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**Document name:** 210687-EDGE-XX-XX-CO-C-0001_LLFA RESPONSE[P05]

06 January 2026

**Ian Sandiford**
Persimmon (Lancashire)
Persimmon House
Lancaster Business Park
Caton Road
Lancaster
LA1 3RQ

Dear Ian,

**Re:** Salesbury View, Wilpshire – Application 3/2025/0801 LLFA consultation

EDGE Consulting Engineers have provided this document and updated drainage strategy along with further greenfield calculations as response to the LLFAs planning consultation. We trust this document and additional supporting information will satisfy the LLFA and remove the objection to the developments planning application.

With reference to the LLFAs response dated 4th December 2025 the LLFA's objection hinges on 3 points, which are quoted below.

**1 – Inadequate Runoff Destination**

The LLFA notes that "*sufficient evidence has not been provided that demonstrates higher priority runoff destinations have been discounted/ fully utilised.*"

Below, each runoff destination is evaluated, in order of priority, to show the maximum extent they can be used and / or discounted.

1. Rainwater harvesting for non-potable use.

The National Standards for Sustainable Drainage Systems (SuDS) require that the potential for rainwater re-use be considered as the first destination for surface water runoff. In accordance with this hierarchy, the feasibility of incorporating rainwater harvesting (RWH) within the proposed residential development has been assessed.

Firstly, it should be highlighted that the development does not lie within an area classified as water stressed.

The development comprises a traditional housing estate with conventional dwelling types and standard domestic water demands. Whilst rainwater harvesting can offer benefits in certain circumstances, its application at estate-wide or plot-level scale for this form of development is limited by financial and practical constraints.

In particular, the installation of rainwater harvesting systems would require additional capital expenditure associated with storage tanks, pumping equipment, filtration systems, dual plumbing networks and ongoing maintenance responsibilities. For individual dwellings, these costs are disproportionate to the relatively modest potable water savings achievable, particularly where water demand is intermittent and largely limited to WC flushing and garden use. For communal or shared systems, costs and operational complexity increase further, alongside the need for long-term management arrangements, liability allocation and adoption considerations.

Evidence from industry guidance and experience indicates that, for low-density or medium-density traditional housing, rainwater harvesting systems typically have long payback periods and do not represent a cost-effective solution when assessed against whole-life costs. This is especially the case where alternative SuDS measures can achieve the required surface water management objectives without introducing mechanical systems or maintenance burdens for future occupants.

That said, the use of individual rainwater butts are promoted throughout the development for capture and reuse in garden areas.

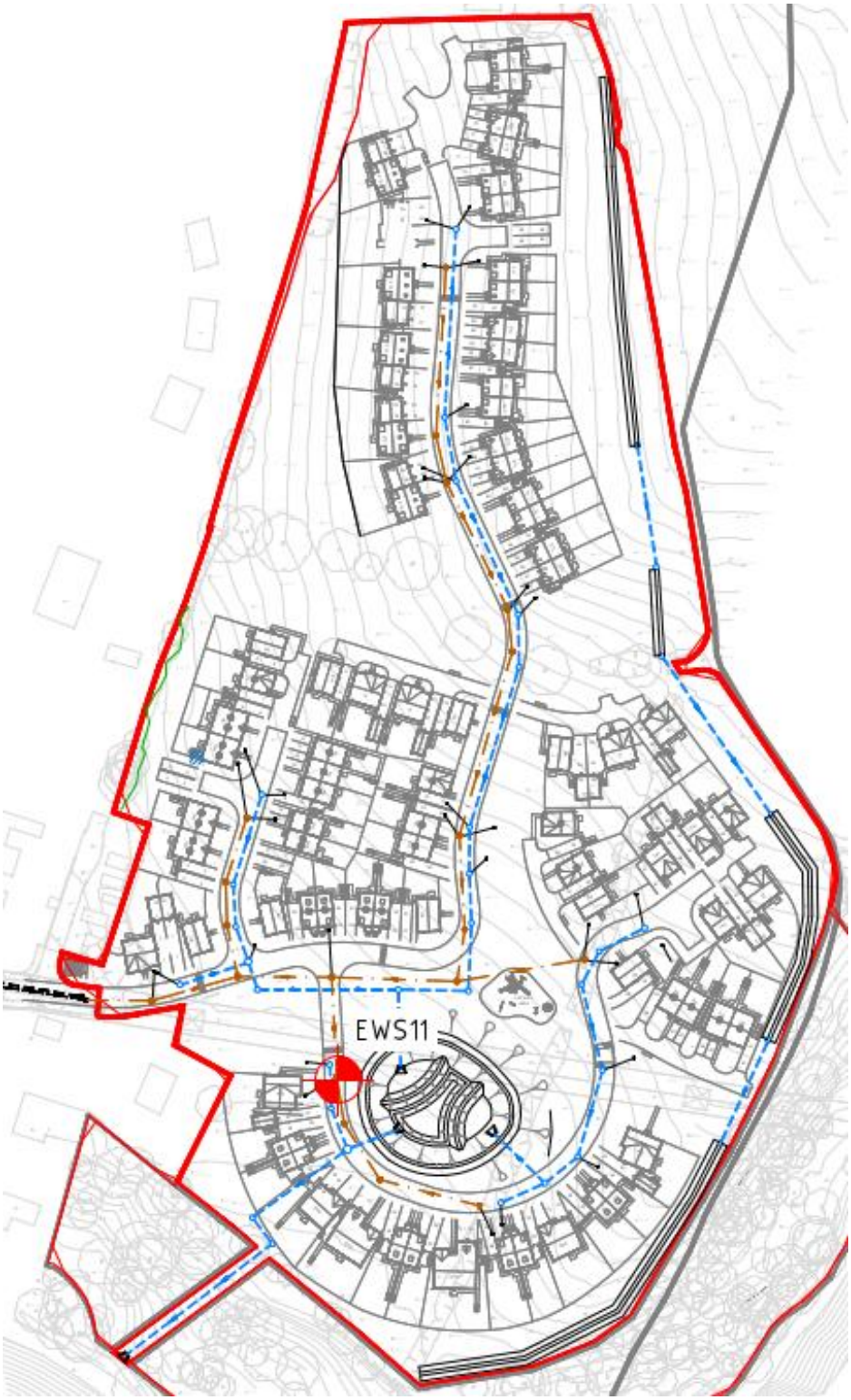
On this basis, whilst rainwater re-use has been fully considered in line with the National SuDS Standards, it is not considered financially viable or proportionate for the proposed development. The drainage strategy therefore prioritises passive, robust SuDS measures that manage runoff close to source, provide water quality and biodiversity benefits, and minimise long-term maintenance and management risks, in accordance with the remaining stages of the SuDS destination hierarchy.

2. Infiltration

As evaluated within the FRA a phase 2 ground investigation was undertaken by GEOL consultants. Report GEOL19-9938 concluded that soakaways are not anticipated to be a viable means of surface water discharge although specific infiltration testing was not undertaken.

Generally, the site sub strata is described as "Variable superficial deposits have been recorded across the site area. A mixture of very soft, soft, firm, and stiff sandy, gravelly and cobbly CLAYS, variable compositions of very loose, loose, medium dense, dense, and very dense clayey, silty, gravelly and cobbly SANDS, and sandy, gravelly COBBLES & BOULDERS of sandstone were encountered.

To fully understand the potential for infiltration and ensure this runoff destination is maximised some site-specific falling head tests were undertaken by EDGE Consulting Engineers. A supplementary report has been provided by EDGE consulting engineers Geo Team alongside this document showing the outcome of the infiltration testing.




3. Watercourse

An ordinary watercourse 'Knotts Brook' runs along the southern boundary of the site. Connection to the watercourse in the low portion of the site is the preferred method of discharge.

**2 – Failure to Manage Everyday Rainfall**

The LLFA note that "*the drainage strategy fails to demonstrate that the proposed development provides adequate measures to manage runoff from everyday rainfall events, as required by Standard 2 (Management of Everyday Rainfall (Interception)) of the National Standards for Sustainable Systems*."

The site proposals will include rainwater butts, as mentioned above, which will be designed to overflow to rain gardens (where site specific detailed design indicates appropriate locations). Furthermore, areas of private drives and private parking courts will be constructed using permeable paving.

The proposed attenuation basin is also proposed as an enhanced SUDs feature which will allow opportunity of absorption, evaporation/ infiltration of some everyday rainfall events within the basins footprint. Moreover, a permanent pool, just upstream of the pond's outlet will capture, hold and help further manage everyday rainfall.

While infiltration is not viable, the measures provide a range of additional benefits including source control, slowing the flow, reducing the system response in normal rainfall events (5mm), improving water quality, amenity value and biodiversity.

The combination of these SUDs aspects sets a site wide management of stormwater. It mimics natural drainage processes as closely to predevelopment levels as possible and maximises source control by reducing flooding and enhancing water quality.

**3 – Inconsistent contributing area to size the SuDS**

The LLFA note that "*the proposed drainage strategy fails to demonstrate compliance with Standard 3 of the National Standards for Sustainable Drainage Systems.*"

Below, we have provided additional narrative/ information to give clarity on the areas used to calculate greenfield rates and the proposed contributing areas of the site.

Site parameters:

- Total site area (red line boundary) = 4.978Ha
- Developable area (total site minus significant areas of POS) = 3.327Ha
- Proposed cumulative impermeable/ contributing area = 1.952Ha.

GREENFIELD RUNOFF RATE

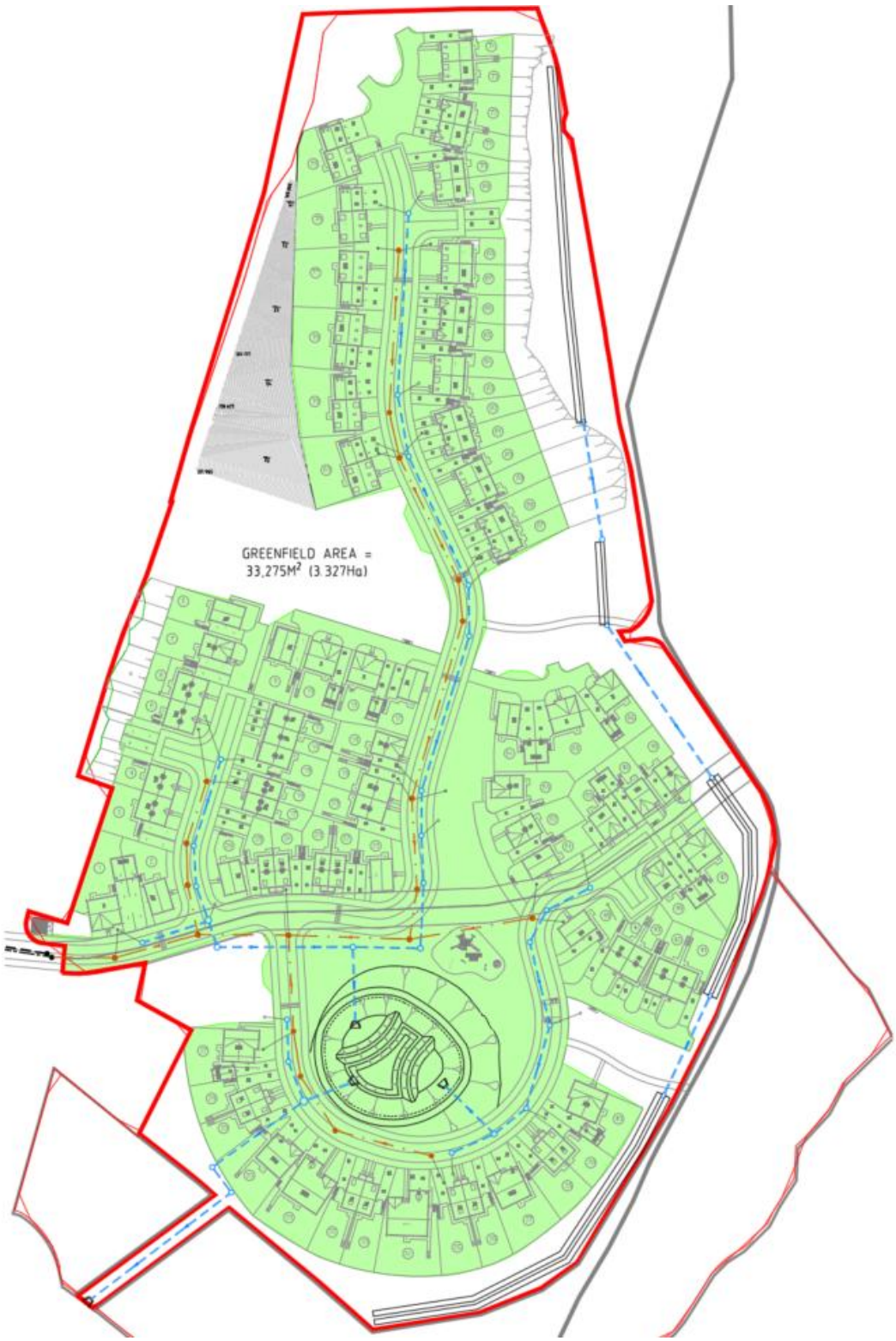
The LLFA note "*Standard 3 requires that the entire development area that could potentially drain to the proposed surface water drainage system in an extreme event shall be used for estimating greenfield runoff rates and volumes (including both permeable and impermeable surfaces).*"

Furthermore, the consensus concerning greenfield runoff calculation is that the entire site (including permeable) minus significant areas of POS should be used in calculations. Extract from Ciria C753 SUDs manual below:

### 24.2.2 Runoff areas to be used in calculations

The runoff area used in any of the runoff estimation methods should be consistent; for example, if the whole site area is used in the greenfield runoff rate calculations, the whole site should also be represented in the runoff calculations for the proposed development. If there is a landscaped area in the developed scenario that discharges directly to receiving waters and does not contribute to the drainage system (so is excluded from the calculations) then this area should also be excluded from the greenfield calculations.

As such the area used to calculate the greenfield rate is represented in the image below and totals 33,275M$^2$




If we reduce the area used to calculate the greenfield rate, we are assuming that all the soft landscaped areas continue to discharge as they did prior to development and in this instance, this is not the case.

Firstly, there will be an introduction of quality topsoil which will inherently have improved drainage characteristics that will reduce the likelihood of initial runoff. There will be a re-profiling of the site gradients, at present the average grade ranges from 1:6 to 1:10, this will be altered and gardens re-graded to provide more accessible and useful spaces, the improved gradients will reduce the rate of runoff and will allow further time for infiltration and evaporation, no matter how limited the potential for infiltration is.

The nature of residential developments means the introduction of barriers in the form of walls, fences and landscaping features which can physically impede surface runoff allowing more time for infiltration and evaporation; soft landscaping and planting greatly reduces the rate of runoff and the benefits should not be underestimated.

It is clear that in this specific instance the introduction of domestic garden areas (especially when mature) will greatly reduce runoff when compared to the predevelopment situation when uncontrolled runoff occurs from a steeply sloping site.

The greenfield runoff tool from HR Wallingfords UK Suds website has been used to determine the greenfield rate associated with this area. A QBAR rate of 28.9 litres per second is generated and will be the maximum allowable discharge rate for the site.

PROPOSED CONTRIBUTING AREAS

The schematic catchment plan was provided previously to show the extent of areas contributing to the proposed drainage system. However, it did not include the SUDs basin as a contributing area. This has now been remedied, and the proposed contributing area is shown in the image below.

The areas total 19,524m$^2$ or 1.952Ha. With an additional area for urban creep included (10%) the total contributing area for the site equates to 21,476m$^2$ or 2.147Ha.

The LLFA notes "*areas, such as gardens, roadside verges and areas of public open space, may not be positively drained, they may contribute indirectly to the drainage system during extreme events. The applicant must design their SuDS with an appropriate estimation of the area contributing to the drainage system, both permeable and impermeable*"

Ciria C753 (extracted below) notes an acceptable and conservative approach (for standard developments (with impermeability ratios of 50-65%)) is to use 100% runoff from impermeable areas and 0% runoff from pervious areas.

From the aforementioned site area measurements we can see that the site has 58% impermeability ratio (contributing area against greenfield area), so the approach taken on the drainage design and storage estimation is regarded as highly conservative. Moreover, the design does not yet consider the source control benefits and reduction in runoff rates and volumes from the proposed permeable paving, rain gardens and water butts with the storage volumes stated accommodating the full extent of assumed site runoff.

### Volumetric and routing coefficients ($C_V$ and $C_R$)

The coefficient of runoff was split into two terms when the modified rational method (HR Wallingford, 1981) was originally produced: the volumetric runoff coefficient, $C_V$ (of the order of 0.6) and the routing coefficient, $C_R$, (of the order of 1.3). However, the routing coefficient (which addresses the fact that some parts of the site will generate flows to a downstream point faster than others) tends to be ignored.

For paved area runoff, the two coefficients are usually incorporated into a single term with a value of between 0.8 and 1.0 – depending on how effectively the catchment is drained and the level of impermeability.

An equivalent approach is required for the pervious area runoff, with the chosen coefficient reflecting the proportion of contributing and non-contributing pervious areas, the soil type, site gradient, event size, likely antecedent conditions etc.

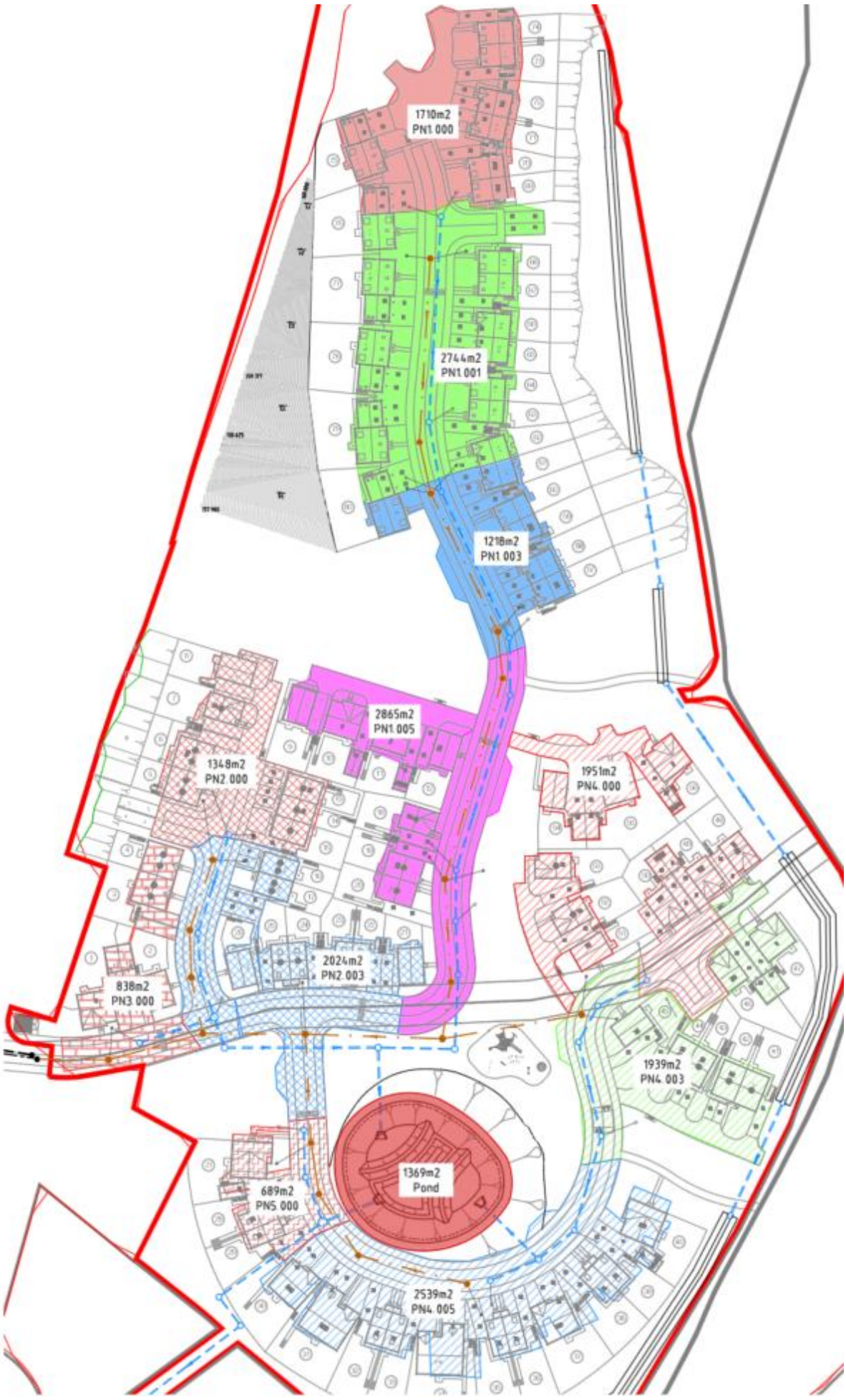
Guidance on runoff proportions from extreme events for different surfaces is provided in NERC (1985).

WRc (2012) is the industry standard produced by water companies for adoption of drainage for new development. It proposes the use of 100% runoff from impermeable areas and 0% runoff from pervious areas. This is known to be suitably conservative for events of between 1:1 year and 1:5 year. However, it is likely to be less appropriate for larger events when the pervious areas start generating significant runoff. For standard developments that tend to have impermeability ratios of around 50–65%, this assumption is regarded as being acceptable, at least in terms of initial design and analysis, as it avoids having to use the more complicated runoff models.

In summary when greenfield runoff from a site is assessed it should be based on the site area (paved areas and garden areas) and only those areas such as POS or parkland that are going to remain draining as they do currently should be omitted.

When calculating the runoff volume from the developed site for design of drainage facilities and storage requirements it should be assumed that 100% runoff from paved areas occurs and 0% from pervious areas in accordance with the Interim National Procedure Principles and the Ciria SUDs manual.

Accordingly, a Quick Storage Estimate (QSE) using micro drainage software shows that the storage volume required for 19,524m$^2$ (1.952Ha), plus an additional 50% rainfall allowance for climate change is between 1,212m3 and 1,873m3. A mean value of 1,542m3 is provided within the pond. This can be upscaled or reduced as required at the detailed design stage when the full hydraulic characteristics of the site are known and detailed modelling and simulation of the system undertaken.


1710m2
PN1.000
2744m2
PN1.001
1218m2
PN1.003
2865m2
PN1.005
1348m2
PN2.000
1951m2
PN4.000
2024m2
PN2.003
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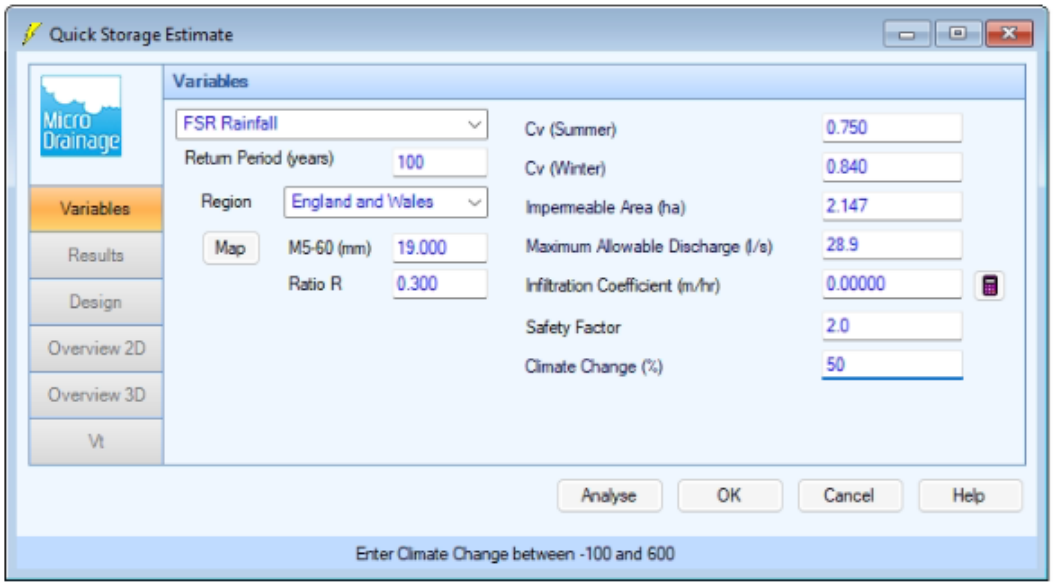
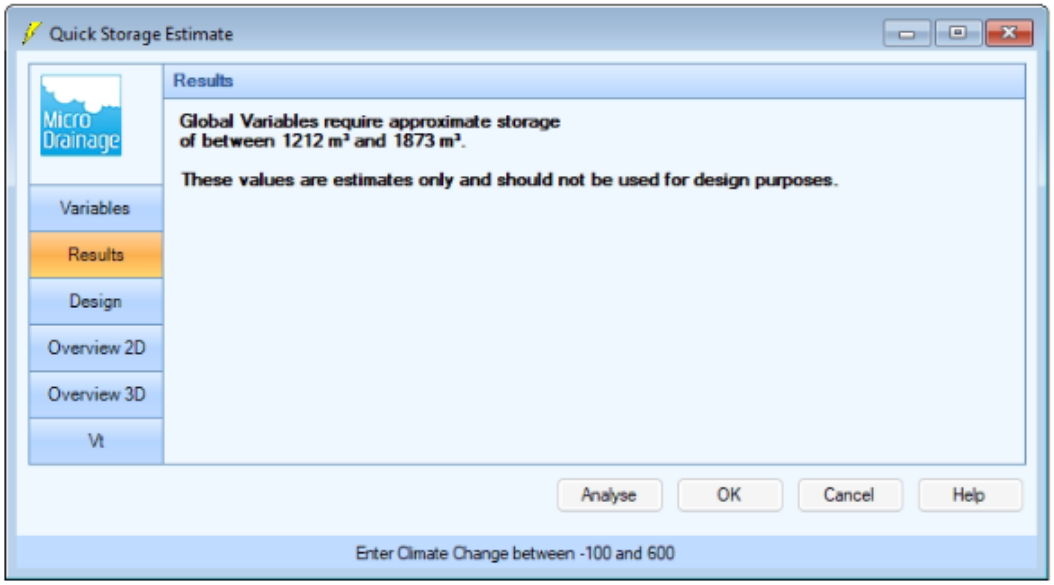
Pond
689m2
PN5.000
2539m2
PN4.005




The proposed drainage strategy has been modified in accordance with the above changes to runoff rates and storage volumes and the revised drawings are provided alongside this document. We trust this answers the LLFAs concerns and allows the objection to development to be lifted.

Yours sincerely,

**Ryan Atherton**
Team Leader - Civil

| | | | |
|---|---|---|---|
| EDGE CONSULTING ENGINEERS | Project Title: Salesbury View, Wilpshire | | EWS11 |
| | Project Number: 210687 | Client: Persimmon Homes Lancs | Sheet 1 Of 1 |
| | GL (mAOD): 0.00 | N Coord: 0 | E Coord: 0 |
| Date: 15/12/2025 | Method: Window Sampler | Driller: LTS Drilling Ltd | Logged By: JH |

| Depth (m) | Type | Test Result | Level | Legend | Depth (m) | Description | Water | Standpipe |
|---|---|---|---|---|---|---|---|---|
| | | | -0.15 | | 0.15 | Very soft dark brown slightly sandy silty CLAY. Frequent rootlets. (TOPSOIL). | | |
| | | V=37 kPa | | | 1.00 | Soft brown with occasional grey mottling sandy silty CLAY. Occasional roots. | | |
| | | V=20 kPa | | | 2.00 | 1.00 - 2.00 Grey, slightly gravelly. Gravel is angular to subrounded fine to coarse of sandstone. Occasional pockets of sand. | | |
| | | | | | 3.00 | End Of Borehole At 2.00 m | | |
| | | | | | 4.00 | | | |

## KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

## REMARKS

No Groundwater Encountered
Hand dug pit to 1.00 m. On completion, infiltration test undertaken then backfilled with arisings.

Scale: 1:30

Water Strikes

| Date | Strike | Level | Minutes | Casing | Sealed |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

Daily Log Of Depths

| Date | Casing | Water |
|---|---|---|
| | | |
| | | |

Chiselling

| From | To | Hours |
|---|---|---|
| | | |
| | | |

**210687 - Salesbury View, Wilpshire**

**EWS11**

| | | | |
|---|---|---|---|
| **BH Depth** | 2.00 m | **Casing** | 2.00 m |
| **Casing stick up** | 1.00 m | **Test Depth** | 1.00 - 2.00 m |

Water depth measured from top of casing.

| Time (mins) | Water Depth (m bgl) |
|---|---|
| 0 | 1.05 |
| 1 | 1.05 |
| 2 | 1.05 |
| 3 | 1.05 |
| 5 | 1.05 |
| 7 | 1.05 |
| 9 | 1.05 |
| 10 | 1.05 |
| 15 | 1.05 |
| 20 | 1.05 |
| 30 | 1.05 |
| 40 | 1.05 |
| 50 | 1.05 |
| 60 | 1.05 |

**Test abandoned**

Unable to calculate soil infiltration rate due to insufficient fall in water level.