



SIMON DENT ASSOCIATES

Consulting Engineers to the Civil and Water Industry

SuDS Verification Report for
Swallows Gate Development at
Dappers Lane Angmering
West Sussex BN16 4EW

GD Homes Ltd
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West Sussex
BN16 4EU

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Compiled by Simon Dent B Eng (Hons) – Senior Partner

ISSUE	DATE	COMPILED	CHECKED
P1	29.11.2021	SAD	SDA

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EXECUTIVE SUMMARY

- The site uses a piped storm water drainage system to a final flow controlled outfall of 4.3 lit/sec
- Balancing of 100 year + 40% climate change flows is supplied by attenuated storage fitted using geocellular crates.
- Porous pavements are used to source control flows to the system.
- A planned SuDS management plan will be in place.
- Our assessment is that the system is fit for purpose as a SuDS scheme for this development.

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1.0 PREAMBLE

- 1.1 This verification report has been prepared by Simon Dent Associates (SDA) for the client GD Homes Ltd (GDH) as third party scrutiny of design and installation by others at the above site in Angmering West Sussex.
- 1.2 The report responds to the request made in the planning condition no. 5 as stated below:-

Condition 5 of approval ref A/142/16/OUT:

Immediately following implementation of the approved SuDS scheme and prior to occupation of any part of the development, the developer shall provide the local planning authority with as-built drawings of the implemented scheme together with a completion report prepared by an independent engineer that confirms that the scheme was built in accordance with the approved drawings and is fit for purpose.

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2.0 DESKTOP REVIEW

The storm water and foul water design has been prepared by CGS Ltd, a civil engineering design practice based in Chichester, West Sussex.

The site is a greenfield development of 18 nr. mixed size dwellings of affordable terraced housing, semi-detached and attached houses along with access road, footpaths, green gardens, porous and non- porous surfacings.

The storm water design collects all roofs and surfaces through porous surfaces with pipes from roofs and channels and gullies from other hardstandings to connect to a final flow restricted connection of 4.3 lit/sec before connection to a local watercourse.

Attenuated balancing of flow volumes is afforded through 2 nr. offline geocellular storage below ground to offer the 100 year + 40% climate change storm providing 21.28 cu.m and 80.08 cu.m combining to a total storage provided of 101.36 cu.m storage.

In addition patios to the rear are shed onto the garden via perforatd land drain wrapped in stone and geotextile and topped with top soil and turf.

Tanks are impermeable and wrapped in geotextile and geomembrane.

The final outflow is controlled with a Hydrobrake TM, as model no. CTL-SHE-0097-4300-1095-4300 as Hydro Research manufacturers.

The site storm water drainage had been jet flushed and cleaned a week prior to our visit.

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3.0 SITE FINDINGS

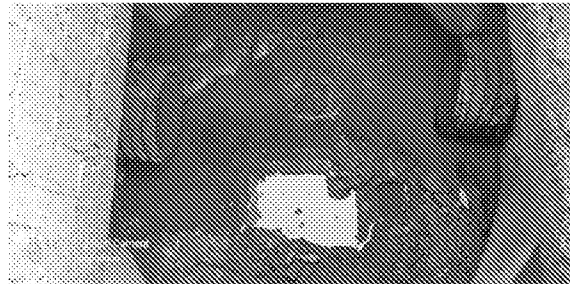
SDA visited the site on Thursday 25th November 2021. Weather was dry and bright.
All storm water chambers were lifted as part of the design check and below is the summarised table of comments and works needed to be carried out.

Glossary of terms used:-

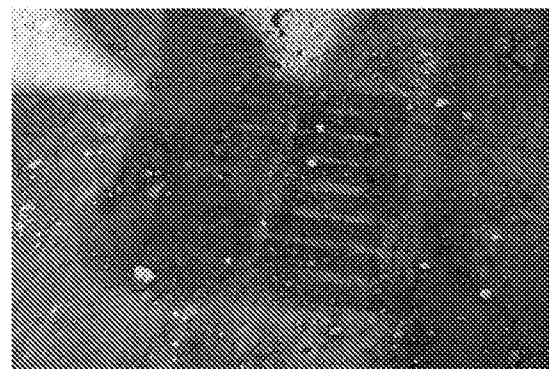
HS	Holes to be sealed around pipe entries into chamber
NI	Chamber or feature not installed
OR	'O' ring to be secured
TP	Trim inlet/outlet pipes to chamber wall – To prevent standing upon and possible breakage by operatives
CC	Chamber needs cleaning
GC	Gully requires cleaning
SW	Surface Water
MH	Manhole
DC	Drainage channel
YG	Yard gully
RG	Road gully
RE	Rodding eye
SW CP	Storm water catchpit
SW PPIC	Storm water polypropylene inspection chamber

SuDS feature Ref	Description of feature	Residual works to be carried out
S7	SW CP	TP CC HS
S9	SW CP	TP CC HS
S10	SW CP	TP CC HS
S7	SW CP	To be uncovered
S6	SW CP	TP CC HS
S5	SW CP	TP CC HS
S4	SW CP	TP CC HS
S3	SW CP	TP CC HS
S2	SW CP	TP CC HS
S1	SW CP	TP CC HS
S11	Storm water flow control chamber	Hydrobrake fitted, clean tag label for bypass door and secure wire – TP CC
S21	SW PPIC	OR
AT1 & AT2	Attenuation tanks	Confirm that tanks have impermeable geomembrane liner installed and vent pipes fitted
RE	Rodding eye	RE in SE corner plot to have RE finished at ground level with cover plate
S33	SW PPIC	Unable to find this chamber – confirm it has been installed.
S39	SW PPIC	Unable to find this chamber – confirm it has been installed.
RGs	All site RGs	Where gully gratings have been fitted the pots must be thoroughly cleaned out by tanker.
F33	Foul PPIC	Although not part of SuDS, this chamber will need the permeable blocks to be resin cemented into the cover to prevent movement

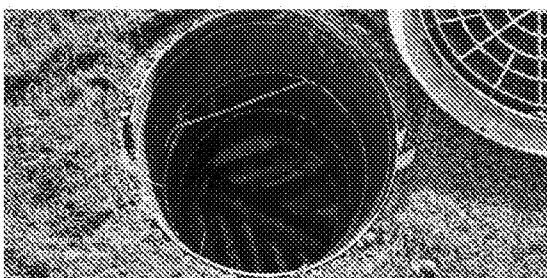
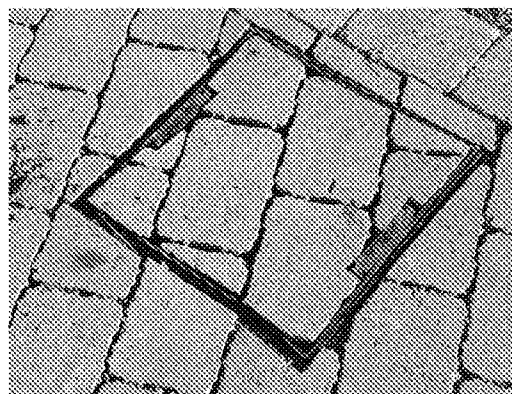
Below are photos of the various issues SDA found on site.



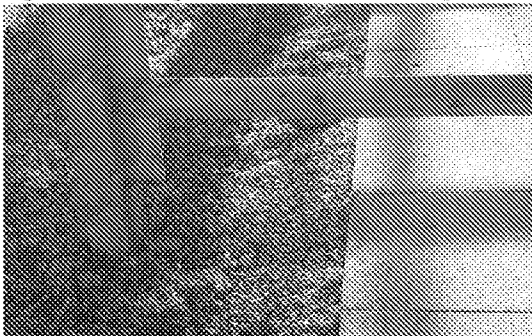
Figs 1, 2 - Pipes to be cut back to prevent being stepped on and chambers requiring sucking out of site debris



Figs 3, 4 – Rodding eye to be cut and have plate fitted and road gullies need cleaning & tankering



Figs 5, 6 – O ring to be fitted to S21 and permeable blockpave to be secured to F33



Figs 7 – Granular land drainage trench at edge of patios (to be topped with topsoil and turf)

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From the CCTV report attached it can be seen that the pipe runs were all cleaned.

There are slight relocations of chamber of little consequence which can be indicated on the 'As Built' drawing for record purposes.

All non-visible SuDS elements such as geocellular structures have had their installation recorded photographically and we are satisfied that from these images, delivery notes and purchase orders (See Appendix B) that the installation is as designed.

Although already cleaned prior to our visit, it is clear that as the development is still in its final stages as a working site, cleaning operations will be ongoing until practical completion of the whole site.

The above observations are considered residual and the developer advises they will be seen to as final snags to be remediated.

NOTE: IT IS IMPORTANT THAT ALL CLEANING OUT OF GULLIES AND CHAMBERS ARE NOT SIMPLY FLUSHED DOWN THE DRAIN BUT THEY MUST BE REMOVED BY GULLY SUCKER/TANKER.

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4.0 SUDS MAINTENANCE PLAN

There are a few drainage elements within a SuDS scheme, namely:-

Geocellular storage tanks – These offer the balancing attenuation volume required when flows are restricted from site. These are tanks wrapped in an impermeable geomembrane and placed below ground. They are inaccessible once installed and so as much should be done to mitigate silts to these features.

Catchpits - These are chambers with pipes entering and unbent chamber with sump of 300mm and outlet leaving at similar level. These chambers are used frequently on the system to mitigate the chance of silts migrating through the system to the geocellular features.

Drainage channels – Grated channels with trapped outlets to the storm system

Road Gullies – Grated deep pot gullies with trapped outlets to the storm system

Yard Gullies – Grated shallow pot gullies with trapped outlets to the storm system

Each require maintenance and below is a maintenance table of what should be carried out and how often.

Schedule	Action	Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Twice a year
	Common roads and driveways & other hard standing areas to be swept clear of debris, to prevent possibility of blockages to the receiving drainage systems.	Twice a year but monthly during winter
	Debris removal from gullies & silt pits, channel drains	Twice a year, particularly, after autumn leaf fall
	Lift and inspect receiving manholes to check for any blockages.	Yearly.
Remedial Actions	Repair any damaged gully gratings or silt pit covers.	As required.
	Replace / fix any loose channel drain covers.	As required.
Monitoring	Check hydrobrake operation and by pass door	Twice a year
	Clean pipework and chambers	Yearly
	Carry out full CCTV survey to confirm ongoing integrity of all drains.	5-yearly intervals.
	Inspect all gullies and silt pits & drainage channels during the CCTV survey.	

5.0 SDA ASSESSMENT

- 5.1 From what we have seen both on site and in record evidence, the installation appears to be in keeping with the intended design and we believe to be fit for purpose.
- 5.2 We are advised that the aforementioned residual items will be completed by the developer.
- 5.4 The SuDS maintenance plan will be in place with the residents for the upkeep of the drainage features.

----- End of Report ---

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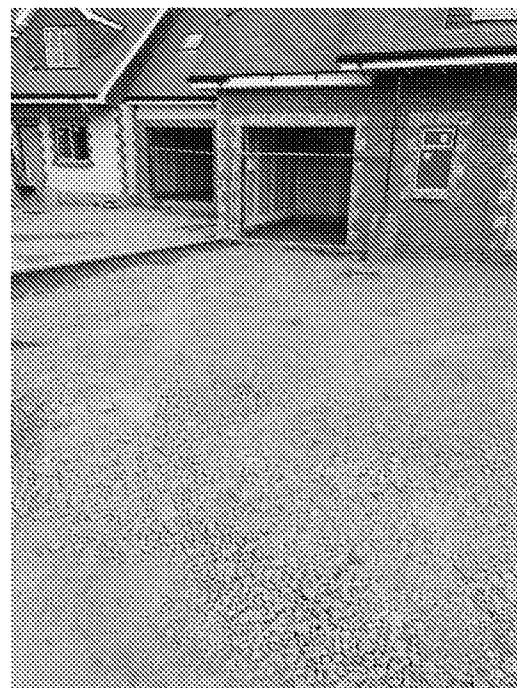
Appendix A – CGS Drainage drawing C-100

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Appendix B – Site Records of tanks and permeable pavement installation



Figs 8 & 9 – Installation of tank AT2



Figs 10 & 11 – Installation of permeable paving

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Appendix C – CCTV Drainage report of all site drainage pipework

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