



Certificate No: 14272

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Please reply to: Julian Pearson

Your ref:

Our ref: TC/T19360/2021/02

Date: 24 November 2021

Dear Chris Harrison

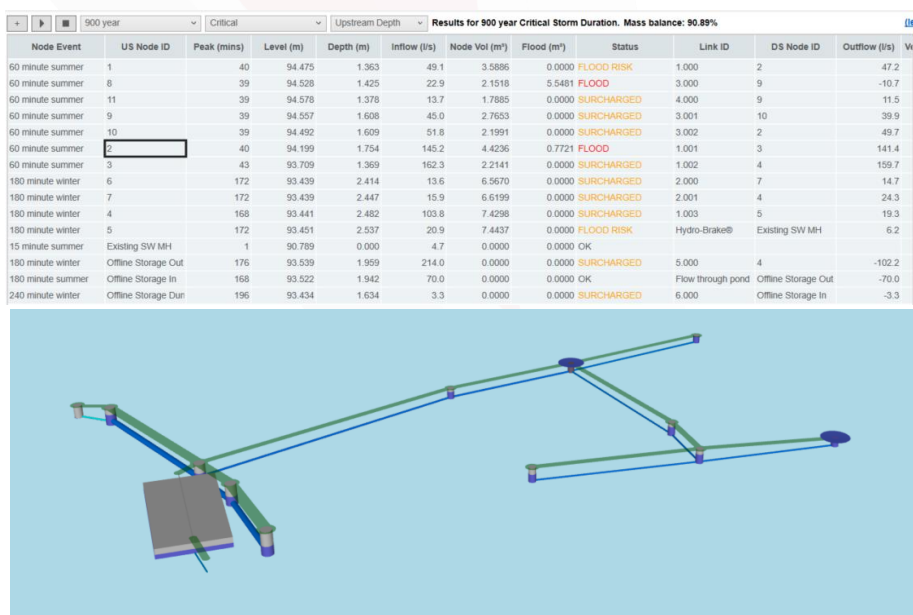
Re: Exceedance Routing at Waters Edge, Whitehaven (Gleeson Homes Development)

It is understood that the exceedance routing has been questioned on numerous occasions in regard to the Gleeson Homes development site at Waters Edge, Whitehaven. This letter has been produced to justify the exceedance routing design through reference and evidence that it is compliant to current guidance and legislation.

The consistent objection on this point, with no justification as to why it is an issue and no reference to guidance/legislation has caused significant delays in the planning application process. We understand this is the only issue left to resolve from the previous consultation response.

The system as clearly stated in the drainage strategy report has been designed to contain a 100-year return period plus a 40% climate change and 10% urban creep allowance.

Below is an extract of the Causeway Flow model for the site. The calculations represent a 1 in 900-year return period of critical duration. The first possibility of flooding occurs in the 1 in 600-year return period above and beyond the design requirement outlined by Cumbria County Council (CCC). Even in the 1 in 600-year return period a maximum of 0.03m³ of flooding would occur from manhole S8. The highway (based on a 4m x 4m area and 0.1m kerb catchment) would provide 1.6m³ of storage to contain the flood before it could start to encroach the footpaths. The buildings FLL's are all raised again above this.



For a return period of this rarity it is likely flooding from the existing highway and housing situated to the east would affect the site before the development were to flood itself.

CIRIA Report C635 – Designing for exceedance in urban drainage – good practice (2006)

The above report is used for designing exceedance routing in new housing developments. Interestingly CCC recommend the use of this guidance and have used it for the development of their own guidance document published in 2017 and referenced later in this letter. Section 7 – hydrological processes and the effects of urbanisation, would argue the use of CV's being set at 1 which has been requested as part of this design ignores the effects of interception, depression, infiltration, and evaporation. This demonstrates that by the design using CV's of 1 and therefore removing any of the aforementioned hydrological processes that the system has been designed above the required design standards.

Below is an extract from Chapter 4, Section 4.4 of the report (Page 38);

The effect of building layout

The spatial distribution of buildings on a site can greatly influence the potential for creating flood pathways and considerably affect property flood risk. Little can be done to affect the building layout in existing urban areas except where significant redevelopment is anticipated. However, much can be done to manage cost effectively exceedance flows in new developments by careful layout of buildings (see Chapter 13).

In any new development it is important that the drainage of the site, including extreme events, is considered at the earliest possible date. Ideally its effects should be part of initial negotiations for land acquisition as it may significantly affect land value. Flood flow paths should be considered in the light of the natural drainage pathways on the site, and space left between buildings to accommodate them. Where roads and pathways can be arranged to act in a secondary capacity as flood pathways then the management of exceedance flows will be much easier. Further details are provided in Chapter 13.

In particular designers and developers should be wary of locating high value property such as housing at low spots, as floodwater will always tend to accumulate there. If unavoidable, special care should be taken to ensure that such property is protected from accumulated flood volumes by raising threshold levels, and/or providing additional drainage.

In many cases it may be more cost effective to amend site layout and the above ground flood channels (major system) rather than alter the below ground (minor) drainage system.

Roads have been designed to slope away from existing buildings to the east with the majority of the site sloping towards the sea to the west where no developments lie between the proposed site and the coastline. Where natural topography does not allow for this, spaces between buildings and raised threshold levels have been provided.

CIRIA Report C753 – The SuDS Manual, Version 6 (2015)

Another document referred to by CCC is CIRIA report C753. Chapter 24, Section 24.12 (page 538) explains the principles of exceedance design. It explains that 'the 100-year event plus climate change can experience surface water volumes which exceed the drainage network. In these events the water flows to the low point on the site.' As shown in the hydraulic calculations submitted at planning, the site has been designed above and beyond the recommended standards with the drainage network being designed to withstand the effects of a 100-year return period plus 40% climate change plus 10% urban creep allowance. Moreover, if a storm of greater intensity/less frequency was to occur the low points on the site being MH8 and MH2 have features surrounding them which can contain exceedance flows and prevent them from flooding the surrounding dwellings and habitable/critical areas. MH8 would have capacity within the highway to store water whilst it subsides and is recaptured by the system. Above this 1 in 600-year return period and towards the 1 in 900-year return period and beyond, MH2 would exceed and prevent further flooding at MH8. MH2 would allow water to run down the highway to the west where exceedance routing has been designed to avoid habitable dwellings and would reach the coastline. Exceedance routing has been indicated on TC drawing TC/T19360/A1/100 which has still been objected to date with no explanation why or reference to calculations which prove the ones submitted at planning by TC are incorrect.

DEFRA Sustainable Drainage Systems – Non-statutory technical standards for sustainable drainage systems (2015)

It is understood the CCC commonly refer to this document as guidance. S9 of the report (Page 2) states 'the design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100-year rainfall event are managed in exceedance routes that minimise the risk to people and property'.

Cumbria Design Guide (2017)

CCC have their own design guide which is commonly referred to by their planning officers. Chapter N titled Sustainable Drainage Systems (SuDS) which begins on Page 69 has a section on 'Designing for Exceedance' (Page 72) this sets out that 'when a site drainage system fails or exceeds, it's to be ensured that flooding of properties on or off site does not occur'.

This section of the design guide also states that runoff must be completely contained within the drainage system for all events up to a 1 in 30-year event. The calculations provided and objected to shows the system can contain a 1 in 100-year event plus 40% climate change plus 10% urban creep allowance.

If the design is still found to be unacceptable, please could an explanation to why this is the case be provided and referenced with guidance and legislation associated with the decision. Also if calculations and/or evidence cannot be provided to prove that its unacceptable, could some recommendations be made to assist in an acceptable design to avoid further fees and costs incurred by the developer and consulting engineers.

Yours faithfully

Julian Pearson BSc (Hons) CEng MICE

For and on behalf of Thomas Consulting Ltd