

Below Ground Drainage

**Initial design Concept
To support
Planning Application
For
Plot 4a
Unit 5
At
Dunsbury Park.
Havant.
Hampshire.**

November 2020.

BAM Design
Centrium
Griffiths way
St Albans
Herts
AL1 2RD

Tel No: (01727) 894200
Fax No: (01727) 818850

BAM Design Technical Report.

SUBJECT

Below Ground Drainage, Initial Design Concept.

CLIENT: BAM Construction South East.

PROJECT: Plot 4a, Unit 5. Dunsbury Park.

Contract no: TBA
Prepared by: S Bliss.

Job no: 4330 Z4A-U
Checked by: SGB.

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AMENDMENTS				
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Below ground drainage Initial Concept Design.

1.0 Introduction.

The Dunsbury Park site is located to the West of Leigh Park in the North-West of Havant and to the East of Waterlooville. It is immediately east of the A3(M) at Junction 3. The motorway forming the western boundary of the site. The previous greenfield site has had a spine road constructed, this links the A3(M) motorway Junction 3 slip road to Callshot Road on the Leigh Park residential area. This road has been constructed to adoptable standards and is called Fitzwygram Way. To date, this road has not been adopted. Various private roads off the spine road provide access to the various plots for future development of Dunsbury Hill.

The total site has an area of 33 hectares, 20.2 hectares of which has been allocated for development. The ground slopes in a southerly direction from a maximum elevation of approximately 55m above ordnance datum (AOD) to a minimum elevation of 15m AOD at the Hermitage Stream.

A Flood Risk Assessment was produced by Atkins Limited in March 2012 for an outline planning submission covering for the whole development at that time.

Plot 2 was the first plot to be developed with the construction of a warehouse / distribution centre. The below ground drainage design consisted separate foul and storm water systems. Storm water included a SUDS drainage system with porous car park surfaces, and on-site below ground storm water attenuation tanks.

During the development of plot 2, it was considered that site wide storm water attenuation would be a preferable option in comparison to provision of storm attenuation on an individual plot basis. Large ponds would provide a valuable asset for local residents whilst also increasing the areas Biodiversity. Both wet and slightly "marshy" storm water attenuation lakes were constructed 2017 to both attenuate and improve water quality prior to discharge into the Hermitage Stream.

2.0 Plot 4a.

Plot 4a is the third plot to be developed on this new Business Park. The plot is approximately half of the total area allocated for plot 4.

The plot is fronted by Fitzwygram Way to the south and Aylwin Avenue to the east.

The Building area is 10,133m² and comprises, Clean Room manufacturing facility of medical equipment, warehouse goods storage, Goods in / Goods out loading bay, Administration offices and staff welfare facilities including showers, toilets, canteen, picnic area, etc. The building will contain approximately 250 personnel at any one time.

Staff and visitor vehicle Access is from Fitzwygram Way. An on-site one way vehicle management system directs vehicles towards a separate exit back onto Fitzwygram Way.

Heavy Goods Vehicle access to the buildings loading bay from Aylwin Avenue on the eastern boundary.

The total site drained area is just under 1.9 hectares, of which approximately 10,000m² of this area is the building roof as previously mentioned.

Overhead power cables are present in the South East corner of the site. These will restrict working practices and have led to design decisions whereby the drainage in this area has been designed to promote hand dig where possible.

3.0 Drainage General.

The new below ground drainage installation will comprise completely separate foul and storm water drainage systems.

The systems will be designed in accordance with BS EN 752, The Building Regulations section H and Environment agency Planning Policy Statement PPS25. Foul water flows will be calculated in accordance with BS EN 12056 part 2.

In accordance with Environment Agency requirements the storm water drainage system from the new works will be designed to prevent surface flooding from a 1 in 30 year storm event.

The previously constructed attenuation ponds were designed to store storm water run-off from Plots 1 – 5 inclusive of the Dunsbury Park development. These have been sized to store water for a 1 in 100 year storm event + 30% for future climate change.

The proposed new building will have 243 vehicle parking spaces. These are spread over a large area to the west, south and east elevations of the building.

We have made effort to provide further SUDS treatment trains in addition to the previously installed SUDS attenuation ponds. A series of gravel filled trenches which receive water from car park drainage gullies have been introduced.

These trenches will have a perforated pipes within the base which conveys the water towards the on-site storm water network and ultimately the storm water attenuation ponds.

The complete granular fill and all perforated inlet / outlet pipes will be wrapped with Inbitex Geotextile fabric. This is a polypropylene and polyethelene non-woven fabric. During the manufacturing process, small dishes are created on the surface of the hairs from which the Geotextile is manufactured. This allows an early establishment of a microbial biomass which is responsible eating and degrading oils suspended in the water. It is also important during dry periods that the microbial population can retreat into the dishes where moisture can still be found. Thus when it rains again the microbial biomass is quickly re-established. This negates the need for traditional petrol interceptors. Silt removal is performed as the water travels through the gravel from both surface levels and piped car park gullies. This provides two trains of improvement in water quality prior to discharge to the on-site network and attenuation ponds.

All drainage calculations will be produced using the industry accepted Micro Drainage software suite.

Once the drainage design has been completed, Section 106 applications will be made to Southern Water the new foul water discharges. The storm water discharges from the attenuation ponds into the Hermitage stream have been previously agreed.

4.0 Storm Water Drainage.

The Requirement H3 of the Building Regulations 2000 has been considered for this project. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to a soakaway infiltration system and secondly, to a watercourse, then thirdly to a public sewer, in that priority order.

Soil infiltration tests have previously been performed for this proposed development. The clay soils preclude the use of conventional soakaways.

Discharge to a water course is the second preferred storm water discharge method within the drainage hierarchy, this method has been adopted with a storm water connection into the Hermitage stream.

Rainwater from building roof, will be provided with a siphonic rainwater installation. This was selected to reduce the extent of below ground drainage which will minimise the depth of excavations.

The infrequently used access road to the rear of the building has been provided with a porous surface over a granular sub base. As with the gravel filled drainage filter trenches a geotextile wrapped perforated pipe will convey water to the main drainage system. Porous surfaces are another accepted drainage method for the entrapment of silts and are an accepted SUDS technique.

Porous surfaces are not robust enough for the heavily used loading bay area. This area will have concrete finishes which will fall to traditional drainage gullies and channels. A bypass type traditional petrol interceptor will be provided prior to connection the storm water drainage network.

SUDS storm water drainage systems which mimic the natural environment as far as practically possible. They are a very important aspect of managing storm water run-off and reducing both on-site and off-site flooding. The ongoing maintenance of the drainage system is recognised as a very important element of these objectives.

A drainage maintenance strategy will be issued to the building owner and occupying tenant upon completion of works. Emphasis will be made that continued maintenance of the drainage installation is a legal requirement.

SUDS Drainage techniques considered for this development are discussed below:

SUDS Drainage Technique Considered	Adopted (Y/N)	Reason	Benefit to Development.
Rainwater harvesting system	No	It is difficult to harvest water from a high velocity siphonic rainwater installation. It has therefore been rejected.	
Green roofs	No	The building frame is a lightweight structure and not designed for the additional weight imposed by green roofs.	
Infiltration systems	No	Soil infiltration tests in accordance with BRE Digest 365 have determined that the underlying soils are not suitable for infiltration drainage.	
Porous surface over granular sub-base	Yes	The infrequently access road to the rear of the building has been provided with porous surface over a granular sub base reservoir.	Removal of silts at surface level. Shallow drainage which will reduce excavation. Level surface with on falls to gullies.
Swales, ponds and detention basins	Yes	Storm water attenuation ponds have been provided as part of the Dunsbury Park site development.	Water stored without losing plot area. Reduced risk off-site flooding. Improved biodiversity.
Attenuation storage tanks	No	The Proposed use of ponds and other SUDS techniques removes the need for below ground attenuation tanks.	
Pervious surfaces	Yes	Overland surface water flow to pervious filter trenches.	Reduced hard drainage. Reduced excavation. Improved silt entrapment.
Filter Trenches.	Yes	Car park drainage gullies will discharge into gravel filled filter trenches. Perforated pipes in the base will be geotextile wrapped.	Filter trenches provide excellent Silt removal qualities which will protect the on-site drainage network and attenuation ponds.
Silt Trap Manholes.	Yes	Siphonic Rainwater pipes will discharge to silt trap manholes.	Further protection of on-site network and ponds.

5.0 Foul Water Drainage.

A Section 106 consent for the new foul water discharge to the Southern Water sewer will be made once the design has been completed.

The new building will be provided with a completely separate gravity foul water drainage system.

Foul water flows will be calculated using the discharge unit method as detailed within BS EN 12056 part 2.

Dual flush 6 / 4.5 litre W.C' cisterns will be specified as will flow limiters on showers and wash basin taps. To further reduce foul water flows and save water, wash basin taps will be push button self closing operation.

Access Chambers and rodding points will be provided to allow future maintenance of the system. Adequate ventilation pipes and trapped gullies will be provided to prevent the build-up of foul smells in or around the building.

The bin store area will be provided with a foul water wash down gully. This will assist keeping the attenuation ponds free of pollution and encourage biodiversity.

6.0 Conclusion.

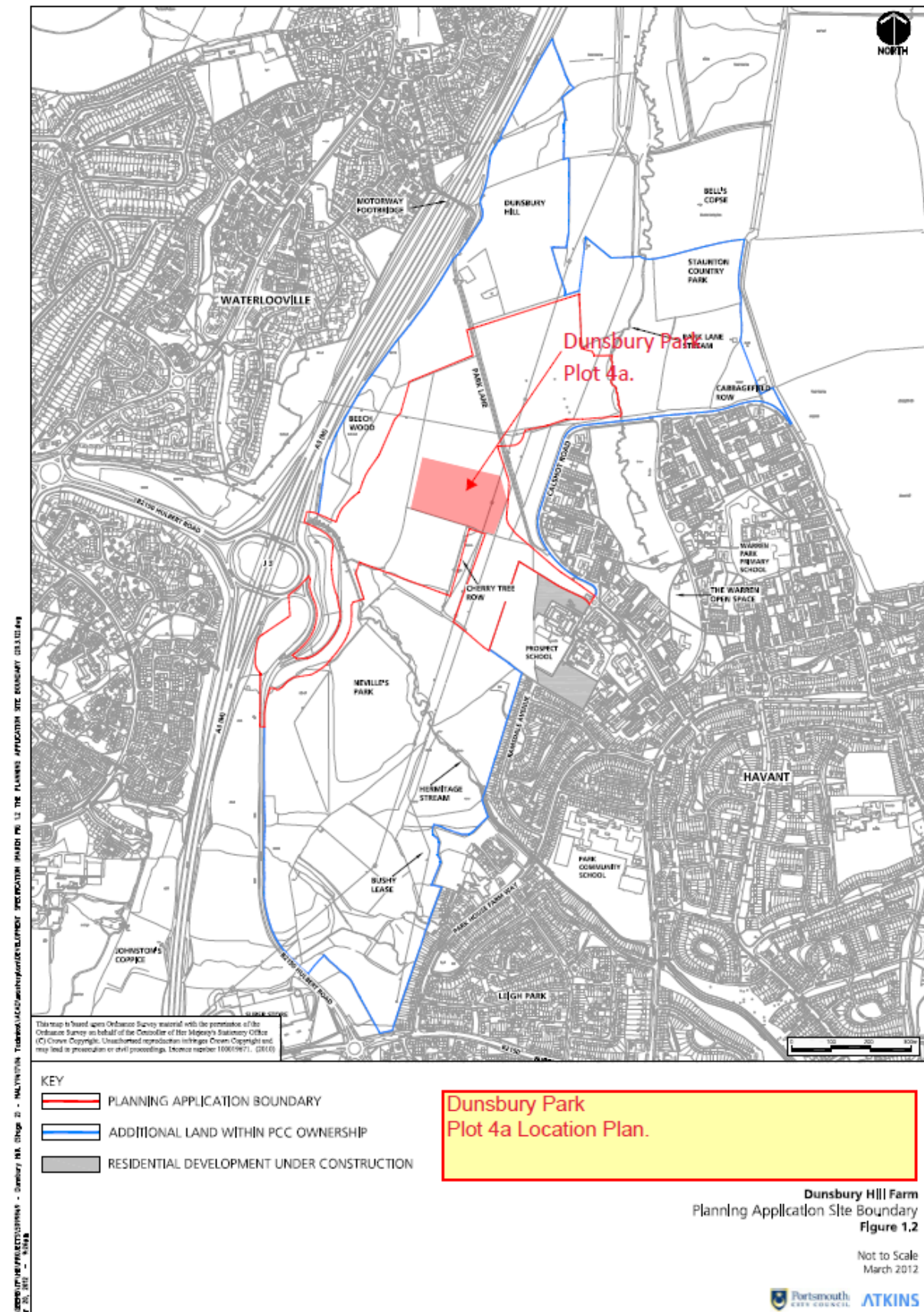
Storm water discharges to the Hermitage Stream. The run-off rates have been restricted to green field rates as previously agreed with the relevant authorities. The site wide drainage system including plot 4a therefore reflects the pre development scenario.

The previous installation of attenuation ponds has increased the developments bio diversity.

The inclusion of additional onsite SUDS techniques and increased treatment trains offers further benefit to the previously approved Dunsbury Park drainage strategy.

Upon completion of works, a drainage maintenance strategy will be issued to the building owner and occupying tenant. Emphasis will be made that continued maintenance of the drainage installation is a legal requirement under planning law.

Appendix A. Dunsbury Park, Site Boundary Red Line.



Appendix B. Aerial Photograph. Plot 4a shaded.



Dunsbury Park, Plot 4a. Aerial Image.

Appendix D. Plot 3 Drainage Proposal.

