KINTORE FLOOD PROTECTION STUDY – NON-TECHNICAL SUMMARY

Date: 15/01/26

1. Introduction

RSK / Binnies were commissioned by Aberdeenshire Council to carry out a flood protection study in Kintore. This non-technical summary provides a general overview of the Kintore Flood Protection Study outputs, issued in January 2026, including its background, objectives, methodology, key findings, and recommendations. For full technical details, please refer to the Kintore Flood Protection Study report, Option Appraisal and Hydrology & Hydraulics Modelling reports.

2. Background and objectives

Kintore, located in Aberdeenshire, has experienced significant flooding in recent years, notably 2016, 2020 and 2022. These events affected homes, businesses, transport links and community infrastructure. The severity of these events combined with SEPA's climate change future projections, highlighted the need for a detailed assessment and flood mitigation solutions.

Under the Flood Risk Management (Scotland) Act 2009, Kintore was designated as a Potentially Vulnerable Area (PVA 02/06/13) within the North East Local Plan District (LPD6) due to river and surface water flooding. The North East Flood Risk Management Strategy set out actions to manage flood risk, including a specific requirement to carry out a flood protection study.

The main objectives of the study were the following:

- Assess the current flood risk from rivers, surface water, and other sources within Kintore.
- Evaluate potential flood risk management measures and recommend effective, sustainable and affordable options.
- Prepare for climate change, which is predicted to produce more intense and frequent flood events in the future.
- Engage with stakeholders including SEPA, Scottish Water, and the local community to incorporate their knowledge and concerns in the study.

Flooding in Kintore typically results from high flows in either Torry Burn, Tuach Burn, Loch Burn, or River Don; when the water levels exceed the river banks during periods of heavy and prolonged rainfall. Surface water flooding is also common generally during episodes of intense rainfall, when the generated runoff exceeds the capacity of the local drainage network. In addition, interactions between both the fluvial and drainage networks can aggravate flooding: high water levels in the River Don reduce the capacity of the drainage network to discharge, leading to potential backing up and flooding. These flooding mechanisms are particularly evident in Northern Road, Macallan Road, Kingsfield Road and Tumulus Way areas.

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3. Methodology

The study followed the established industry and government standards and good practices for flood risk management planning. The key stages covered in the flood protection study included:

1. Collection and review of data such as historical flood records, topographic data, geological and geotechnical constraints, environmental aspects, and river flow and rainfall data. These were gathered from Aberdeenshire Council, national datasets, previous studies, and local observations via questionnaire. To ensure accuracy, topographic surveys were carried out to update information on areas of interest, including river cross sections, so watercourses and their surroundings could be accurately represented in the hydraulic model. In addition, property threshold level survey was conducted to help estimate flood damages across Kintore.
2. A mathematical model was built to understand the current and future flood risk in Kintore. This integrated catchment model, represented the River Don, local watercourses, the drainage network, and the ground surface, enabling the simulation of flows through these systems and their interactions. A hydrology assessment was carried out to estimate representative inflows into the watercourses. The model was calibrated and validated using recorded flow data from the River Don and historical flood event information. The verified hydraulic model was used to predict flooding for a wide range of rainfall events. Flood maps were generated for return periods ranging from 1 in 2-year to 1 in 1,000-year, both for present-day and climate change scenarios. These maps show the extent and depth of flooding, highlighting which areas are most at risk.
3. The available information and the hydraulic model were used to identify flooding issues within the catchment. These findings served as a baseline for evaluating options to manage flood risk. A long list of measures was developed, including actions that could be taken to reduce or manage the flood risk, such as direct defences (flood walls and embankments), natural flood management (NFM), wetland creation, floodplain recovery, sustainable drainage systems (SuDS), and non-structural measures. This long list was screened to remove actions that were clearly unfeasible, leaving an initial short list of potential actions. The screened options were evaluated using a multi-criteria assessment (MCA) to determine their suitability, covering technical, environmental, social and economic aspects. This scoring allows the elimination of measures that were not practical or viable for the situation. The final short-listed options were appraised in detail, using the hydraulic model to evaluate their performance under different scenarios. Implementation requirements, compatibility with other policies and plans are also considered at this stage. Based on the benefits associated with the flood reduction provided by the short-listed viable options, and the cost of implementing, operating and maintaining them through their life cycle, the benefit-cost ratio (BCR) is calculated. Options with a BCR greater than 1 are considered to provide a cost-effective flood mitigation. The combination of MCA results and BCR estimation informed the final options recommended for implementation.
4. A public consultation event was held to present and explain the flood protection study outcomes and recommended options for implementation and engage with the community and stakeholders. The event provided an opportunity to gather feedback, incorporate local knowledge into the process.

4. Outcomes and recommendations

The model shows that parts of Kintore are already at risk from flooding during high-flow events through the watercourses crossing the study area (Northern Road, Macallan Road, Kingsfield Road and Tumulus Way areas are particularly exposed). Surface water flooding can also occur in heavy rainfall, especially where drainage capacity is limited (notably Hallforest Drive and Castle Road area). Climate change scenarios reveal an increase in the severity of flood events, causing greater damages affecting more people and properties. A total of 48 potential actions to mitigate flood risk were considered in the long list. Following screening, stakeholders' engagement consultations, and a multi-criteria assessment process, twelve options were shortlisted:

- **Option 1**: Storage area at Kintore football pitch.
- **Option 2**: Upstream storage area on Tuach Burn.
- **Option 3**: Upstream storage area on Sheriff Burn.
- **Option 4**: Flood walls along Tuach Burn.
- **Option 5**: De-culverting section at Tumulus Way.
- **Option 6**: Flood-relief channel at Tumulus Way.
- **Option 7**: Upstream storage area on Torry Burn.
- **Option 8**: Wetland north of Tuach Burn.
- **Option 9**: Flood wall at Macallan Road.
- **Option 10**: Land reprofiling at Old Torryburn Hotel.
- **Option 11**: Culvert replacement on Torry Burn.
- **Option 12**: New surface water pipes and SuDS.

Only two options passed the multi-criteria assessment in full, these were Option 3 (Upstream storage area on Sheriff Burn) and Option 9 (Flood wall at Macallan Road).

Table 4-1 – Method used for flow estimation

Option No.	Estimated Cost	Estimated Benefit	Benefit-Cost Ratio (BCR)
1	£5,958,846	£203,941	0.0
2	£1,842,185	£1,103,639	0.6
3	£509,276	£1,203,880	2.4
4	£2,697,667	£279,637	0.1
5	£162,255	£139,916	0.9
6	£505,427	£16,795	0.0
7	£695,997	-£95,599	-0.1
8	£5,291,263	£488,516	0.1
9	£487,368	£1,145,725	2.4
10	£1,534,180	£489,164	0.3
11	£1,146,938	£201,369	0.2
12	£2,129,315	£89,704	0.0

(a) Option 3. Upstream storage area on Sheriff Burn

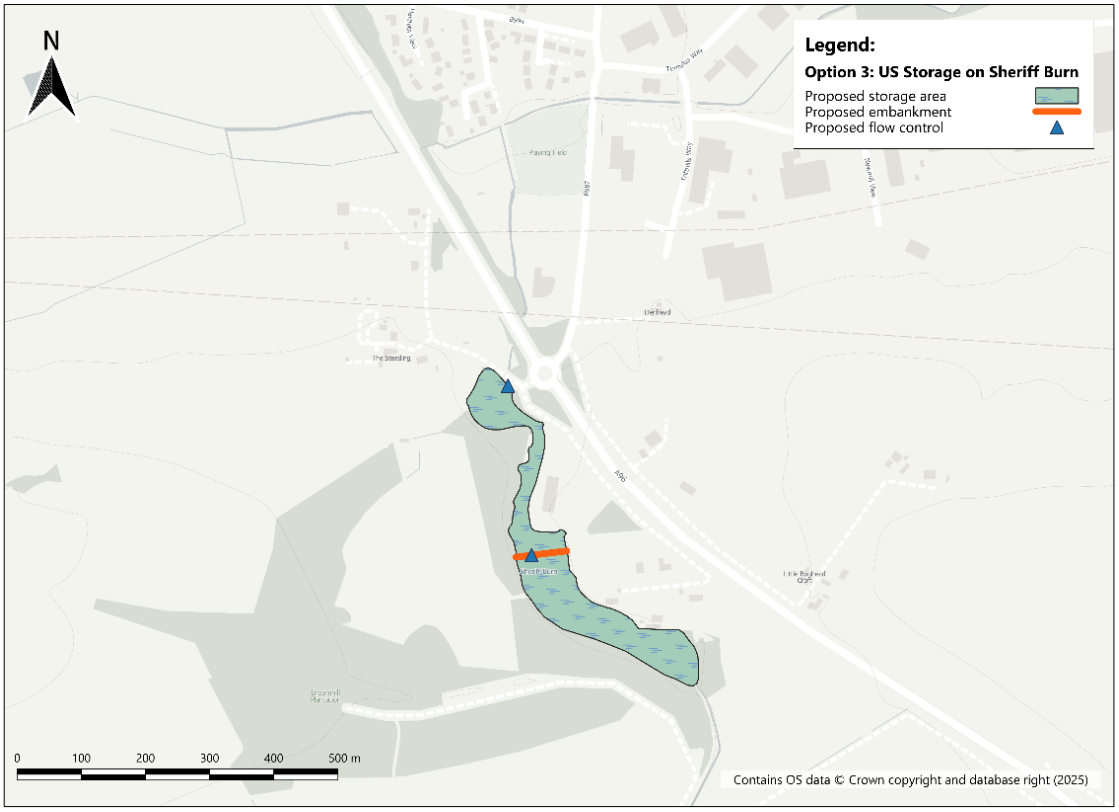

Figure 4-1 – Option 3 sketch

The preferred option at the Sheriff Burn involves creating two separate flood storage areas to temporarily hold back water during high flows and reduce flood risk downstream in Kintore.

The upper storage area, located further upstream, will be formed by building a small earth embankment or flood bund across the Sheriff Burn and it will have a storage capacity of 8,500 m^3. Water will be able to pass through a pipe with a flow control device (Hydro-Brake), which attenuates water flow downstream. The embankment will also include an overflow channel to safely release water excess if levels rise too high during extreme events.

The lower storage area, located closer to the A96 road, will use the existing culvert under the road with a flow control device to attenuate flows. An overflow across the farm track will be incorporated to allow water to be safely discharged if levels are too high. This storage area will be able to store up to 7,100 m^3 of water.

(b) Option 9: Flood wall at Macallan Road

Figure 4-2 – Option 9 sketch

At Macallan Road area, the preferred option is to build a new flood wall about 250 metres long. The proposed wall will be around 0.8m to 1.4m high (depending on ground level) and will provide protection for the properties located east of Torryburn Wood. This wall will be made from precast concrete blocks (such as LEGATO blocks) which are manufactured off-site. This method reduces construction time, noise and dust compared to more traditional formwork and in-situ concrete pouring; and therefore, minimising disturbances for nearby residents. There are also two off-site locations where speed humps are proposed on minor roads to direct surface water away from the area and back into the Torry Burn.

4.2 Outcomes and recommendations

Considering the multi-criteria assessment outcomes, the benefit-cost ratio (BCR) values and the feedback received during the public engagement event, the following course of action is recommended.

The preferred option at Macallan Road comprises a section of flood wall. This wall will protect homes in the area and is expected to reduce flooding for up to 28 properties during major flood events with a 1% chance of occurring in any given year (called 1 in 100-year event). Feedback from the public was very positive, and the analysis shows this option is highly cost-effective, with a BCR of 2.4.

The preferred option on the Sheriff Burn comprises two separate on-line flood storage areas. These areas will temporarily hold excess water during heavy rainfall, helping to protect around 21 properties from flooding during events with a 1% annual chance (1 in 100-year event). This option also received strong support from residents and offers good value for money, with a BCR of 2.4.

Together, these two measures will provide protection for 49 properties during major flood events with a combined BCR results in 2.4. Both options are cost-effective and strongly supported by the community, so it is recommended they be implemented as a combined flood protection scheme.