

Calcinotto

Calcinotto

civil and structural engineers

114038

Arthur Hill Swimming Pool
221-225 Kings Road
Reading
RG1 4LS

Drainage Management and Maintenance Report
for Gleeds & Reading Borough Council

07th July 2021
Revision 3.0

Produced By
Jordan Hayward
Project Civil Engineer

Checked By
Matt Roe
Principal Civil Engineer

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 Drainage Management and Maintenance Report for Gleeds & Reading Borough Council

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1 Background

- 1.1.1 Calcinotto Consulting Engineers have been appointed by Gleeds to prepare a drainage strategy and corresponding management and maintenance statement for the redevelopment of the former Arthur Hill Swimming Pool. The current building comprises a closed and drained swimming pool, changing facilities, fitness area and office/kitchen areas.
- 1.1.2 The development comprises of 15 new flats along with associated landscaping, car parking and ancillary buildings including a bin storage area and cycle store. The site location is shown on Figure 1 below and the proposed layout of the site is within Appendix B.

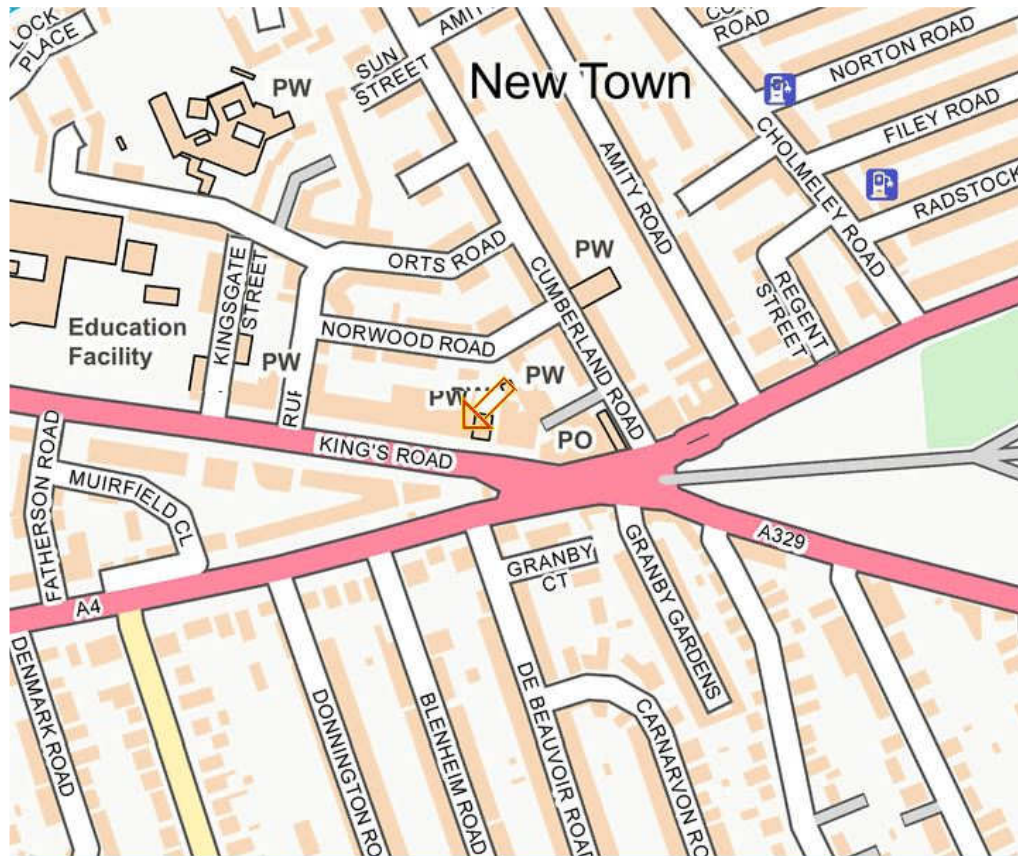


Figure 1 Site Location

- 1.1.3 The site under development has an area of 0.108ha and is bounded by Kings Road to the South, Norwood Road to the North and residential buildings to the East and West. This site has Post Code RG1 4LS and national grid reference for the site is SU 73035 73240.
- 1.1.4 This document has been produced to aid and inform the maintenance and inspection regime required to maintain the performance of the foul and surface water drainage systems designed to serve the proposed development over the lifetime of the finished site. This document should be read in conjunction with the standalone Drainage Strategy Statement by Calcinotto Ltd.
- 1.1.5 The guidance highlighted within this report has been referenced from the CIRIA document C753 SuDS Manual and CIRIA RP992.

2 Description

2.1.1 Drainage Infrastructure

2.2 The site is a Brownfield Site that is being redeveloped to create 15 Flats split into Block A and B and Block C and D with associated landscaping, car parking and a bin store. The development will provide new foul and surface water drainage infrastructure to serve the proposed scheme. The existing off-site foul connection and existing off-site surface water connection are intended to be reused as agreed with Thames Water.

2.2.1 Foul Drainage

2.2.2 The foul drainage network will be a gravity system with the foul drainage from Block C and D draining into the public foul sewer in Kings Road reusing the existing 150mm diameter foul sewer connection. The foul drainage from Block A and B will drain by gravity into the public foul sewer in Norwood Road with a new manhole connection as agreed with Thames Water.

2.2.3 Surface Water Drainage

2.2.4 The method of disposal is a restricted discharge into the Public Sewer in Norwood Road, utilising the existing 150mm diameter connection. The surface water network is composed of 100mm, 150mm and 225mm diameter pipework joined by inspection chambers/catchpits and passes through a 15.0 x 4.0 x 0.4m deep modular crate attenuation tank with a hydro-brake manhole downstream of the tank limiting the discharge to 6.8l/s and allowing the storage to be utilised in the attenuation tank. Tanked permeable paving has been utilised within the access and parking areas to provide additional storage and for water quality purposes.

2.2.5 The drainage strategy plan drawing is in Appendix C and an in-depth analysis of the proposed strategy can be found in the standalone drainage strategy statement by Calcinotto Ltd.

2.2.6 The proposed surface water drainage system contains several principal elements which will need to be individually inspected and maintained, as outlined in Appendix A, to retain the performance of the system. These elements are as follows:

- **Permeable Paving** – The permeable paved area of the site has been designed to act as both a drainage collection system and an attenuation system.
- **Cellular Attenuation Tank** – 1 No. attenuation tank will provide attenuation for a 1:1 year, 1:30 year and 1:100 year storm events +0%, 20% and 40% climate change respectively. The tank has been designed to incorporate two inspection ducts at each end which can be used to monitor and remove any silt build up within the tank.
- **Flow Control Chamber** – 1 No. Hydrobrake flow control chambers have been used to manage the proposed surface water drainage system. This is required to allow surface water to build up in the attenuation tank and ultimately limit the total site discharge to 6.8l/s.

Maintenance - Hydrobrake chambers require little maintenance due to having no moving parts and no power requirements. The sump should be emptied/checked and the emergency drain down mechanism checked to ensure it is in good working order. This should be completed every 6 months for a year period and yearly thereafter.

2.2.7 The proposed surface water drainage system has been designed to minimise the risk of any flooding occurring on-site by using the range of recommended storm return periods. Where appropriate for more extreme long-term events an allowance for climate change has also been allowed for to protect the site over the lifetime of the development.

Design storm return periods used:

1 in 1 Year Storm

1 in 30 Year Storm + 20% Climate Change Allowance

1 in 100 Year Storm + 40% Climate Change Allowance

3 Maintenance Items

3.1.1 The following is a list of components included within the foul and surface water drainage system which will need to be regularly inspected and maintained:

- Foul and Surface Water Pipework
- Foul and Surface Water Chambers
- Flow Control Chamber
- Attenuation Tank (and Associated Access / Catchpit Chambers)
- Permeable Paving
- Gully Pots and Drainage Channel Deep Sump Units

Refer to Appendix A for the recommended frequency of inspection works.

This will be a live document and any changes to inspection periods should be recorded and a reason given for future reference.

Appropriate safety fencing and barriers should be erected during any servicing and maintenance works on any part of the drainage system to ensure the safety of all site users, visitors as well as the maintenance staff carrying out the works. Timing for these works should be programmed in with notifications given to the site users.

4 Conclusion

- 4.1 The intention of this document is to highlight areas within the proposed surface water and foul design as it stands that require regular maintenance in order to ensure the system works effectively throughout its lifetime. If regular maintenance is not put into action, this can result in system failure which in the case of this development will lead to contaminated water and flooding. This will then impose strain on other systems outside of the site area.
- 4.1.1 The maintenance guidelines are live documents and will be monitored through the lifetime of the development and will be amended and addressed as necessary. Reading Borough Council have their own internal Maintenance teams that will be commissioned to do all required maintenance.

A Drainage Components Inspection & Maintenance Regime

SuDS Components Operation and Maintenance Activities

Operation and Maintenance Activity	SuDS Component												
	NOTE: Only components highlighted in BLUE are relevant to this project.												
	Pond	Wetland	Detention Basin	Infiltration Basin	Soakaway	Infiltration Trench	Filter Drain	Modular Storage	Permeable Paving	Swale	Gravel Drainage Strip	Green Roofs	Proprietary Treatment Systems
Regular Maintenance													
Inspection	●	●	●	●	●	●	●	○	●	●	●	●	●
Litter and Debris Removal	●	●	●	●	○	●	●	○	●	●	●		○
Grass Cutting	●	●	●	●	○	●	●	○	○	●	●		
Weed and Invasive Plant Control	○	○	○	○		○	○	●	○		○	●	
Shrub Management (Including Pruning)	○	○	○	○				●	○	○	○		
Shoreline Vegetation Management	○	●	○					●	●				
Aquatic Vegetation Management	●	●	○					●	●				
Occasional Maintenance													
Sediment Management ¹	●	●	●	●	●	●	●	●	●	●	●		●
Vegetation Replacement	○	○	○	○				●	●	○	○	●	
Vacuum Sweeping and Brushing								●	●				
Remedial Maintenance													
Structure Rehabilitation / Repair	○	○	○	○	○	○	○	○	○	○	○	○	
Infiltration Surface Reconditioning				○	○	○	○	●	○	○	○		

¹ Sediment should be collected and managed in pre-treatment systems, upstream of the main device

Legend: ● Will be required ○ May be required

General Foul and Surface Water Drainage Maintenance

Piped Network/Chambers Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	The entire on-site foul and surface water drainage system should be visually inspected by lifting all manhole covers and checking the silt traps of catch pits, sump units and gullies.	Every six months
	The entire on-site foul and surface water drainage system should be CCTV surveyed to identify any damage, blockages or silt build-up. Any obstructions to be jet cleaned and any damage repaired.	Every 5 Years
Remedial Maintenance	Any identified blockages within the drainage system to inspected via a CCTV survey, jet cleaned and repaired if necessary.	As required

Piped Network / Chambers

Piped Network/Chambers Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any features that are not operating correctly. If required, take remedial action.	Monthly for three months, then six monthly.
	Debris removal from catchment surface/gratings (where may cause risks to performance)	Monthly (and after large storms)
	Remove sediment from trapped sumps, manholes and catch pits.	Annually or as required
Remedial Maintenance	Repair/rehabilitation of gratings, inlets and outlets.	As required
Monitoring	Inspect/check all gratings, trapped sumps, manholes and catch pits to ensure that they are in good condition and operating as designed.	Annually and after large storm events
Structure Rehabilitation/Repair	Regular maintenance and monitoring to identify if repair and/or replacement of features or pipework is required.	As required

Modular Storage - Attenuation Tank Maintenance

Tank Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove sediment and debris from pre-treatment devices and floor of inspection tube or chamber	Annually
	Cleaning of gutters and any filters on downpipes	Annually
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	-	-
Remedial Actions	Reconstruct tank and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year then annually
	Check tank to ensure emptying is occurring	Annually
The SuDS Manual Table 13.1: Operation and maintenance requirements for soakaways		

Permeable Pavements (Attenuation)

Permeable Pavement Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over the whole surface). Care should be taken in adjusting vacuuming equipment to avoid removal of jointing material if present. Any lost material should be replaced	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturers' recommendations – pay particular attention to areas where water runs from adjacent impermeable areas, as this area is most likely to collect the most sediment
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weed or management using glyphosate applied directly to the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Maintenance	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structured performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration and filtration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, forty-eight hours after large rainfall events in the first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually
The SuDS Manual Table 20.15: Operation and maintenance requirements for pervious pavements		

B Architects Plan



NOTES

This drawing to be read in accordance with the specification/Bill of Materials and related drawings.

No Dimensions to be scaled from this drawing. All stated dimensions to be verified on site and the Architect notified of any discrepancies.

Scale: 1:100 or as indicated



LEGEND

- BOUNDARY BASED ON EXISTING SURVEY, TITLE PLAN, SUBJECT TO LEGAL AGREEMENT AND CONFIRMATION BY ALL PARTIES.
- TOPO SURVEY SHOWS NO EXISTING TREE TO BE REMOVED.
- HIGHWAYS ARRANGEMENT IS SHOWN FOR INDICATIVE PURPOSES ONLY. REFER TO HIGHWAY ENGINEERS DRAWINGS FOR DETAILED PROPOSALS.
- PROPOSED WORKS SUBJECT TO AGREEMENT WITH LOCAL HIGHWAYS AUTHORITY.

KEY:

- APPLICATION BOUNDARY
- ▲ BUILDING ACCESS

Rev.	Description	Date	Initials
1	Issue for Tender	18/08/2021	AM/DR

TENDER ISSUE

Saunders
Architecture + Urban Design

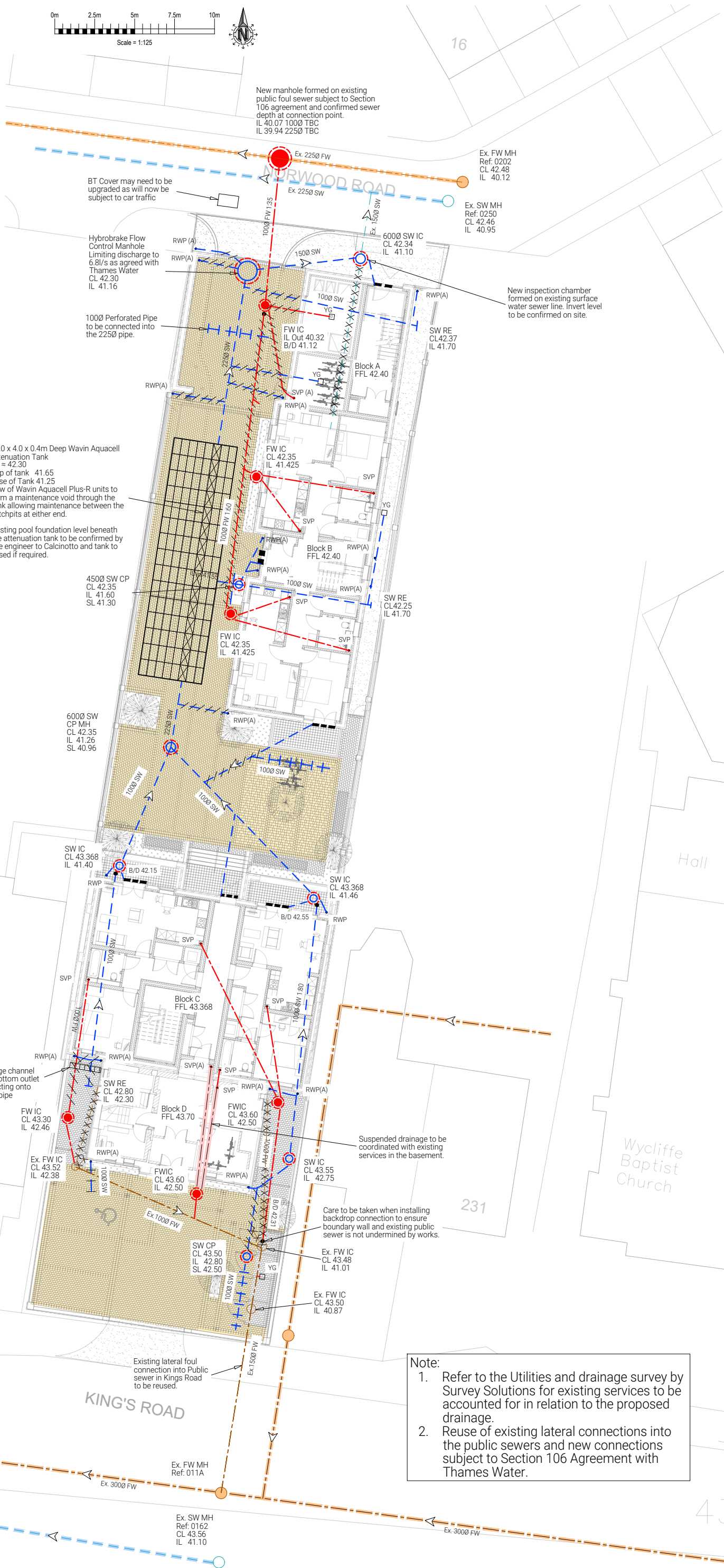
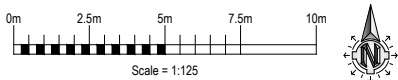
Description: Arthur Hill Road Regeneration			
Client	SA	18/08/2021	AM/DR
Project Name	GA Site Plan	18/08/2021	AM/DR
Scale	1:100	18/08/2021	AM/DR
Drawing No	8129 / 1200	18/08/2021	AM/DR

C Proposed Drainage Plan

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/Catchpit)
- Proposed FW Sewer (& Manhole)
- RWP Rainwater Collection Pipe
- RWP(A) Rainwater collection Pipe (with Access)
- RE Rodding Eye (Refer to plan for invert level)
- Proposed Suspended FW Drain
- Drainage Channel
- Threshold Drainage Channel (to Architects Spec)
- SVP Soil & Vent Pipe
- YG Yard Gully (To Architects Specification)
- Perforated Distributor Pipe
- Locally lowered Perforated Collection Pipe
- Pipeline to be Removed / Abandoned
- Tanked Permeable Paving
- Attenuation Tank

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



Notes:

- This drawing is to be read in conjunction with all of the relevant architects, engineers and specialist sub-contractor drawings and specifications.
- Any discrepancies between the engineers and the architects drawings to be referred to the architect before proceeding. Drawings must not be scaled.
- 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).
- All adoptable drainage is to be in accordance with 'Sewers for Adoption 7th Edition', where appropriate.
- All materials for adoptable drainage are to be Kitemarked as appropriate.
- All adoptable manhole covers and frames are to be 150mm deep minimum and the covers badged as appropriate i.e. FW or SW.
- For adoptable drainage, a reinforced concrete cover slab is to be provided where the effective cover to the crown of the adopted pipe(s) is less than 0.9m in verges or 1.2m in carriageways and / or footpaths. Where effective cover is 1.0m or less in carriageways and / or footpaths, pipework will need to be ductile iron (ie. Stanton Pam St. Gobain type 'Integral'). (Applies during and after construction).
- All adopted foul drainage to be laid with a minimum of 1.2m cover depth to soffit. Unless specifically identified otherwise with relevant protective measures.
- Pipework Type - Flexibly jointed extra strength vitrified clay, to BS EN 295-1, Hepworth 'Supersieve' or equivalent.
- 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.)
- Pipework Type - Cast iron, to BS EN 877 - Ductile iron to BS EN 598.
- Pipework Type - Concrete, to BS EN 1916 and BS 5911-1.
- Precast concrete manholes and fittings shall be to BS 5911 parts 3 and 4 and BS EN 1917.
- 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.
- Whenever pipework passes through screen walls, footings or retaining walls, lintels are to be provided.
- 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.
- 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.
- 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.
- 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).
- 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.
- 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.
B/D - Denotes a backdrop connection.
CP - Denotes a catchpit chamber.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Modular crate attenuation tank system(s) to be Wavin Aquacell Core-R & Plus-R units or Polytype Polystorm. Any other system offered will need to be provided with a separate warranty for design and installation.

T3	07.07.21	Updated to Reading Borough Council comments.
T2	23.02.21	Updated pipe size to Thames Water comment
T1	05.02.21	Tender
P5	16.12.20	New site plan & Updated to Architects & Reading Council comments
P4	11.12.20	New site plan
P3	28.09.20	Additional public sewer info, build near to a public sewer agreement text added & scale adjusted
P2	10.07.20	Updated Architects Plan
P1	09.07.20	Planning
Rev.	Date	Description

Note:

- Refer to the Utilities and drainage survey by Survey Solutions for existing services to be accounted for in relation to the proposed drainage.
- Reuse of existing lateral connections into the public sewers and new connections subject to Section 106 Agreement with Thames Water.



Calcinotto
Jensen House
43 Commercial Rd
Poole, BH14 0HJ
01202 237237
info@calcinotto.co.uk
www.calcinotto.co.uk

Client
Gleeds (Reading Borough Council)
Project Title
Arthur Hill Swimming Pool
Drawing Title
Drainage Layout

Drawing Status

For Tender

Originator No.	Rev by	Chk by	Scale
114038	JH	PW	1:125 @A1

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

114038-CAL-XX-XX-DR-D-0100

Revision

T3