# Joint SCC & Appellant Response to Inspectors Questions on Drainage Matters

# SCC - Red Text

# Appellant - Blue Text

- 1. 'Is this about low versus medium pollution category?'
- 2. Categorisation is important but the features themselves must meet criteria to be considered valid in contributing to that pollution load. CIRIA does not specify for every single criteria a hard number but suggest for example that vegetation should be kept above the height of the 1 in 1 storm treatment event. Correct categorisation is the first step in providing a design that can achieve treatment compliance in addition to volume management.
- 3. Table 26.3 of the SuDS manual has the following footnote:

#### Notes

- 1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.
- 4. Point 6 in the holding objection AD12 was a query on the categorisation of the main distributor road. It has since been agreed that this road should be categorised as 'Medium' not 'Low' as original stated in the FRA AD10.1 due to the number of vehicle movements. It should be noted that this did not result in inadequate levels of treatment being provided.

#### 5. 'What is the requirement for a treatment compliant swale?'

- 6. An example of a treatment compliant swale would have water depths not in excess of the vegetation in the 1 in 1 event, this is typically less than 150mm but can be higher with the correct planting, a retention time of at least 9 minutes, an average velocity not in excess of approximately 0.3m/s. This is important because these criteria influence the form of a swale.
- 7. Guidance of the technical detail for swales is covered in Chapter 17 of the CIRIA SuDS Manual **OT26 (other documents)**

#### 8. 'CIRIA Suds treatment design?'

- 9. CIRIA SuDS manual primary chapter on treatment is 26 but it will refer back to other sections of the guidance in designing specific features. Notably Sections 13 (infiltration systems), 17 (swales), 22 (detention basins), 24 (hydraulic design), and 25 (infiltration design).
- 10. Principles of the simple index approach are outlined in section 26.7.1 of the CIRIA SuDS Manual **OT26**. And is explained in **PoE AP2.1**

#### 11. 'Need correct design for both attenuation and treatment?'

12. Attenuation and treatment are two separate parts of the design and they are not mutually exclusive. It is easier to demonstrate treatment in an infiltrating solution due to the ability to use specialise soils etc to treat inflows. The basins proposed are deep infiltration and thus propose to use a retention system in forebays. Designs often function well in large storm events (1 in 100) in managing the required volumes but are not able to provide a treatment function in the smaller storm events.

# 13. Point 53

14. We are now satisfied that this can be provided as part of the recommended conditions for the strategic network condition. When full development of the strategic network is provided all features will be fully designed and a fleshed out treatment train provided.

# 15. **Point 54**

- 16. We are now satisfied that this can be achieved via the strategic network condition.
- 17. 'Is the 1m depth of attenuation basins as absolute maximum? If so why?'
- 18. Believe there is some confusion here. The 1m refers to the water level. Over this begins the need for larger, deeper basins that are less multifunctional and require features such as knee rail fencing. 1m is considered the maximum desirable water depth for both safety and usability of the scheme. LLFA generally says basins should be no deeper than 1.5m overall but there is exception to this on topographically challenging sites.
- 19. **TF** proof para 6.10 and ref to the DAS please explain as I could not work it out from docs.
- 20. Firstly, I do note that I referenced the wrong page in my proof. If you could please refer to page 100 of the Design and Access Statement AD16. The illustrative option for the spine road on page 100 identifies the road corridor width and its various components, in which it shows the 3.7m swales on either side of the carriageway.
- 21. **TF** proof **7.6** acknowledges the basins could be improved upon therefore please explain how in principle it would be acceptable?
- 22. This is the same answer for the following question on 7.13.
- 23. In order for drainage calculations to be undertaken, we have to make an assumption on the amount of impermeable area that the development will generate. Without a completed site layout, which won't be available at this stage, we assume that 60% of the developable area will be impermeable, which is common practice. This assumption tends to be a conservative estimate (typical values will range may range from 45% to 55%), which in turn will provide a conservative estimate for the storage requirements. Therefore, as the stages of design continue and the site layout becomes more detailed, so to does the total catchment area become more detailed. This then allows for refinement in the attenuation volumes and thus the basin sizes and or shape. In addition to this, the calculations currently map out a simplified network covering assumed 'main routes', missing out large chunks of pipework that cannot be designed until there is an accompanying layout. When these are eventually added in, along with the on-plot drainage features, there will be additional 'storage' built into the network exclusive of the basins.
- 24. These two points in combination would typically lead to a reduction in attenuation requirements and as such amendments to the basin through the stages of design. This is what's meant by 'further consideration' in my proof.
- 25. They are designed to conservative parameters at this stage, to ensure that they won't need to be bigger as more detail is added, only smaller, and as such ensure that all the other area land uses can be accommodated under these conservative parameters.
- 26. I agree that the design at present is conversative, but it is important that all features meet LLFA minimum standards at outline stage to ensure that no precedent is set when carrying forward reserved matters or for other developers on other sites. By meeting

minimum standards at this stage we ensure a smooth transition to full detailed design that benefits all parties in the long run of a site this complex.

- 27. **TF proof 7.13 fundamentally different approach to SCC please explain.**
- 28. Please refer to response above.
- **29.** The table below was prepared by SCC and represents the information provided by the appellant in order to address the 9 points in the holding objection submitted by SCC AD12.

| Points (30-04-2024 HP)            | First information submission    | Second submission prior to | Third submission post proof |
|-----------------------------------|---------------------------------|----------------------------|-----------------------------|
|                                   | in relation to LLFA holding     | first SoCG (04-12-2024)    | of evidence (08/09-01-2024) |
|                                   | objection (initial appeal       |                            |                             |
|                                   | submission) (08-05-2024)        |                            |                             |
| 1                                 | Applicant has confirmed in      |                            |                             |
| A plan of the watercourse         | this document that ditches in   |                            |                             |
| network is included in the        | the site boundary do not have   |                            |                             |
| flood risk assessment and         | onwards connections and no      |                            |                             |
| drainage strategy however it is   | alterations to them are         |                            |                             |
| missing some of the               | planned.                        |                            |                             |
| adjacent to the site. It is of    |                                 |                            |                             |
| vital importance that the         |                                 |                            |                             |
| development does not              |                                 |                            |                             |
| adversely impact the existing     |                                 |                            |                             |
| surface water network and         |                                 |                            |                             |
| thus a detailed survey of the     |                                 |                            |                             |
| existing watercourse network      |                                 |                            |                             |
| should be undertaken. This        |                                 |                            |                             |
| should comprise a walkover of     |                                 |                            |                             |
| the watercourse network and       |                                 |                            |                             |
| trace each from where it          |                                 |                            |                             |
| approaches the site, its          |                                 |                            |                             |
| it to its outfall beyond the      |                                 |                            |                             |
| site's boundaries including       |                                 |                            |                             |
| any culverted sections. The       |                                 |                            |                             |
| plan should be updated and        |                                 |                            |                             |
| ,<br>photos included where        |                                 |                            |                             |
| necessary. Any required           |                                 |                            |                             |
| maintenance to the network        |                                 |                            |                             |
| needs to be highlighted to        |                                 |                            |                             |
| ensure that the new               |                                 |                            |                             |
| development will not increase     |                                 |                            |                             |
|                                   | Applicant has confirmed in the  |                            |                             |
| Z<br>There is a watercourse       | Applicant has commed in the     |                            |                             |
| adjacent highway on the           | parcel does not have a defined  |                            |                             |
| eastern parcel that could be      | watercourse. Applicant          |                            |                             |
| adversely impacted by the         | confirmed that highway works    |                            |                             |
| proposed highway upgrades.        | will be considerate of existing |                            |                             |
| Any upgrade works to the          | constraints. Detailed           |                            |                             |
| existing highway need to be       | information on how this will be |                            |                             |
| carefully planned in              | developed is a matter for       |                            |                             |
| conjunction with existing         | further development stages.     |                            |                             |
| onsite constraints.               | This document in addressing     |                            |                             |
| o<br>The hierarchy set out in the | noints 1 and 2 sets out that    |                            |                             |
| Suffolk SuDS Guide (based on      | deep hore infiltration is       |                            |                             |
| the NPPF and CIRIA SuDS           | appropriate. The applicant      |                            |                             |
| Guide) states that deep           | demonstrates that the           |                            |                             |
| infiltration is a last resort and | hierarchy has been sufficiently |                            |                             |
| should only be considered         | followed.                       |                            |                             |
| once all other options have       |                                 |                            |                             |
| been fully assessed. Whilst       |                                 |                            |                             |

|                                   | r                                | r                              |  |
|-----------------------------------|----------------------------------|--------------------------------|--|
| shallow infiltration and a        |                                  |                                |  |
| connection to a surface water     |                                  |                                |  |
| sewer are understood to be        |                                  |                                |  |
| not viable, a discharge to the    |                                  |                                |  |
| nearby watercourse network        |                                  |                                |  |
| should be considered further.     |                                  |                                |  |
| We would encourage a hybrid       |                                  |                                |  |
| approach being adopted            |                                  |                                |  |
| where surface water is            |                                  |                                |  |
| directed to the nearby            |                                  |                                |  |
| watercourse network where         |                                  |                                |  |
| nossible with deep infiltration   |                                  |                                |  |
| being used where this is not      |                                  |                                |  |
| nossible is adjacent the          |                                  |                                |  |
| railway line Constructing         |                                  |                                |  |
| deen infiltration structures up   |                                  |                                |  |
| to 9m bolow ground lovel as is    |                                  |                                |  |
| currently proposed requires       |                                  |                                |  |
| significant carthworks is         |                                  |                                |  |
| significant earthworks, is        |                                  |                                |  |
| nigher risk and less              |                                  |                                |  |
| sustainable than surface-         |                                  |                                |  |
| based solutions. The deep         |                                  |                                |  |
| infiltration structures also      |                                  |                                |  |
| increase the risk of              |                                  |                                |  |
| discharging pollutants directly   |                                  |                                |  |
| into the ground in an area        |                                  |                                |  |
| highlighted as being              |                                  |                                |  |
| vulnerable to pollution           |                                  |                                |  |
| incidents.                        |                                  |                                |  |
| 4                                 | This point was initially covered |                                |  |
| The greenfield runoff rate has    | by Hannah Purkis in assessing    |                                |  |
| been calculated but is very       | the original FRA. The applicant  |                                |  |
| low compared to the more          | rightly clarified that as        |                                |  |
| typical figure of 2l/s/ha that is | infiltration was to be used the  |                                |  |
| often used. If a restricted       | greenfield rate was not          |                                |  |
| discharge to a watercourse is     | appropriate in the design of     |                                |  |
| progressed then this should       | strategic SuDS.                  |                                |  |
| be reviewed to ensure a viable    |                                  |                                |  |
| rate is proposed.                 | Greenfield rates will become     |                                |  |
|                                   | relevant when assessing          |                                |  |
|                                   | potential runoff from large      |                                |  |
|                                   | areas of SANG but this can be    |                                |  |
|                                   | deferred to the discharge of     |                                |  |
|                                   | conditions covering the          |                                |  |
|                                   | strategic infrastructure.        |                                |  |
| 5                                 |                                  | Applicant demonstrated via     |  |
| -<br>Many of the sub catchments   |                                  | conversation prior to          |  |
| use the more traditional nine     |                                  | submission of revision 2       |  |
| to pond approach which does       |                                  | document and with indicative   |  |
| not incorporate above ground      |                                  | swale cross section on Rev 2   |  |
| conveyance of surface water       |                                  | nlan that strategic swales are |  |
| or address surface water at       |                                  |                                |  |
| source. The strategy should be    |                                  | Applicant also provided a      |  |
| source. The strategy should be    |                                  | Applicant also provided a      |  |
| Supervision the next stands       |                                  | proposed treatment train       |  |
| Subs within the parcels, eg.      |                                  | mulcaling What                 |  |
| raingardens, downpipe             |                                  | reatures/principles are to be  |  |
|                                   |                                  | used at parcel delivery stage. |  |

| planters, tree pits, permeable   |   |  |
|--|---|--|
| paving or swales.  |   |  |
| <b>6</b><br>The simple index approach<br>has been used to assess the<br>surface water pollution hazard<br>potential however given the<br>number of dwellings, a school<br>and community uses<br>proposed on the site, it is<br>likely that the main distributor<br>road will generate a greater<br>level of pollution than can be<br>assessed using this method.<br>The assessment used only<br>applies to roads with less than<br>300 traffic movements per<br>day. |   | Applicants fully modelled<br>Swale and basin (1) has<br>additional check dams added<br>and revised calculations show<br>good retention times and<br>velocities. Swale is deeper<br>than standard and treatment<br>water depth is higher than<br>acceptable in normal swales,<br>but the LLFA is satisfied that<br>when rolled out at detailed<br>design stage sufficient<br>treatment can be provided,<br>particularly in conjunction<br>with basin design and<br>treatment upstream from<br>plots. Applicant had not had<br>check dams prior to this<br>autoriation |
| 7<br>In accordance with the Suffolk<br>SuDS Guide and Suffolk<br>Design for Streets Guide the<br>main access roads should be<br>drained to roadside swales.<br>Cross sections should be<br>provided to demonstrate how<br>space has been provided to<br>ensure this can be<br>accommodated in the final<br>layout.   |   | Applicants Rev.3 plan now<br>notes the swale widths,<br>lengths and provides target<br>design parameters to meet<br>treatment. Prior to this no<br>information on highway<br>swales was provided other<br>than a dashed line.  |
| 8<br>The school plot will require a<br>connection to services and<br>utilities and this often extends<br>to the SuDS network. It should<br>be confirmed with the schools<br>team if they require a<br>unrestricted discharge into the<br>SuDS network as this may<br>result in a change to the<br>current proposal.  | Applicant confirmed that<br>current outline design has free<br>discharge from all parcels into<br>the strategic network. This<br>includes the early years plot.<br>Applicant has included a<br>reference to this on the Rev.2<br>drainage strategy drawing.<br>This satisfies the LLFA as it is<br>easier to provide<br>schools/education with free<br>discharge rather than having<br>an obligation to provide<br>storage. |  |
| <b>9</b><br>The strategic swales and<br>basins should have<br>dimensions provided to<br>demonstrate they are in<br>accordance with the Suffolk<br>SuDS Guide. As many of the<br>parcels are currently shown<br>tobe drained by traditional   |   | Applicant has evidenced<br>swales are appropriately<br>scaled for the level of<br>development as per point 6.<br>Basins are now shown with<br>wet bench and water levels in<br>the northern basins has now<br>been reduced to under 1m.<br>The basins are now compliant  |

| drainage, it is likely that the   | with LLFA Appendix A           |
|-----------------------------------|--------------------------------|
| invert level of the pipes will be | minimum standards and will     |
| too deep to discharge into        | thus be required to meet these |
| surface features and this         | standards at detailed design   |
| should be considered at this      | stage.                         |
| stage to avoid excessive below    |                                |
| ground infrastructure being       |                                |
| required at the detailed design   |                                |
| stage.                            |                                |