CRAIGIE BURN FLOOD STUDY

1. INTRODUCTION

Welcome to the community drop-in session for the Craigie Burn Flood Study

The purpose of this event is to provide you with an update on the extensive work carried out as part of the **Craigie Burn Flood Study**, including:

- Flood risk and flooding mechanisms in the catchment;
- Draft findings for managing flood risk in the future, and;
- Information on existing actions, and measures already in place.

Your Views

We value your input and want to ensure that your opinions are clearly heard. This consultation event provides a platform for you to express your views on the proposed flood risk management options. Your feedback is important to us in deciding how to take our proposals forward.

Representatives from the Council's Flooding Team, Amey Consulting Ltd, SEPA, Scottish Water and the Scottish Flood Forum are here today. Please ask questions, share your experiences, and comment on the draft outputs.

We thank you for taking the time to attend this event. Your views matter, and we look forward to hearing your comments on the flood study.

Why are we doing a flood study?

The **Craigie Burn Flood Study** forms a key part of the **Tay Flood Risk Management Plan** and **Local Flood Risk Management Plan**.

Perth and Kinross Council engaged consulting engineers, **Amey Consulting**, to carry out the study and develop proposals to manage the risk of flooding from the main watercourses in the area.

Amey Consulting have considered a wide range of potential options for managing the risk of flooding from the Craigie Burn and have recommended a preferred option to the Council. The Council is now keen to discuss the draft findings of the flood study with the community.

The following display boards present and summarise the work we have completed for the study to date and outline the next steps.

Flood history

There is a history of flooding in Perth from the Craigie Burn, and its main tributaries — the Scouring and Buckie Burns.

Notable flood events that have caused significant flooding in the Craigie Burn catchment have occurred in September 1981, February 1990, January 1993, June 2002, November 2012, August 2020 and September 2022.

Flooding in the catchment can be driven by short intense storm events (typically during summer) and from more prolonged rainfall (typically during winter).

As well as flooding directly from the watercourses, surface water flooding (from both overland flow and sewers) has also been observed previously.

1993

January 1993 // Overtopping of Necessity Brae towards Low Road
(Source — The Great Flood, Perth & Kinross District Council, 1993)

2002

June 2002 // Flooding at:

- Cherrybank Inn (Top);
- Balmoral Place (Middle), and;
- Queens Avenue (Bottom)

Source: Cargill *et al.* (2004) Flash Floods on the Craigie Burn, Perth, Scotland. Weather (vol. 59) pp 12-14.

2020

11-12 August 2020 // Queen Street
(Source: The Courier)

11-12 August 2020 // Post-flood damage at Windsor Terrace
(Source: Perth & Kinross Council records)

2022

8 September 2022 // Queen Street
(Source: SEPA)

8 September 2022 // Murray Crescent
(Source: Perth & Kinross Council)

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2. FLOOD RISK

Perth and Kinross Council engaged consulting engineers, **Amey Consulting**, to carry out the Craigie Burn Flood Study to improve understanding of the flood risk and develop proposals to manage the risk of flooding from the main watercourses in the area.

Flood modelling process

We have built a **computer-based hydraulic model** to better understand and predict how flooding can happen in the Craigie Burn catchment. This model uses detailed information from **surveys** we have conducted on the watercourses, structures, and ground levels throughout the area.

By inputting estimates of how much water will flow in the rivers under different rainfall conditions, the model can simulate a range of flood events and generate maps to show the areas at risk of flooding, which you can see on the next board.

The model has been calibrated to represent the Craigie Burn as accurately as possible by comparing its predictions with **telemetry** data, observed water levels and extents of **previous flood events** (including the 8 September 2022 flood event). We also took into account information provided by the local **community** through questionnaires to make sure our model reflects the actual experiences of people in the town.

With this flood model, we were able to test different potential options and strategies to manage and reduce the risk of flooding in the area.

River flows, return periods and probabilities

River flows are measured in **cubic meters per second** (m^3/s), and we often refer to the largest flow as the "**peak flow**".

To understand how rare a flood event is, we use concepts called the "**return period**" or "**annual exceedance probability** (AEP)". These tell us about the probability, or chance, of a flood happening in any given year.

Let's take an example: During a 1-in-200-year return period, or 0.5% AEP event, the peak flow is estimated to be $8.71m^3/s$. This means there's a 0.5% chance of this flood flow being exceeded in any given year. However, it's important to remember that this is a statistical way of describing flooding. It doesn't mean that the 1-in-200-year flood will only happen once in a 200-year period. Flooding is a natural event that can occur at any time, so, it's possible to experience two 200-year floods within a short span of time.

In summary, river flows are measured in m^3/s, and we use return periods or AEP to understand the rarity and likelihood of flood events.

It's essential to recognise that flooding can happen at any time, and the frequency of events is based on statistical averages rather than strict timelines.

Existing Flood Risk Management within the Craigie Burn catchment

The Craigie Burn catchment already benefits from a number of features and actions which significantly reduce flood risk. These have been factored in to our assessment of current and future flood risk.

Existing flood scheme

The **Perth Flood Scheme** was completed in 2002. It provides protection against the river flooding from the River Tay, the Craigie Burn, and other smaller watercourses. The scheme includes a number of elements to reduce the risk of flooding in the Craigie Burn catchment including flood walls and flood storage areas.

The location of the infrastructure within the catchment is shown on the map below.

Flood Storage Ponds at Broxden, Perth

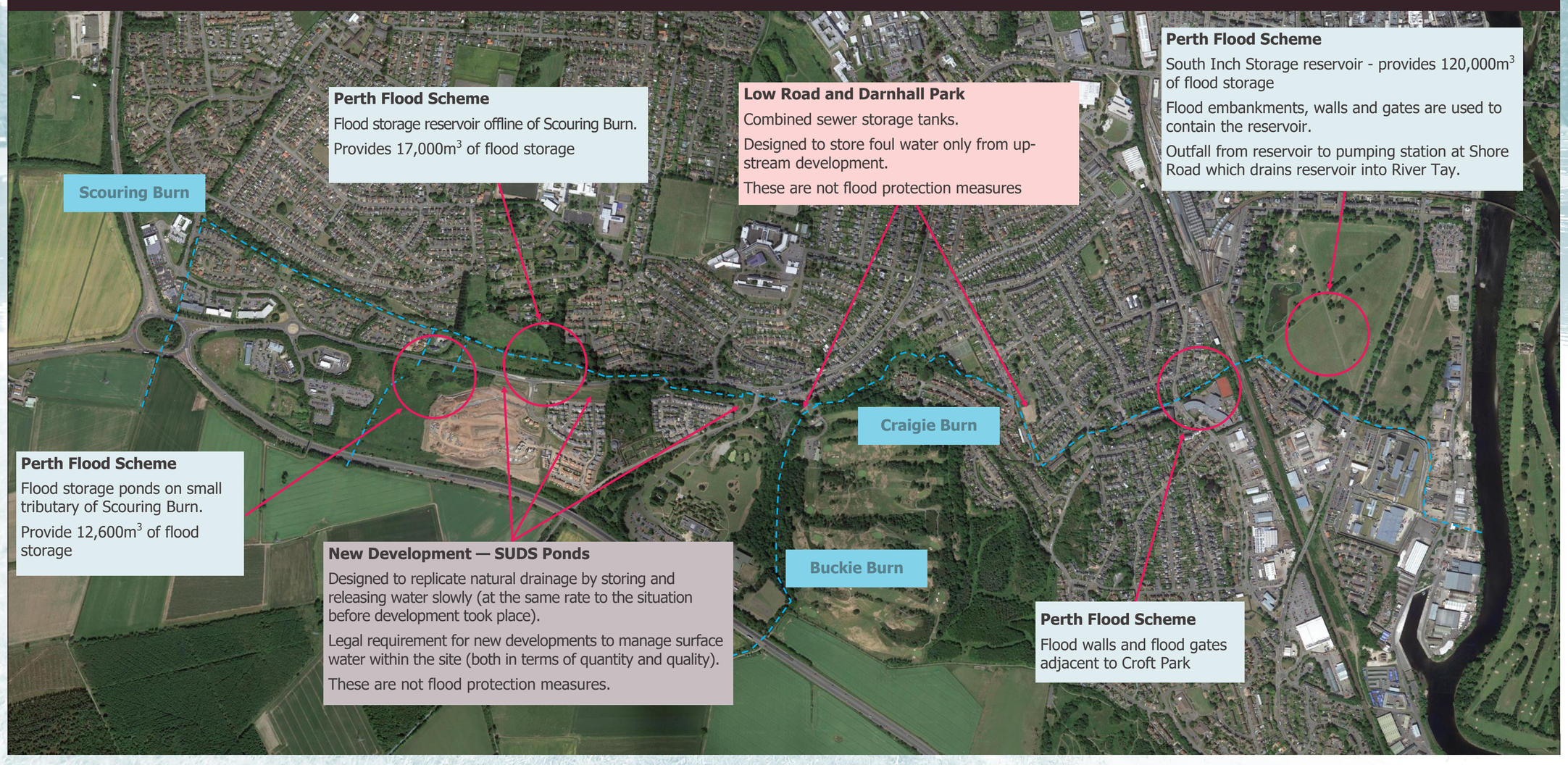
Flood Gate on South Inch, Perth

On-going Maintenance

Responsibility for watercourse maintenance primarily rests with the riparian (river bank) landowner; however the Council also has duties under the Flood Risk Management (Scotland) Act 2009 to inspect watercourses in its area from time to time. The Scouring and Craigie Burns are routinely inspected on a 6-monthly basis. Where our assessments confirm the watercourses to be in a condition that gives rise to a flood risk, and clearance and repair works will substantially reduce that risk, then the Council will undertake these works, in line with other priorities and available resources.

The Perth flood protection scheme is inspected annually, and maintenance carried out as required.

The Council's Roads Maintenance partnership also inspect and clear trash screens on a fortnightly schedule, and respond to any issues raised between scheduled maintenance. Critical screens are monitored during flood events, as far as resources will allow.



PERTH & KINROSS COUNCIL

ameyconsulting

CRAIGIE BURN FLOOD STUDY

3. FLOOD RISK

Flood Risk Maps

The flood map below shows the **0.5% AEP design flood event** (i.e. it has 0.5% chance of occurring in any given year).

The main areas of flooding are well defined, but there may be differences from flooding that you have experienced.

The table below provides a comparison of recent flood events against the 0.5% AEP design flow.

Date	Estimated peak flow	Estimated return period
Flood Map — Design event	8.7 m^3/s	0.5% AEP (or 200 year return period)
June 2002	7.0 m^3/s	1.11% AEP (or 90 year return period)
August 2020	15.0 m^3/s	>0.5% AEP (or +200 year return period)
September 2022	11.1 m^3/s	>0.5% AEP (or +200 year return period)

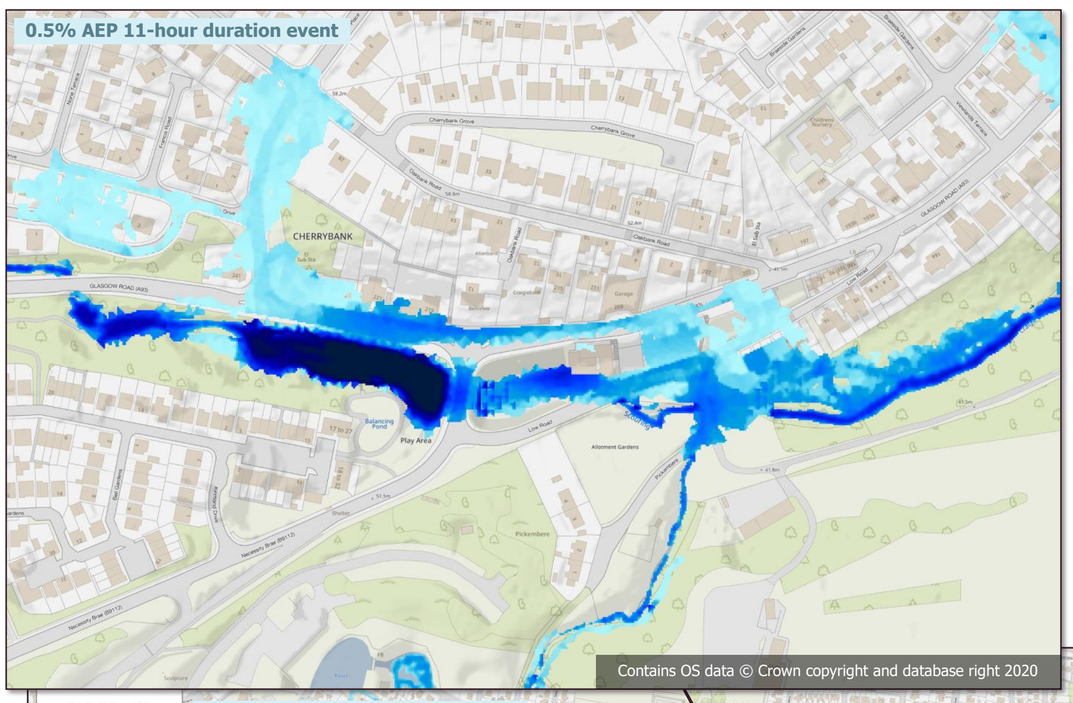
Flood Mechanisms

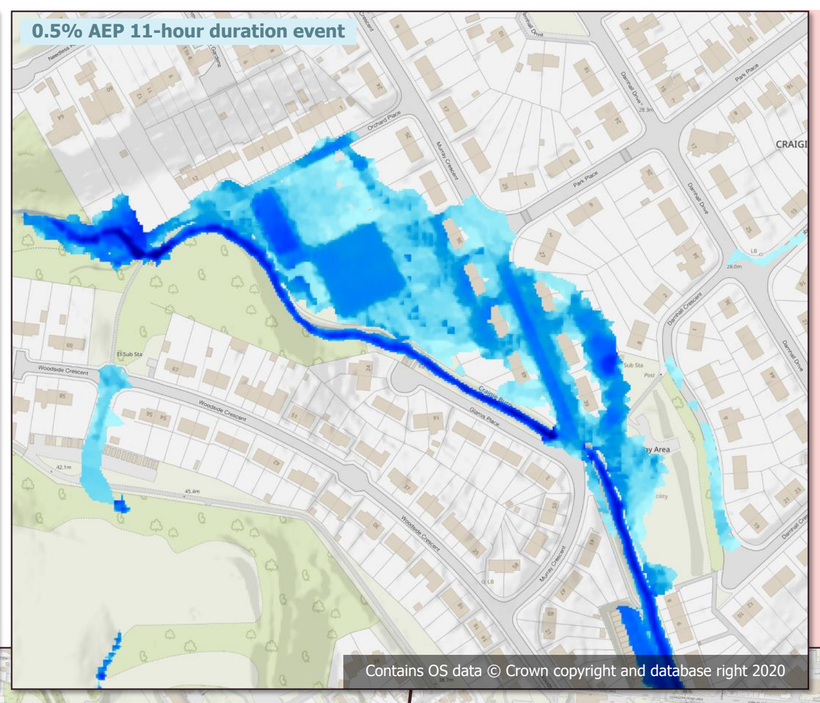
The hydraulic model is an **integrated model**, meaning it considers both surface water and watercourse flooding. This has allowed us to further improve our understanding of these well-observed flooding mechanisms in the catchment. Notable findings are:

The **critical duration** of the catchment, which is the duration of the storm that causes the largest volume of flooding, is **11 hours**. This means that the most severe **flooding from the watercourses** is expected to happen when a storm of this duration occurs in the catchment. Severe flooding can also occur during short duration intense rainfall events too, as has been witnessed.

While rivers and watercourses are a significant contributor, **surface water flooding** has also been identified as having a major impact on flooding in the catchment. This means that the flooding cannot be attributed solely to one source. This is particularly noticeable during **shorter storms**.

The catchment is made up of both **urban** and **rural** areas, and this mix of environments leads to substantial water flows even during shorter storms. The combination of urban and rural areas contributes to the overall flood risk in the catchment, regardless of the storm duration.



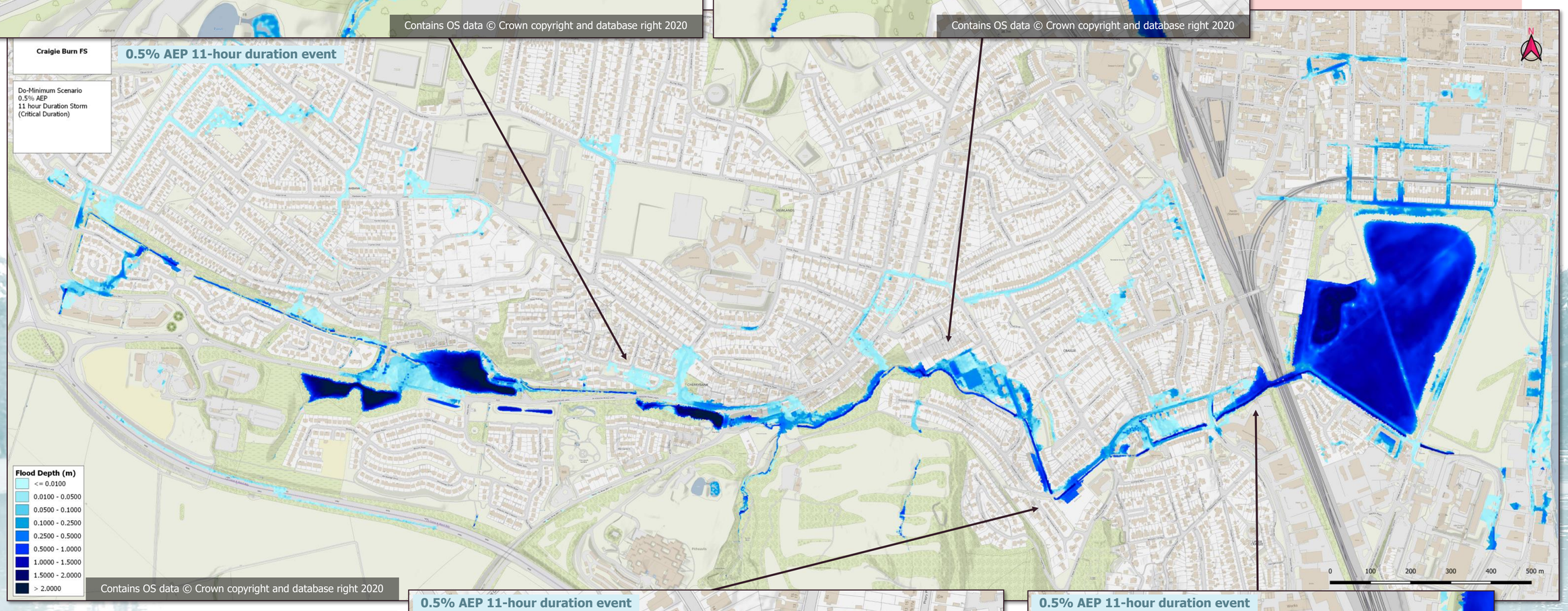


Flood Risk in Numbers

57 properties are predicted to be at risk of flooding during the **0.5% AEP** event (51 residential properties and 6 non-residential).

The estimated flood damages are **£632,173**.

The number of properties at risk of flooding is predicted to increase to 106 residential and 8 non-residential properties in future due to **climate change**.



What about my property?

Feel free to check the flood maps here to see the general flood risk in your area. It's important to keep in mind that the computer modelling used for these maps looks at the overall catchment area and **may not consider specific details of individual properties**. Factors like raised floor levels, roads, and garden walls, which can influence the flow of water in reality, are not specifically accounted for in the modelling. So, while the maps give a good **indication** of the flood risk, they may **not** reflect all the localised features that could affect water flow paths at your specific property.