



# Land Between Lodge Road and Tape Lane, Hurst, Wokingham, RG10 0EG

## Supplemental Proof of Evidence – Flood Risk and Drainage

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### On behalf of Mactaggart and Mickel Strategic Land

Section 78 Appeal against refusal of planning permission by Wokingham Borough Council for the:

Outline application for the proposed erection of up to 99 no. dwellings, green infrastructure, open space, pedestrian and cycle links, recreational facilities and other associated infrastructure and access points on Lodge Road and Tape Lane with required improvements. (All matters reserved except for means of access).

Prepared by:

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## 1.0 Introduction

- 1.1 At the time I submitted my Proof of Evidence on 29 July 2025, the results of the Environment Agency's second review of the hydraulic model were not available.
- 1.2 The results of the review were provided by the Environment Agency under cover of an email on the afternoon 5 August 2025. A copy of the and model review spreadsheets and covering email is provided at Annex A.
- 1.3 The covering email from Environment Agency stated that both the hydraulic model and the hydrological analysis '*are not considered fit for purpose so we will be maintaining our objection*'.
- 1.4 A separate Proof of Evidence has been prepared by my colleague Mr Robert Walker to address the reasons why they were not considered fit for purpose. In addressing the Environment Agency's concerns, the model has been updated as described in Mr Walker's Proof and the results of the revised analysis provided to me.
- 1.5 I have used to results of the revised analysis to review the application of the exception test to the Appeal Site in respect of the fluvial flood risk.



## 2.0 Review of Exception Test

- 2.1 Section 5.0 of my Proof of Evidence (CD 5.5) considered the application of the exception test to the Appeal Site in respect of surface water (pluvial) flooding, groundwater flooding and fluvial flooding.
- 2.2 The revised hydraulic model outputs have no bearing on the surface water (pluvial) and groundwater flood risk to the Appeal Site and I therefore have only considered the impact on the application of the exception test with respect to fluvial flooding.

### Exception Test – Fluvial Flooding

*the development will be safe for its lifetime taking account of the vulnerability of its users*

- 2.3 Paragraph 002 of the Flood risk and coastal change section of the PPG defines the 'design flood' as the river flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year) plus an appropriate allowance for climate change. In my experience, it is generally held that the safety of a development should be considered in the context of the design flood.
- 2.4 The revised extent of the design flood is shown by Figure SP1 enclosed at Annex A
- 2.5 Paragraph 005 of the PPG Flood risk and coastal change section of the PPG requires that when assessing the safety implications of flood risk for development proposed in a planning application, the following should be considered:
- the characteristics of a possible flood event, including residual risks from flood risk management infrastructure e.g. the type and source of flooding and frequency, depth, velocity, speed of onset and duration;
  - the safety of people within a building if it floods and also the safety of people around a building and in adjacent areas, including people who are less mobile or who have a physical impairment. This includes the ability of residents and users to safely access and exit a building during a design flood and to evacuate before an extreme flood (0.1% annual probability of flooding with allowance for climate change);
  - the structural safety of buildings: and
  - the impact of a flood on the essential services provided to or from a development.

#### Characteristics of the flood event.

- 2.6 The characteristics of the design flood are summarised in Table 2-1 for the area of the Appeal Site at risk of flooding shown by Figure SP1 enclosed at Annex A. I have included a comparison with the equivalent Table 5-1 set out in my Proof of Evidence such that the impact of the revised modelling is clear.



**Table 2-1: Summary of Design Flood Characteristics**

| Flood Metric<br>(Design Flood) | Characteristic                                                                                                      |                                                                                                                       |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
|                                | Proof of Evidence                                                                                                   | Revised Modelling                                                                                                     |
| Type and source of flooding    | Fluvial flooding from Main River                                                                                    | Fluvial flooding from Main River                                                                                      |
| Frequency                      | Less than 1% annual probability                                                                                     | 1% annual probability                                                                                                 |
| Depth                          | 0.05m                                                                                                               | 0.15m                                                                                                                 |
| Velocity                       | 0.004 ms <sup>-1</sup>                                                                                              | 0.005 ms <sup>-1</sup>                                                                                                |
| Speed of onset                 | Flooding of the Appeal Site starts 7.5 hours after the start of the rainfall event and reaches a peak at 12.5 hours | Flooding of the Appeal Site starts 8.75 hours after the start of the rainfall event and reaches a peak at 13.75 hours |
| Duration                       | The duration of flooding from the onset until it recedes from the Appeal Site is 11.5 hours                         | The duration of flooding from the onset until it recedes from the Appeal Site is 21.25 hours                          |

The safety of people within a building

- 2.7 It is clear from Figure SP1 enclosed at Annex A that the extent of the design flood is limited to the internal road network within the Appeal Site along with six dwellings along the western flank of the proposed development parcel. The flood depths within the footprint of these dwellings varies between 0.04m and 0.14m.
- 2.8 Paragraph 8.2.5 of the SFRA (CD9.17) states that:
- ‘the EA advises that minimum finished floor levels should be set 300mm above the 1% AEP plus climate change peak flood level, where the appropriate new climate change allowances have been used. An additional allowance may be required because of risks relating to blockages to the channel, culvert or bridge and should be considered as part of an FRA.’*
- 2.9 Section 3.5 of the Flood Risk Modelling Report Revision 03 addresses the freeboard that should be provided above the design flood level to cater for uncertainty in the hydraulic model. The analysis concludes that the modelling has a ‘3 star Confidence rating’ and as such a minimum 0.6m freeboard should be provided, i.e. finished floor levels should be set a minimum of 0.6m above the design flood level.
- 2.10 The maximum design flood level within the Appeal Site based on the revised modelling is 37.66mAOD (an increase of 0.13m from my Proof of Evidence) and therefore in my opinion the minimum finished floor level of the dwellings should be set at **38.26mAOD**.
- 2.11 For comparison, and to address the ‘additional allowance’ point in the SFRA, Table 2-2 provides a summary of the modelled outputs in comparison to the recommended freeboard allowance that again includes a comparison with the equivalent Table 5-2 set out in my Proof of Evidence such that impact of the revised modelling is clear.



**Table 2-2: Modelled Outputs vs Freeboard**

| Model Scenario                                             | Proof of Evidence  |               | Revised Modelling  |               |
|------------------------------------------------------------|--------------------|---------------|--------------------|---------------|
|                                                            | Flood Level (mAOD) | Freeboard (m) | Flood Level (mAOD) | Freeboard (m) |
| <b>Baseline Modelling</b>                                  |                    |               |                    |               |
| 1% AEP plus 46% Climate Change Allowance (design flood)    | 37.53              | 0.60          | 37.66              | 0.60          |
| 0.1% AEP                                                   | 37.59              | 0.54          | 37.68              | 0.58          |
| 0.1% AEP plus 46% Climate Change Allowance (extreme flood) | 37.67              | 0.46          | 37.71              | 0.55          |
| <b>Sensitivity Analysis on Design Flood</b>                |                    |               |                    |               |
| 50% culvert blockage                                       | 37.64              | 0.49          | 37.67              | 0.59          |
| 75% culvert blockage                                       | 37.65              | 0.48          | 37.67              | 0.59          |
| 20% increase in roughness                                  | 37.53              | 0.60          | 37.67              | 0.59          |
| 0.3m surcharge on downstream boundary (culvert)            | 37.53              | 0.60          | 37.66              | 0.60          |
| 0.6m surcharge on downstream boundary (culvert)            | 37.56              | 0.57          | 37.67              | 0.59          |

2.12 I therefore conclude that by adopting a 0.6m freeboard allowance, the occupants of the buildings would not be at significant risk, i.e. they would be safe during times of flood.

The ability of residents and users to safely access and exit a building during a design flood and to evacuate before an extreme flood (0.1% annual probability of flooding with allowance for climate change)

2.13 With reference to Table 4 of the Supplementary note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose - Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1, based on the depth of flooding and the velocity of the floodwaters predicted by the hydraulic model for the design flood (summarised in Table 2-1), the maximum '*Flood Hazard Rating*' is 0.59 which results in a '*Hazard to People Classification*' of '*Very low hazard – Caution*'. A copy of this document is provided at CD 9.19. The maximum flood depths and '*Flood Hazard Rating*' for the design flood is shown by Figures SP1 and SP2 respectively enclosed at Annex A.

2.14 Whilst the *Flood Hazard Rating* increases for the extreme flood, the '*Flood Hazard Rating*' is less than 0.75 and as such the '*Hazard to People Classification*' remains '*Very low hazard – Caution*' albeit over a wider area within the Appeal Site. The maximum flood depths and '*Flood Hazard Rating*' for the extreme flood is shown by Figures SP3 and SP4 respectively enclosed at Annex B.

2.15 Whilst a greater number of the dwellings shown on the illustrative masterplan are shown to be within the extreme flood envelope, as shown by Table 2-2, the floor levels are set well above the extreme flood level. The areas of built development within the Appeal Site that are at risk of flooding during an extreme flood are therefore confined to the internal access roads.



- 2.16 The maximum depth and velocity of floodwaters along the internal access road during the design flood is 0.15m and  $0.005\text{ms}^{-1}$  respectively as set out in Table 2-1.
- 2.17 To set this in context, this is effectively still water that would reach just above the ankle of an adult and so with care could be traversed on foot should the need arise. The height of the underside of the average small family car is circa 0.2m and so again, with care the floodwaters could be traversed in a car should the need arise. This is principally why the '*Hazard to People Classification*' is considered '*Very low hazard – Caution*'.
- 2.18 The maximum depth of flooding along the internal access road during the extreme flood is 0.21m and the maximum velocity is  $0.18\text{ms}^{-1}$ . It is my understanding that emergency service vehicles can readily traverse floodwaters of this depth and velocity along with the majority of motor vehicles. With this depth of flooding and low velocity of floodwater, there is no significant risk of vehicles being destabilised or washed away.
- 2.19 I therefore conclude that residents and users of the proposed development would be able to safely access and exit a building during a design flood and to evacuate before an extreme flood. It is clear from Table 2-1 above that the onset of flooding occurs slowly.

#### The structural safety of buildings

- 2.20 As the finished floor level of the buildings will be a minimum of 0.60m above the design flood level and 0.55m above the extreme flood level, I conclude that there will be no issue with the structural safety of buildings.

#### The impact of a flood on the essential services provided to or from a development

- 2.21 Essential services to a development might include:
- Electrical supply;
  - Gas supply;
  - Water supply; and
  - Telecoms
- 2.22 These services are normally installed in below ground ducting, or directly in the ground. My understanding is that ducting is not sealed against the ingress of water and therefore under normal operating conditions, it can be expected that the ducting, and hence the service, will be inundated from time to time.
- 2.23 The limited depth and duration of flooding predicted by the hydraulic modelling for the design flood would have no greater impact on the essential services than experienced under their normal operating conditions.
- 2.24 The only exception might be if there are to be above ground service cabinets for telecoms or sub-station for the electricity supply, in which case they should be set above the design flood level.



***without increasing flood risk elsewhere***

- 2.25 In my experience, when considering the impact on the flood risk elsewhere through the displacement of floodwaters or obstruction of flood flows, the impact is assessed against the design flood.
- 2.26 As shown by Figure SP1 enclosed at Annex A, the part of the Appeal Site at risk of flooding during the design flood is confined to part of the internal road network and several dwellings along the southern part of the western boundary.
- 2.27 Therefore, provided there is no land raising within design flood envelope without suitable compensation elsewhere, the proposed development would not increase the flood risk elsewhere by virtue of the reduction in floodplain storage or the obstruction of flood flows.

***where possible, will reduce flood risk overall***

- 2.28 The proposed development will not reduce the fluvial flood risk overall.

**Exception Test Conclusions**

- 2.29 To conclude, despite the increase in flood levels arising from the revised hydraulic model the proposed development still passes the exception test in respect of the fluvial flood risk as it:
- will be safe for its lifetime taking account of the vulnerability of its users; and
  - will not increasing flood risk elsewhere.



### **3.0 Fifth Reason for Refusal**

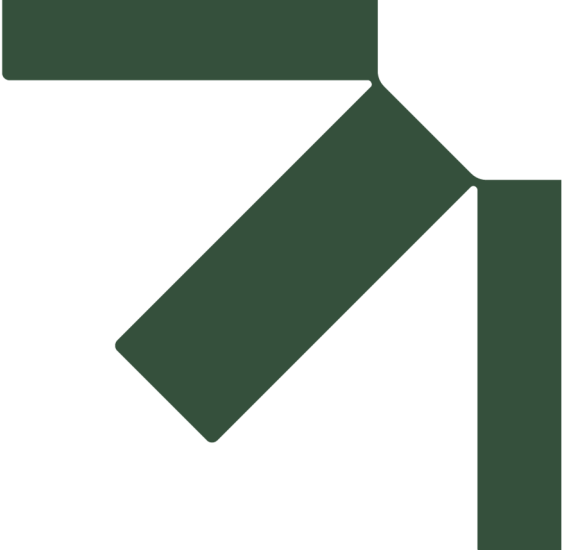
- 3.1 At Section 6.0 of my Proof of Evidence I address the Council's fifth reason for refusal.
- 3.2 The revised modelling discussed in this supplementary proof does not alter the conclusion I draw at paragraph 6.23 of my Proof of Evidence in that apart from part of Policy CC09 and part of Section 14 of the NPPF, I consider that the reasons stated for refusing the planning application in the fifth reason for refusal have been addressed.



## 4.0 Summary and Conclusions

- 4.1 The Agency has confirmed that the submission of an acceptable model will allow them to remove their objection to the planning application.
- 4.2 The 2<sup>nd</sup> review completed by the Environment Agency concluded that both the hydraulic model and hydrology were still not fit for purpose, however, the number of issues has been substantially reduced.
- 4.3 The information provided in Mr Walker's Proof of Evidence addresses the four principal outstanding issues and he considers that the changes made to the hydraulic model and hydrology mean they are now fit for purpose.
- 4.4 The impact of these changes to the model have been assessed and, whilst the flood level has increased compared to those assumed in my Proof of Evidence, the increase is not sufficient to invalidate my conclusion that the exception test is passed for the Appeal Site.
- 4.5 Therefore, the proposed development is fully compliant with the parts of Core Strategy Policies CP1 and CP3 and Local Plan Policy CC10 that relate to flood risk, and by virtue of a failure to pass the sequential test, is only partially compliant Local Plan Policy CC10 and Section 14 of the NPPF.





# **Annex A      Design Flood Figures SP1 and SP2**

**Land Between Lodge Road and Tape Lane, Hurst,  
Wokingham, RG10 0EG**

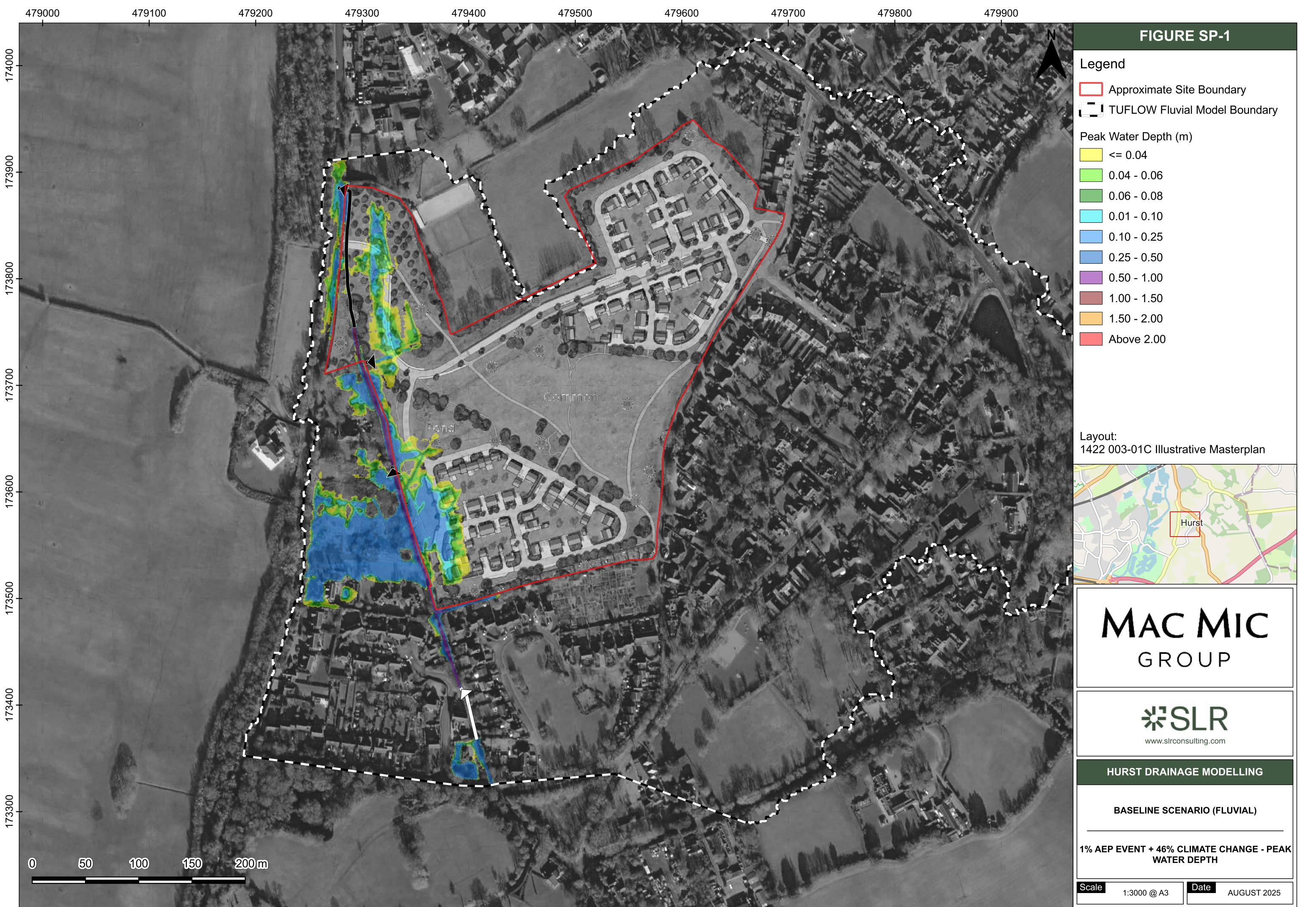
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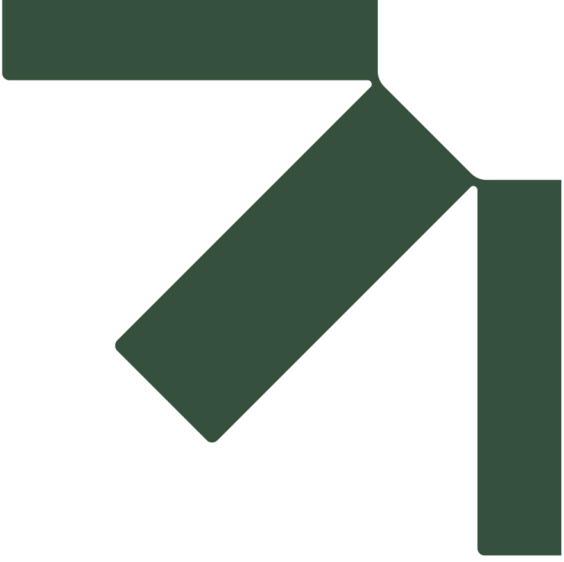
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# **Annex B      Extreme Flood Figures SP3 and SP4**

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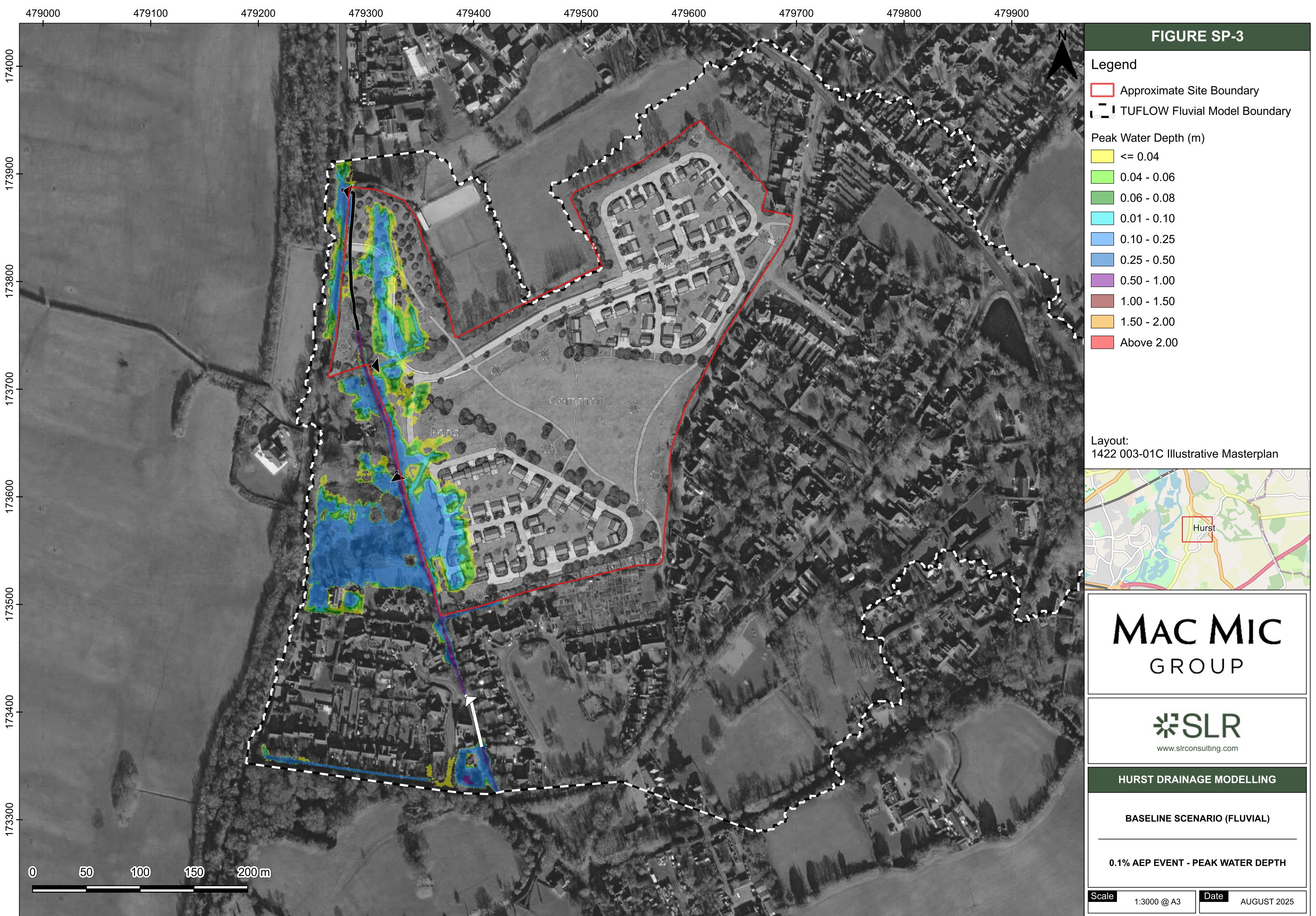
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