

From: Laura Gibbons
Sent: 23 June 2020 13:56
To: Planning.Responses [REDACTED]
Cc: Simon Davis [REDACTED]
Subject: N of Summer Lane P/35/20/DOC & P/37/20/DOC

Dear Simon,

We have the following comments regarding the revised surface water drainage details submitted for P/35/20/DOC and P/37/DOC.

Key

Drainage Comments From Paul Cann (12th May 2020)

RCP Response Not further action (05th June 2020)

RCP Indicate Information will be provided by Drew Smith (5th June 2020)

RCP Response 3rd July 2020

Further ADC drainage comments. N.B. Strike throughs indicate comments that have been resolved.

1. Further to the site meeting with interested parties on the 22nd January 2020, I can confirm that we accepted the principle of the surface water drainage scheme ie. To connect part of the site into the northern boundary ditch and for that ditch to be redirected across the site via on the onsite suds and ultimately reconnecting to the ditch on the southern boundary. This agreement was on the basis that offsite works would be undertaken by the applicant, subject to our approval and landowner agreements. This was to be progressed by having a further meeting with all interested parties/landowners to agree the way forward and this was to be arranged by the applicant. To date, I am not aware of any progress in this respect, but is critical to the scheme. Drew Smith providing separate response. *Without evidencing that the receiving watercourses are in an appropriate condition currently or as a result of completing further works the proposals are unacceptable. The proposals are reliant on water getting away, although flows are restricted, volumes will increase as a result of the development. As a result, without appropriate measures the development could increase offsite flood risk. Please re-engage with us regarding the previously agreed works.* Drew Smith Response as follows: *"Drew Smith note your comments and the email from Simon Davis dated 29.06.20 confirming that you will not refuse the resubmission of the drainage conditions on the basis of the off-site works, we will respond separately with our comments."*

2. Infiltration to ground was ruled out due to the presence of high groundwater and known ground conditions. – Note, though it should be noted that we have still sought to use some shallow infiltration available per the shallow infiltration testing carried out, thus the Type B permeable paving systems have been proposed for parking bays, making use of the low permeability as well as a positive outfall discharge to the main drainage system. This follows the previous detailed consultation with the ADC Drainage Officer to promote infiltration measures are possible. *Okay, construction detail drawing requires review, please supply.* Drawing 322 enclosed indicating Permeable block paved construction detail with connection to main drainage system.

3. Provide full details of the proposed remediation works to the northern ditch and Crayfern outfalls.

... reference to be made to the OWC application and associated OWC response 22/05/2020 *Cutting of headwall aprons and treating exposed reinforcement unlikely to provide a good long term solution, who is then going to be responsible for maintenance, if this is Crayfern then all proposals will require their approval too. Reconstruction may be better. Please provide details of anticipated design life of net gabions. Provide details of how future maintenance of ditches with this reinforcement will be undertaken- risk of damage. Have these proposals been run by an ecologist? Drew Smith response as follows: "This point is being dealt with under the OWC application." Design Life of rock mattress nets stipulated in point 6.*

4. Existing outlet from northern ditch – detail how this is being incorporated into the scheme.

Indicate pipe diameter and invert level too. I would suggest that a manhole is constructed to provide a robust means of access. **Drew Smith recommissioned survey to ensure topographic survey picks up this pipe.** Note this pipe is being incorporated within one of the new headwalls from the ditch thus should not need a further manhole constructed on this. Pipe has been surveyed as having an invert of 3.70 and connects to Headwall SW-14 as indicated in drawing 441.

5. Section through swale (Drg. 432) – indicate top predicted water level. – Top water level added to typical section. Okay, will be reviewed against calculations when network details are clearer. Noted.

6. I note the proposal for basin/swale link pipes and inlets to discharge into gravel filled channels. Instead, I would like to see the gravel filled channels to be either open channels or a perforated pipe arrangement of suitable diameter/headwalls. Gravel filled channel amended to open channel. Note channels have 1 in 1 side slopes so proposal includes gabion mattress along sides to prevent erosion and stabilise channel slopes. Is there potential for slackening the slopes to remove the need for the erosion and stabilisation? If not please detail the anticipated design life of the nets, anchoring details, etc. Will these proposals still meet the ecological requirements for the site, engineered bank in areas that are going to be wetter for longer will preclude burrowing of water voles. Slackening of slopes is not possible due to the constraints of space available and would entail works within 3rd party land. Salix advise: "The Design life of the UV stabilised mattress nets is a minimum of 60 years with upwards of 100 years potential if covered with sediment/vegetation."

7. Southern ditch to which the ultimate outfall connects (Drg. 431) – show proposed ditch bed levels and invert level of existing 300mm culvert downstream. As much freeboard as possible needs to be achieved between the ditch bed and the connecting pipes invert. Refer to drawing 421 showing regrading of southern ditch to gain freeboard. Circa 0.49m freeboard shown, okay. Noted.

8. Northern boundary ditch – Indicate true bed levels and all Crayfern outfall inverts. Per OWC – will be provide a copy of these along with this response as well . Circa 1m fall from crayfern inverts to proposed bed level. Design will be carefully reviewed in these areas once point 6 is agreed. Noted.

9. All headwall grilles to be cranked as opposed to be flat or just sloped faced. Headwalls SW-4, SW-5, SW-9, SW-13, SW-29 and SW-32 updated to cranked grilles. Headwall SW-9 cross-section grille not shown (layer not visible?), please ensure this is visible on drawings. Please remove note to Sewers for Adoption, please add construction detail showing typical grille, ensuring that bar spacing, materials, point of lock are shown. Headwall SW-9 cranked grille now shown. Typical grille construction detail added indicating Material, centre spacing and point of lock added.

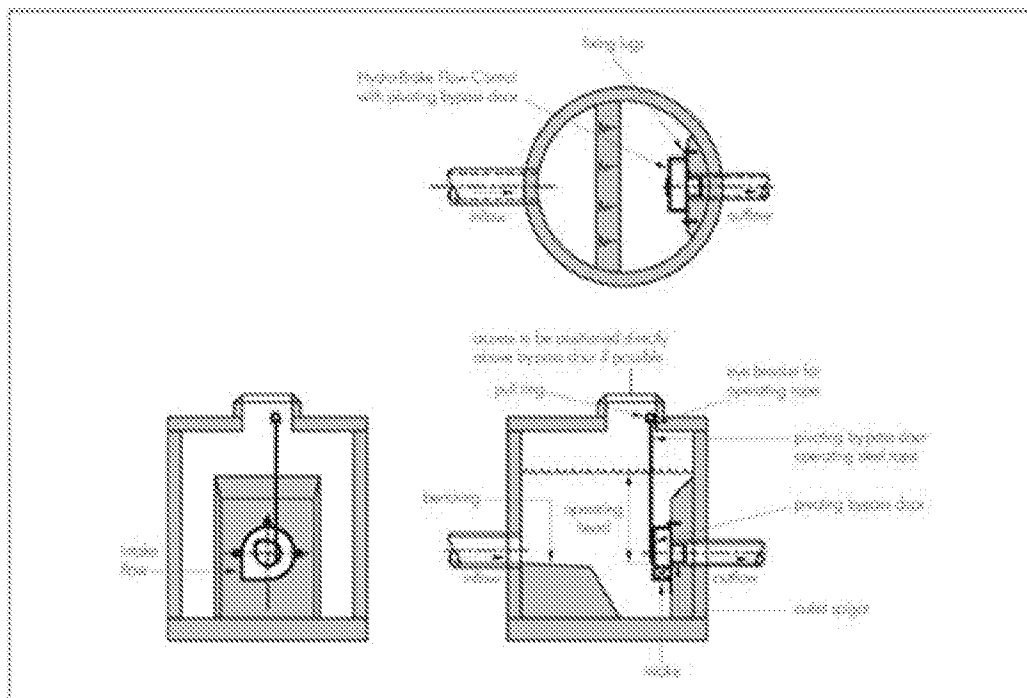
10. Provide construction detail for headwall SW-14. Per OWC -- will be provide a copy of these along with this response as well. *Unclear where this is included in details, please provide.* Headwall SW-14 details indicated on drawing 441.

11. Headwall SW-1 construction detail – remove grille. Indicate proposed ditch bed level , pipe invert level and diameter. Concrete capping to be ST4 or similar approved. Per OWC -- will be provide a copy of these along with this response as well *Invert at base of ditch. Can ditch bed be lowered in this location, or outlet raised?* Grille omitted. Ditch bed level 2.538 incoming invert level 2.900.

~~12. All headwalls – 50mm cover required to reinforcement. Drawings 433 and 434 updated with concrete cover note increasing from 40mm to 50mm. Okay.~~

~~13. All headwalls – Dimension and specify concrete for hand railing foundations. Dimension handrail height above ground level and offset from brickwork. Drawings 433 and 434 updated with handrail dimensions and foundation annotation. Okay.~~

14. All hydrobrake chambers – pull handle to be attached to a point vertically above the hydrobrake. It's not clear how this is possible when the opening is offset from the hydrobrake and the pull handle attaches to a bracket at the manhole opening. *Access should be positioned directly above bypass door, as per hydro international standard details.* The rope runs through an eye bracket to allow operation. The alignment of the rope allows is aided by the eye bracket which is common practice. A 675x675 clear opening is required for stepped access to the base of the manhole hence the manhole opening cannot be directly over the hydro brake but the pull rope and eye bracket have now been positioned as close as possible directly above the hydrobrake in both cases.



15. If gabions are to be utilised as part of the solution, bearing in mind item 6 above, then specify wire thickness/protective coating. *Salix gabion mattress detail added. Wire gabion mattresses preferred.* Noted-but Salix rock mattress solution comprising of 3mm Synthetic Polyethylene braided knotted nets is to be used due to it suitability.

16. Land drainage consent is required for the three headwalls being constructed in the banks of the existing ditches. Please submit the application accordingly. OWC application currently ongoing. *Awaited.* Noted.

17. Incoming pipes at headwalls SW-4, SW-5 and SW-32 – increase freeboard between pipe inverts and basin/swale bed. The base of the pipe work connects to the drain bed level, which is specifically deepened to accommodate the incoming pipework levels and eventually connect onto the downstream watercourse. This is a similar arrangement to the main drainage channel running through the swale associated with headwalls SW9 and SW13. *Understand the difficulties here, however minimum of 150mm above pipe inverts and base of swale should be provided.* Local deepening of the bed levels to give 150mm freeboard to SW-4, SW-5 and SW-32. Note that this will mean the channel will be continually wet within the in places but is no different to peak groundwater levels within the channel base at periodic times of the time of the year.

18. SE corner of site – investigate possible presence of culvert from Sylvia Close. Additional topographic survey of ditch which runs along northern side of the site and not indicated the presence of any incoming pipes from south or east of the site, other than the Crayfern Development site to the north. *Visual inspection/ topographic survey are unlikely to identify such structures. Would suggest ongoing work, identifying any signs of dampness after heavy rainfall in the summer, etc.* It would be beneficial for the Site Manager to undertake weekly inspections and after heavy rainfall during summer months within the North East portion of the site when onsite, and to notify the engineer immediately, should any culverts be discovered whilst undertaking construction activities. Until such time only the topographical information and data we currently have to hand can be worked from.

19. SE corner access road – where Summer Lane culvert passes beneath, provide CCTV results of the pipe section, so any necessary remedial work can be identified and provide details of how the pipe will be protected from vehicular loadings. – Paul Basham Associated to provide supporting information. *Awaited.* These offsite works were undertaken as part of an OWC application and vetting process by which I enclose the OWC consent for your reference.

20. Headwall construction details for eastern section of site – include pipe outlet invert level and true ditch bed level. Per OWC – will be provide a copy of these along with this response as well Enclosed as part of information pack.

21. Provide construction details for all manholes, pipe bedding, rodding eyes, permeable paving, gullies, fin drains, diffuser units, catchpits, backdrops, RWP's, etc. – This information is provided on drawing DSM-E4761-460 to 461, DSM4761-410-411 and DSM/4761/322 *Only have a record of DSM-E4761-461. Please supply others, full review will be undertaken.* Enclosed as part of information pack.

~~22. Specify materials for all pipes. These are specified on the drawing notes on the drainage layouts DSM/4761/451-455.~~ *Okay.*

23. Show finished floor levels, permeable paving finished surface levels and base levels. This information is provided on the external levels drawings DSM/4761/551-505. The base levels for the permeable paving are a constant relative depth to the finished levels as the make ups are constant,

as it's a type b permeable paving system *Please supply these plans.* Enclosed as part of information pack.

~~24. All connections not made to manholes to be connected via oblique 45 degree junctions. Add note. Note 16 added to domestic drainage layouts. Okay.~~

~~25. Road gully adjacent SW-24 – not located within road channel. This has been addressed. Road gullies removed.~~

~~26. Catchpit manholes required immediately upstream of all connections to permeable paving. Where RWP's connect directly in, a bottle gully or similar can be detailed with the downpipe discharging onto a grated cover to remove larger items of debris. Bottle gully proposed on all upstream connections to the diffuser units. Okay.~~

~~27. SW 24 to SW 26 – improve gradient to min 1/167 or upsize to 300mm diameter maintaining similar gradient to that proposed. gradient and upstream invert from 1 in 170 to 1 in 167. Okay.~~

~~28. Plots 10 to 13 – connect to a manhole (in the road). Okay.~~

~~29. All drains to be 100mm diameter unless otherwise specified. Add note. Note 11 in the drainage drawings address pipe diameter requirements for both foul and surface plot drainage. Okay.~~

~~30. Add invert levels to all rodding eyes. invert levels added to all rodding eyes. Okay.~~

~~31. All pipes to connect soffit to soffit unless otherwise stated. Add note. Note 17 added to domestic drainage layouts. Okay.~~

~~32. Manhole rear plot 15 – reposition onto pipe connection. Repositioned onto pipe connection Okay.~~

~~33. Rear plots 31 to 35 – connect drain to manhole in road. Same for plots 21 to 24. Connections amended to connect to Manhole S21. Okay.~~

~~34. On layout plans, add invert levels to manholes in road, including invert levels of all connecting pipes. Invert levels added to every all manholes in carriageways. Note that invert levels of connecting drainage is all provided on manhole schedules with clear schematics. Providing this on the layout drawings will cause this drawing to be a bit too cluttered. Okay.~~

~~35. SW-19 to SW-20 – Improve gradient to achieve 1 m/s velocity at full bore. This has been reviewed however the current design has a 450mm at 1 in 450 grade. We can't raise further as we need to connect to northern ditch. This is below self-cleansing velocity, is anything possible to improve gradient? Gradient revised to 1 in 400 between SW-18 to SW-20.~~

~~36. Road gully laterals – stipulate 150mm diameter pipes. -Outlet size is specified on road gully detail DSM/E4761/322 Please provide detail. Enclosed as part of information pack.~~

~~37. Rear plot 30 – connect RWP to head manhole. RWP connection amended to head manhole Okay~~

~~38. Rear plot 27 – pipeline seems to take a long route – not sure why? Pipeline amended to reduce pipe length. Okay~~

~~39. Drain rear plot 28 – move pipe as far as possible away from trees. Pipe runs moved closer to plot, away from trees. Okay.~~

40. SW-16 to Headwall – improve gradient to min. 1 in 400, ensuring as much freeboard as possible between pipe invert and ditch bed. Longitudinal section doesn't appear to show the SW-16 to SW-15 arrangement as per the layout plan ie. SW-15 is a headwall not a manhole. Per OWC – will be provide a copy of these along with this response as well Drawing 452 enclosed now indicates Headwall. This gradient is actually 1 in 277 and has been updated.

41. Rear boundary fences of plots 29, 30 & 32-35 need to be kept 3m from top of ditch bank for future maintenance access and compliance with our byelaws. Per OWC – will be provide a copy of these along with this response as well. This follows the approved planning layout. Future Maintenance concerns relating to these extents will be clarified in the maintenance strategy. *Layout is not compliant with byelaws. Drew Smith response as follows: "The layout was given planning consent, so if it did not adhere to byelaws the Arun District should have requested this amendment during determination, along with other revisions that were made due to comments. However, Drew Smith are currently exploring the option of an easement within the gardens, some of which are being transferred to Arun District Council as the affordable housing provider."*

42. Outside plot 63 – gully connections need clarifying. Individual gully connections from double gullies at low point added. Okay.

~~43. Plot 66 – RWP needs connecting to a diffuser unit and RWP on NE corner needs connecting to the head manhole. This has been reviewed but is restricted by invert depths. Okay.~~

44. Headwall SW-32 – investigate connecting the 450mm and 225mm pipes together via a manhole before connection to the headwall or alter upstream arrangement to ensure both pipes connect to headwall in parallel. – Already actioned as part of subsequent update

~~45. Manhole S46 to be catchpit. Actioned. All manholes upstream of hydrobrake or headwalls shown as catchpit. Okay.~~

~~46. Connection into SW33 – gradient 1 in 5 – connect via backdrop? to slacken gradient. – This is a secondary plot drainage connection, would not recommend adding a back drop for a single connection or deepening this. The flows associated with this single RWP connection are low and would not feel this will cause excessive velocity to the downstream manhole and network arrangement. Okay.~~

~~47. Road gullies east of plot 84 – connections need clarifying. Individual gully connections from double gullies at low point on southern side of carriageway added, northern gullies connect via branched connection to avoid clash with manhole F42. Okay.~~

~~48. Connections from plot 69 – connect to manhole SW40 and slacken gradient (currently 1 in 3). This is a secondary plot drainage connection, would not recommend adding a back drop for a single connection or deepening this. The flows associated with this single RWP connection are low and~~

~~would not feel this will cause excessive velocity to the downstream manhole and network arrangement. Okay.~~

49. Rear plot 50 — move manhole S26 onto connection. — ~~Already actioned as part of subsequent update. Okay.~~

50. Permeable paving requires an impermeable membrane wrapping (include on construction detail) as per item 2 – this is a Type B permeable paving. Detail is provided on drawing DSM/4761/322. Note that the base of the permeable paving is higher than the recorded highest groundwater level of 4.08mAOD. *Okay, will review drawing when available. Enclosed as part of information pack.*

51. Manhole south of plot 48 — move southwards onto RWP connection. ~~Redding eye south of plot 48 offset from RWP connection. Okay.~~

52. RWP's between plots 47 & 48 — points of connection not clear. ~~RWPs have branched connection to pipe run to the north (in rear gardens). Okay.~~

53. Plot 47 parking space — specify as permeable paving. ~~Permeable Paving added to Plot 47 parking bay. Okay.~~

54. Connections from plots 51-52 and 74 — slacken gradients — connect to manholes in road via backdrops? ~~These are secondary plot drainage connections, would not recommend adding a back drop or deepening this. The flows associated with these are low and would not feel this will cause excessive velocity to the downstream manhole and network arrangement. Okay.~~

55. Plots 52, 53 & 75 — Move head manholes onto downstream RWP connection. ~~Manholes adjusted. Okay.~~

56. Plot 49 to diffuser unit — remove bend. ~~Already actioned as part of subsequent update. Okay.~~

57. SW43 & SW45 to be catchpits. ~~Actioned. All manholes upstream of hydrobrake or headwalls shown as catchpit. Okay.~~

58. SW43 to SW 5 — show gradient and pipe diameter on plan. ~~Pipe gradients and diameters shown on pipes. Okay.~~

59. Plot 80 — slacken pipe gradient on west side of property. ~~This has been actioned. Okay.~~

60. Manhole west side of plots 78 & 79 and plots 76 & 77 — move manholes onto connections downstream. ~~Manholes moved onto connections. Okay.~~

61. Provide silt trap at SW 3 headwall to help protect the hydrobrake. ~~Headwall redesigned with sump at base which will provide silt trap. Okay.~~

62. Two sets of microdrainage calculations have been submitted. One set in the drainage strategy document. It is assumed that the Nov 2019 set is the most current. Please submit a new set taking into account the comments above. It would be useful for some commentary on how the system has been modelled. How the Crayfern outfall have been included in the modelling and how groundwater flows have been allowed for in the calculations. Certain items that need clarification are the

hydrobrake at SW-10 being modelled at 50 l/s as opposed to 10 l/s, the weir control at SW-10 and the 4.6 l/s hydrobrake at GCF-04. Whilst I appreciate that pipe network numbers have been added to the drainage layouts, for ease of reference, it would be useful to have an overall network plan to support the calculations. Flooding is noted in some areas on the 1 in 100 year storm event – it will need to be proven that this water can be contained on site without detriment to people and property. -Technical Note included with updated information

- a) *Pipe network numbers on drawings do not appear to correspond to MD pipe numbers. Please include MicroDrainage PNs and node numbers on surface water drainage layouts (potentially in different colour to reduce number of amendments, i.e. just add a new layer). It would also facilitate review if the mdx file could be provided. Pipe numbers have been updated on drainage plans and long sections along with updated calculations to cross reference.*
- b) *Please include an impermeable areas plan in dwg format. Enclosed as part of information pack.*
- c) *Invert level of SW-2 is inconsistent with plan. This has been updated.*

63. Maintenance manual – needs updating to reflect the current design. Explain in detail how the drainage system is designed to operate and identify key features (in layman's terms). Other items to include on the maintenance schedule; Maintenance plan updated and included with information

a) Hydrobrake chambers to include sump/sediment removal. *Please specifically detail requirement for sediment removal from control chamber sumps. Now added to schedule.*

b) Bottle gullies associated with permeable paving and their importance to prevent silt entering the paving. Similar applies to catchpit manholes upstream of permeable paving. *Still unclear in document. This is now stipulated in 3) "Maintenance Schedule for catchpits, control chambers, flow control devices and gullies (including bottle gullies)"*

c) Basins/swale – include removal of any tree saplings that seed themselves. *Saplings not specifically mentioned, nuisance plants detailed. Saplings added as part of being managed and removed along with nuisance plants.*

d) Grilles – include clearance after heavy rainfall. *Okay.*

e) Include ditch and culvert maintenance. Culvert under eastern access road, also possibly from Sylvia Close, proposed culverts under driveways fronting Summer Lane. *Please indicate maintenance of ditches for which you have riparian responsibility. Include details of how frequently silt removal should occur, and how this is to be conducted in areas of engineered channel. Maintenance Plan indicating ditches to be maintained by way of Riparian responsibility-Maintenance will accord with the maintenance plan section 9) "Maintenance Schedule Ditches and Culverts" Monitoring and removal of silt is to be undertaken half yearly. It is proposed the drainage channel can be disturbed by mechanical methods as required in order to breakdown and remove silt as required. Adequate access is provided to undertake works with 1:4 side slopes providing easy entry and egress to attenuations basins and swale. Drawing 014 has been provided to indicate ditches which fall under Riparian responsibility.*

f) Cellular tanks are included but are not applicable on this site – please remove. *Still included in plan. Please update to ensure all elements are relevant to this site.* Now removed from plan.

In summary, we do not recommend discharge of conditions 3, 10 or 11 at this time. We are keen to discuss further the layout and lack of 3m buffer zone from fence line near plot 29, 30 & 32-35 to the top of the bank of the adjacent watercourse.

Kind regards,

Laura Gibbons

Engineer, Adur & Worthing Councils

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Adur and Worthing Councils are working in partnership with Arun District Council

