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[REDACTED]

Hi Paul

Thank you for the comments. Please find attached revised drawings and calculations.

We still need to send CCTV info, which is being undertaken today and SuDS report as we are waiting on manufacturers info. If you are able to review the rest however that would be appreciated.

Comments below in blue.

Kind regards

Chris Slade **FIHE**

CGS Civils Ltd

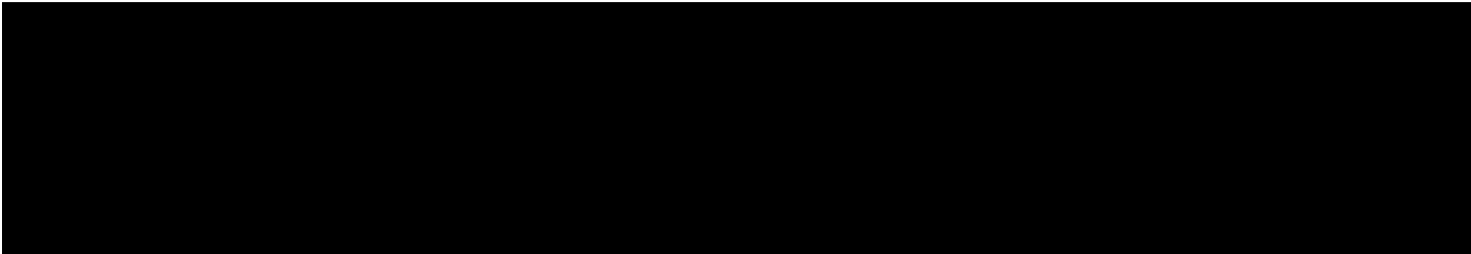
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Drainage Design | SuDS | Flood Risk Assessments | Highways | External Works

Richard Cobden House | Lion Street | Chichester | West Sussex | PO19 1LW

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Hi Chris

Comments on your proposals;

1. I am still awaiting WSCC to review the findings of the CCTV survey/jetting – I will contact you again once I get their feedback. The one thing that is clear, is the abundance of tree root issues, as expected. Agreement on this matter is critical to the whole scheme. - Further CCTV being undertaken today. This info will be with you shortly.
2. Please provide confirmation from our tree officer confirming that the tank is outside the existing and future root protection zones - Tree officer copied in.
3. Specify tank inlet and outlet invert levels on the layout plan - Done
4. New 150mm connection to 225mm highway drain to connect at soffit to soffit level. Make this clear on the layout plan - Done
5. Provide backdrop construction detail - Done
6. Add suitable note 'all connections not to manholes to connect via oblique junctions as per your construction details'. - Added
7. Pipes downstream of tank encroach into root zones. Please adjust as necessary to ensure they are not within existing or future tree root protection zones. Length S10 to HWD will probably need to be lengthened to achieve this and will require a 150mm concrete bed and surround (add note) to protect against root intrusion. Please indicate the clients proposals (on the plan) in respect to the vegetation in that area. - Adjusted.
8. Floatation calcs mention groundwater 1.3m bgl. Is this the peak recorded winter level at that location? - Yes. The pit was regularly inspected and this was the highest recorded level.
9. Existing manhole covers of IC1 and IC3 have broken covers as recorded on the CCTV survey and from visual inspection. Please could these be replaced in a similar manner as proposed for the manhole being connected to. Add locations/notes on plan. This will form part of any agreement under item 1 - Done.
10. Show permeable paving finished surface levels and base levels on plan - The finished levels are on the engineering layout plan and the depth is shown on the details sheet. Adding further notes to the drainage layout will clutter it.

11. Permeable paving – provide permeable geotextile layer between binder course and sub base to prevent migration of fines - This is not in accordance with the detail from Addafill and not usual. A geomembrane is at formation level.
12. Show finished road levels - Done.
13. Trees on southern boundary – pipes are within the root zones here – indicate proposals for these trees. Further discussion will need to be had and these will include our tree officer - Noted. This will be agreed with tree officer.
14. Provide manhole as close to the tank as possible on incoming pipe and provided the vented cover at this location rather than the one shown at S5. Manhole to also include a sump. Show ventilation link pipe on plan. Also alter construction details to suit this arrangement - Done
15. Provide manhole as close to the tank as possible on the tank outlet pipe - Done
16. Specify pipe materials of non-adopted drainage - Done
17. Specify gradient manhole S2 to gully - Done
18. Where pipes take flow from more than one property, connect these to a manhole on the carrier drain, rather than a junction - Done
19. Show plot numbers on plan - Done
20. Geosynthetic encapsulating polystorm unit – provide technical brochure extract detailing the tanking spec - Attached.
21. Add general note regarding manhole cover grades ie. grade and use - Done
22. Type B manhole – currently not being used anywhere? If being used, indicate where and specify step rungs/min 2 courses brickwork under frame and max. 4 courses. If not to be used delete from drawing but keep rocker pipe table for other manholes - Deleted.
23. Catchpit manhole – Specify base slab thickness/concrete grade. Indicate clear opening access dimensions - Done
24. Hydrobrake manhole – fully detail as per details on/required for type B manhole ie. base thickness, brickwork, cover, cover slab, ring diameter, concrete surround, etc - Done
25. Driveways are falling towards the properties. Whilst the sub base water is being collected by fin drains, additional measures need to be put in place to protect the property/garages should the permeable surface become blinded and ineffective. I would suggest a decent channel drain - Agreed. Channel drain added.
26. Catchpit required upstream of hydrobrake chamber (length S9 to S6) - Done
27. Provide manufacturers technical data sheet for hydrobrake. Due to the low flow rate, and the likely small diameter hydrobrake orifice, we may need to consider a vertical filter upstream to help prevent blockages - On SUDS report.
28. Manholes S9 and S22 – sealed covers noted. Can adjustments be made to reduce predicted water levels (for the 100yr+40%) in the system here? and raise cover levels further? - Sealed covers removed. From previous revision.
29. Microdrainage calculations - All done.
 - a. Use ratio r of 0.35
 - b. Provide revised calcs based upon the alterations to the system discussed in the above comments.
 - c. Provide network plan or add pipe numbers to layout plan.
 - d. Check all details in pipe network match what is shown on the layout plan ie. steep gradient shown S6 to S10, some cover levels and other gradients differ.
 - e. Provide catchment plan (to include m2 areas) to support calcs.
 - f. Label permeable pavement nodes on plan.
30. Maintenance manual - All done but waiting on info for the Storm Shark filter chamber. To be issued in due course.
 - a. Modify as necessary to take account of the alterations to the system discussed in the above comments.
 - b. Include channel drains (specifically) if they are to be installed and their reasons why.
 - c. Make particular mention of silt traps and the importance to keep them emptied ie. prevent a majority of silt entering the tank.
 - d. Include filter upstream of hydrobrake and its importance if one is specified.
 - e. Include recorded winter groundwater levels.

Look forward to receiving your revised details. Any questions, let me know.

Regards

Paul Cann
Principal Engineer (Drainage)



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Hi Paul & Sarah

Hope all is well with you both.

Just wondered how this check was coming along? Please do let me know if you need any further information.

Kind regards

Chris Slade **FIHE**
CGS Civils Ltd



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Hi Dean

Please find attached latest drainage layout, details and calculations for the above scheme for submission to Arun DC.

Kind regards

Chris Slade **FIHE**
CGS Civils Ltd



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