	0.219	0.000	0.000	0.4	0.257	10	92	OK
PP 4_4	FSR: 1 years: +0 %: 15 mins: Winter	15.183	15.051	0.022	0.012	0.7	0.228	0.000	0.000	0.4	0.254	8	92	OK
PP 4_5	FSR: 1 years: +0 %: 30 mins: Winter	15.288	15.190	0.022	0.013	0.5	0.239	0.000	0.000	0.4	0.376	11	91	OK
PP 1_2	FSR: 1 years: +0 %: 60 mins: Winter	14.981	14.893	0.041	0.007	0.6	0.574	0.000	0.000	0.3	0.812	27	88	OK
PP 1_1	FSR: 1 years: +0 %: 15 mins: Winter	14.654	14.577	0.023	0.019	1.5	0.477	0.000	0.000	0.6	0.421	23	93	OK

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Ridge:		

RIDGE



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Cellular Storage	FSR: 30 years: +0 %: 480 mins: Winter	13.798	13.798	0.298	0.298	12.7	108.794	0.000	0.000	1.8	88.086	562	55	OK
PP 2_1	FSR: 30 years: +0 %: 15 mins: Summer	14.578	14.559	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000		100	OK
PP 2_2	FSR: 30 years: +0 %: 15 mins: Summer	14.812	14.793	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000		100	OK
PP 3_1	FSR: 30 years: +0 %: 15 mins: Winter	14.544	14.467	0.038	0.028	2.3	0.677	0.000	0.000	1.5	0.878	9	89	OK
PP 3_2	FSR: 30 years: +0 %: 15 mins: Summer	14.809	14.737	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000		100	OK
PP 4_1	FSR: 30 years: +0 %: 60 mins: Winter	14.851	14.667	0.111	0.011	0.7	0.635	0.000	0.000	0.3	0.861	29	70	OK
PP 4_2	FSR: 30 years: +0 %: 60 mins: Winter	15.000	14.774	0.115	0.009	0.8	0.856	0.000	0.000	0.3	0.949	40	69	OK
PP 4_3	FSR: 30 years: +0 %: 15 mins: Winter	15.063	14.919	0.038	0.017	1.7	0.386	0.000	0.000	1.4	0.712	4	86	OK
PP 4_4	FSR: 30 years: +0 %: 15 mins: Winter	15.199	15.060	0.038	0.021	1.7	0.405	0.000	0.000	1.4	0.709	4	86	OK
PP 4_5	FSR: 30 years: +0 %: 15 mins: Winter	15.305	15.200	0.040	0.023	1.7	0.428	0.000	0.000	1.3	0.671	6	85	OK
PP 1_2	FSR: 30 years: +0 %: 30 mins: Winter	15.028	14.898	0.087	0.011	2.2	1.196	0.000	0.000	0.9	1.346	22	75	OK
PP 1_1	FSR: 30 years: +0 %: 15 mins: Winter	14.672	14.607	0.041	0.049	4.4	1.077	0.000	0.000	3.3	1.397	9	85	OK

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Ridge:		

RIDGE



FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Cellular Storage	FSR: 100 years: +0 %: 480 mins: Winter	13.916	13.916	0.416	0.416	16.4	151.687	0.000	0.000	1.7	82.678	826	37	OK
PP 2_1	FSR: 100 years: +0 %: 15 mins: Summer	14.578	14.559	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000		100	OK
PP 2_2	FSR: 100 years: +0 %: 15 mins: Summer	14.812	14.793	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000		100	OK
PP 3_1	FSR: 100 years: +0 %: 15 mins: Winter	14.550	14.478	0.044	0.039	3.5	0.867	0.000	0.000	2.7	1.253	6	86	OK
PP 3_2	FSR: 100 years: +0 %: 15 mins: Summer	14.809	14.737	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000		100	OK
PP 4_1	FSR: 100 years: +0 %: 60 mins: Winter	14.880	14.669	0.140	0.013	0.9	0.794	0.000	0.000	0.4	1.159	27	62	OK
PP 4_2	FSR: 100 years: +0 %: 60 mins: Winter	15.032	14.775	0.147	0.010	1.1	1.088	0.000	0.000	0.4	1.299	38	61	OK
PP 4_3	FSR: 100 years: +0 %: 15 mins: Winter	15.070	14.922	0.045	0.020	2.2	0.447	0.000	0.000	1.9	0.935	4	84	OK
PP 4_4	FSR: 100 years: +0 %: 15 mins: Winter	15.205	15.064	0.045	0.024	2.2	0.471	0.000	0.000	1.9	0.939	5	83	OK
PP 4_5	FSR: 100 years: +0 %: 15 mins: Winter	15.312	15.204	0.047	0.027	2.1	0.502	0.000	0.000	1.8	0.892	4	82	OK
PP 1_2	FSR: 100 years: +0 %: 30 mins: Winter	15.050	14.900	0.110	0.013	2.9	1.492	0.000	0.000	1.3	1.835	17	69	OK
PP 1_1	FSR: 100 years: +0 %: 15 mins: Winter	14.680	14.622	0.049	0.064	5.8	1.353	0.000	0.000	4.5	1.885	9	81	OK

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Ridge:		

RIDGE



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Cellular Storage	FSR: 100 years: +40 %: 960 mins: Winter	14.133	14.133	0.633	0.633	13.5	231.064	0.000	0.000	1.7	170.244	1252	4	OK
PP 2_1	FSR: 100 years: +40 %: 15 mins: Summer	14.578	14.559	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000		100	OK
PP 2_2	FSR: 100 years: +40 %: 15 mins: Summer	14.812	14.793	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000		100	OK
PP 3_1	FSR: 100 years: +40 %: 15 mins: Winter	14.566	14.560	0.060	0.121	7.5	1.908	0.000	0.000	8.9	2.267	5	70	OK
PP 3_2	FSR: 100 years: +40 %: 15 mins: Summer	14.809	14.737	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000		100	OK
PP 4_1	FSR: 100 years: +40 %: 60 mins: Winter	14.924	14.672	0.184	0.016	1.3	1.039	0.000	0.000	0.7	1.670	21	50	OK
PP 4_2	FSR: 100 years: +40 %: 60 mins: Winter	15.082	14.778	0.197	0.013	1.5	1.447	0.000	0.000	0.7	1.893	30	48	OK
PP 4_3	FSR: 100 years: +40 %: 15 mins: Winter	15.080	14.926	0.055	0.024	3.1	0.544	0.000	0.000	2.7	1.341	3	81	OK
PP 4_4	FSR: 100 years: +40 %: 15 mins: Winter	15.215	15.069	0.055	0.029	3.1	0.571	0.000	0.000	2.8	1.341	3	80	OK
PP 4_5	FSR: 100 years: +40 %: 15 mins: Winter	15.322	15.210	0.057	0.033	3.0	0.613	0.000	0.000	2.6	1.283	4	78	OK
PP 1_2	FSR: 100 years: +40 %: 30 mins: Winter	15.084	14.903	0.144	0.016	4.0	1.941	0.000	0.000	2.1	2.693	13	60	OK
PP 1_1	FSR: 100 years: +40 %: 15 mins: Winter	14.693	14.644	0.062	0.086	8.2	1.785	0.000	0.000	6.5	2.725	8	75	OK

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Ridge:		

RIDGE



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
SW1.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SW1	Cellular Storage	14.9	14.570	0.048	5.954	1.9	0.1	11.7	OK
SW2.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SW2	Cellular Storage	14.9	14.412	0.052	4.096	1.5	0.25	8.2	OK
SW1.002	FSR: 1 years: +0 %: 240 mins: Winter	Pipe	Cellular Storage	SW6	15.3	13.606	0.150	40.154	0.2	0.11	1.8	OK
SW1.003	FSR: 1 years: +0 %: 360 mins: Winter	Pipe	SW6	SW7	15.2	13.606	0.031	57.503	0.8	0.22	1.8	Surcharged
SW1.004	FSR: 1 years: +0 %: 360 mins: Winter	Pipe	SW7	SW8	15.1	13.279	0.029	57.481	1.0	0.17	1.8	OK
SW3.002	FSR: 1 years: +0 %: 30 mins: Winter	Pipe	SW4	Cellular Storage	15.3	14.270	0.019	1.153	1.2	0.08	1.3	OK
SW1.000	FSR: 1 years: +0 %: 30 mins: Winter	Pipe	PP 1_1	SW1	15.0	14.578	0.028	0.656	0.4	0.01	0.6	OK
SW3.000	FSR: 1 years: +0 %: 30 mins: Winter	Pipe	PP 4_5	SW3	15.7	15.195	0.016	0.376	0.5	0.04	0.4	OK
SW3.001	FSR: 1 years: +0 %: 30 mins: Winter	Pipe	SW3	SW4	15.4	14.768	0.019	0.767	0.8	0.07	0.8	OK
SW4.000	FSR: 1 years: +0 %: 30 mins: Winter	Pipe	PP 4_4	SW3	15.5	15.056	0.015	0.398	0.6	0.03	0.4	OK
SW5.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	PP 4_3	SW4	15.3	14.918	0.015	0.257	0.9	0.02	0.4	OK

5018335: Former Diary Crest Depot Vivid Homes					Date: 03/05/2022							RIDGE	
					Designed by: BT		Checked by: TC		Approved By:				
					Report Details: Type: Connections Summary Storm Phase: Phase					Ridge:			
SW6.000	FSR: 1 years: +0 %: 120 mins: Winter	Pipe	PP 4_2	SW5	15.1	14.794	0.007	0.590	0.4	0	0.1	OK	
SW7.000	FSR: 1 years: +0 %: 60 mins: Winter	Pipe	PP 4_1	SW5	15.0	14.685	0.007	0.328	0.4	0.01	0.1	OK	
SW2.000	FSR: 1 years: +0 %: 30 mins: Winter	Pipe	PP 3_1	SW2	14.9	14.457	0.028	0.507	0.4	0.02	0.5	OK	
SW11.000	FSR: 1 years: +0 %: 15 mins: Summer	Pipe	PP 3_2	SW6	15.1	14.737	0.068	0.000	0.0	0	0.0	OK	
SW6.001	FSR: 1 years: +0 %: 120 mins: Winter	Pipe	SW5	Cellular Storage	15.2	14.258	0.008	1.085	0.7	0.01	0.2	OK	
SW8.000	FSR: 1 years: +0 %: 60 mins: Winter	Pipe	PP 1_2	Cellular Storage	15.2	14.911	0.006	0.812	1.4	0.01	0.3	OK	
SW9.000	FSR: 1 years: +0 %: 15 mins: Summer	Pipe	PP 2_1	Cellular Storage	15.1	14.559	0.000	0.000	0.0	0	0.0	OK	
SW10.000	FSR: 1 years: +0 %: 15 mins: Summer	No Delay	PP 2_2	Cellular Storage		14.793	0.000	0.000	0.0		0.0		

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Ridge:		

RIDGE



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
SW1.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW1	Cellular Storage	14.9	14.601	0.077	14.830	2.4	0.24	29.4	OK
SW2.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW2	Cellular Storage	14.9	14.450	0.088	10.244	1.9	0.62	20.3	OK
SW1.002	FSR: 30 years: +0 %: 30 mins: Winter	Pipe	Cellular Storage	SW6	15.3	13.663	0.150	3.952	0.2	0.11	1.8	Surcharged
SW1.003	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	SW6	SW7	15.2	13.706	0.032	10.942	0.8	0.23	1.8	Surcharged
SW1.004	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	SW7	SW8	15.1	13.279	0.029	10.893	1.0	0.18	1.8	OK
SW3.002	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW4	Cellular Storage	15.3	14.286	0.035	2.059	1.6	0.26	4.1	OK
SW1.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	PP 1_1	SW1	15.0	14.603	0.064	1.135	0.5	0.08	3.3	OK
SW3.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	PP 4_5	SW3	15.7	15.208	0.028	0.671	0.7	0.12	1.3	OK
SW3.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW3	SW4	15.4	14.783	0.034	1.365	1.1	0.23	2.7	OK
SW4.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	PP 4_4	SW3	15.5	15.069	0.027	0.709	0.9	0.09	1.4	OK
SW5.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	PP 4_3	SW4	15.3	14.930	0.027	0.712	1.1	0.07	1.4	OK

5018335: Former Diary Crest Depot Vivid Homes					Date: 03/05/2022							RIDGE	
					Designed by: BT		Checked by: TC		Approved By:				
Report Details: Type: Connections Summary Storm Phase: Phase					Ridge:								
SW6.000	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	PP 4_2	SW5	15.1	14.827	0.011	0.949	0.6	0.01	0.3	OK	
SW7.000	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	PP 4_1	SW5	15.0	14.717	0.012	0.861	0.6	0.02	0.3	OK	
SW2.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	PP 3_1	SW2	14.9	14.471	0.055	0.878	0.5	0.08	1.5	OK	
SW11.000	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	PP 3_2	SW6	15.1	14.737	0.100	0.000	0.0	0	0.0	OK	
SW6.001	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	SW5	Cellular Storage	15.2	14.264	0.014	1.800	0.9	0.04	0.6	OK	
SW8.000	FSR: 30 years: +0 %: 30 mins: Winter	Pipe	PP 1_2	Cellular Storage	15.2	14.936	0.011	1.346	2.0	0.02	0.9	OK	
SW9.000	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	PP 2_1	Cellular Storage	15.1	14.559	0.000	0.000	0.0	0	0.0	OK	
SW10.000	FSR: 30 years: +0 %: 15 mins: Summer	No Delay	PP 2_2	Cellular Storage		14.793	0.000	0.000	0.0		0.0		

5018335: Former Diary Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Ridge:		



FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
SW1.001	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	SW1	Cellular Storage	14.9	14.616	0.091	19.256	2.6	0.32	39.6	OK
SW2.001	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	SW2	Cellular Storage	14.9	14.470	0.106	13.310	2.0	0.81	26.6	OK
SW1.002	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	Cellular Storage	SW6	15.3	13.659	0.150	1.264	0.1	0.11	1.8	Surcharged
SW1.003	FSR: 100 years: +0 %: 60 mins: Summer	Pipe	SW6	SW7	15.2	13.744	0.032	11.002	0.8	0.23	1.8	Surcharged
SW1.004	FSR: 100 years: +0 %: 60 mins: Summer	Pipe	SW7	SW8	15.1	13.279	0.029	10.953	1.0	0.18	1.8	OK
SW3.002	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	SW4	Cellular Storage	15.3	14.293	0.042	2.732	1.8	0.35	5.5	OK
SW1.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	PP 1_1	SW1	15.0	14.614	0.079	1.523	0.6	0.11	4.5	OK
SW3.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	PP 4_5	SW3	15.7	15.214	0.033	0.892	0.8	0.16	1.8	OK
SW3.001	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	SW3	SW4	15.4	14.788	0.041	1.814	1.2	0.31	3.6	OK
SW4.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	PP 4_4	SW3	15.5	15.074	0.031	0.939	0.9	0.13	1.9	OK
SW5.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	PP 4_3	SW4	15.3	14.934	0.031	0.935	1.1	0.09	1.9	OK

5018335: Former Diary Crest Depot Vivid Homes					Date: 03/05/2022							RIDGE	
					Designed by: BT		Checked by: TC		Approved By:				
					Report Details: Type: Connections Summary Storm Phase: Phase					Ridge:			
SW6.000	FSR: 100 years: +0 %: 60 mins: Winter	Pipe	PP 4_2	SW5	15.1	14.844	0.013	1.299	0.7	0.02	0.4	OK	
SW7.000	FSR: 100 years: +0 %: 60 mins: Winter	Pipe	PP 4_1	SW5	15.0	14.732	0.015	1.159	0.6	0.03	0.4	OK	
SW2.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	PP 3_1	SW2	14.9	14.480	0.075	1.176	0.5	0.15	2.7	OK	
SW11.000	FSR: 100 years: +0 %: 15 mins: Summer	Pipe	PP 3_2	SW6	15.1	14.737	0.100	0.000	0.0	0	0.0	OK	
SW6.001	FSR: 100 years: +0 %: 60 mins: Winter	Pipe	SW5	Cellular Storage	15.2	14.266	0.045	2.445	1.0	0.06	0.9	OK	
SW8.000	FSR: 100 years: +0 %: 60 mins: Winter	Pipe	PP 1_2	Cellular Storage	15.2	14.947	0.042	2.745	2.2	0.04	1.3	OK	
SW9.000	FSR: 100 years: +0 %: 15 mins: Summer	Pipe	PP 2_1	Cellular Storage	15.1	14.559	0.000	0.000	0.0	0	0.0	OK	
SW10.000	FSR: 100 years: +0 %: 15 mins: Summer	No Delay	PP 2_2	Cellular Storage		14.793	0.000	0.000	0.0		0.0		

5018335: Former Dairy Crest Depot Vivid Homes	Date: 03/05/2022		
	Designed by: BT	Checked by: TC	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Ridge:		

RIDGE



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
SW1.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	SW1	Cellular Storage	14.9	14.638	0.112	27.035	2.8	0.46	55.9	OK
SW2.001	FSR: 100 years: +40 %: 30 mins: Summer	Pipe	SW2	Cellular Storage	14.9	14.513	0.134	22.621	2.0	0.99	32.2	Surcharged
SW1.002	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	Cellular Storage	SW6	15.3	13.701	0.150	0.901	0.1	0.11	1.8	Surcharged
SW1.003	FSR: 100 years: +40 %: 60 mins: Winter	Pipe	SW6	SW7	15.2	13.896	0.032	10.477	0.8	0.23	1.8	Surcharged
SW1.004	FSR: 100 years: +40 %: 60 mins: Winter	Pipe	SW7	SW8	15.1	13.279	0.029	10.432	1.0	0.18	1.8	OK
SW3.002	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	SW4	Cellular Storage	15.3	14.304	0.052	3.924	1.9	0.51	8.0	OK
SW1.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	PP 1_1	SW1	15.0	14.632	0.101	2.209	0.6	0.15	6.5	OK
SW3.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	PP 4_5	SW3	15.7	15.222	0.040	1.283	0.9	0.23	2.6	OK
SW3.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	SW3	SW4	15.4	14.798	0.051	2.606	1.3	0.45	5.3	OK
SW4.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	PP 4_4	SW3	15.5	15.081	0.039	1.341	1.0	0.19	2.8	OK
SW5.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	PP 4_3	SW4	15.3	14.941	0.039	1.341	1.2	0.13	2.7	OK

5018335: Former Diary Crest Depot Vivid Homes					Date: 03/05/2022							RIDGE	
					Designed by: BT		Checked by: TC		Approved By:				
					Report Details: Type: Connections Summary Storm Phase: Phase					Ridge:			
SW6.000	FSR: 100 years: +40 %: 60 mins: Winter	Pipe	PP 4_2	SW5	15.1	14.870	0.016	1.893	0.8	0.03	0.7	Surcharged	
SW7.000	FSR: 100 years: +40 %: 60 mins: Winter	Pipe	PP 4_1	SW5	15.0	14.756	0.017	1.670	0.8	0.05	0.7	OK	
SW2.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	PP 3_1	SW2	14.9	14.529	0.150	1.705	0.7	0.48	8.9	OK	
SW11.000	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	PP 3_2	SW6	15.1	14.737	0.100	0.000	0.0	0	0.0	OK	
SW6.001	FSR: 100 years: +40 %: 60 mins: Winter	Pipe	SW5	Cellular Storage	15.2	14.269	0.100	3.549	1.0	0.09	1.4	OK	
SW8.000	FSR: 100 years: +40 %: 30 mins: Winter	Pipe	PP 1_2	Cellular Storage	15.2	14.967	0.059	2.693	2.4	0.06	2.1	OK	
SW9.000	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	PP 2_1	Cellular Storage	15.1	14.559	0.001	0.000	0.0	0	0.0	OK	
SW10.000	FSR: 100 years: +40 %: 15 mins: Summer	No Delay	PP 2_2	Cellular Storage		14.793	0.000	0.000	0.0		0.0		



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