

Case Study: Developing & Deploying Temporary Flood Barriers

Introduction:

Kemnay is a village situated 16 miles west of Aberdeen with a population of approximately 4000. The main source of flooding is from the River Don. [Kembhill Park Flood Group](#) (KPFG) formed in 2016 after around 32 homes in the Kembhill Park area were flooded causing approximately £1million in repair costs. [Aberdeenshire Council](#) (AC) and the [Scottish Flood Forum](#) (SFF) provided support and advice to residents during the recovery process.

Who are Kembhill Park Flood Group?

KPFG was set up by residents of Kembhill Park in March 2016 to try to prevent and reduce future flood risk to the area. KPFG developed further by becoming a [registered charity](#) in 2017 with specific aims to:

- Save lives
- Advance community development and improve environmental protection.
- Increasing awareness about flood risk in the Kembhill Park and surrounding area.
- Propose actions to reduce the risk of damage to property which could be caused by a repeat of the flood of 8th January 2016.
- Provide a voice for residents in Kembhill Park and surrounding area who are members of this group concerning all matters in relation to flood risk and prevention.
- Mitigate the risk of environmental pollution caused by raw sewage from the local sewage plant in the event of a flood event.

What circumstances led to the development of a temporary flood barrier?

“Although an earth bund had been constructed around the houses at Kembhill Park in 1978 as a result of near flooding events in previous years, the bund did not extend round all of the housing scheme with the result that the exceptionally high water levels in the River Don in January 2016 came through the gap in these defences.”

“After our homes were flooded in January 2016, we quickly formed a local flood group with the support of the SFF. After discussions with Aberdeenshire Council officials they agreed that they would provide temporary protection for our houses until such time as they could provide a permanent solution. Our houses are not suitable for individual property level protection as they are constructed with wooden cladding on top of a wooden frame sitting on a concrete base with a two-inch gap round the bottom of each semi-detached house”.

“The Council recognised that standard property level protection such as automatic air bricks, synthetic sandbags and flood barrier protection would not stop flooding to our houses”.

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“The Council indicated that they cannot build a permanent flood protection barrier at Kembhill Park without a flood study and although we understand community frustrations, we need to understand the impacts upstream and downstream of any barrier, so that other areas are not put at risk. They therefore suggested a temporary solution to the problem in the form of the Watergate barrier”.

What type of temporary flood barrier is used in Kemnay?

“The [Watergate system](#) is a temporary flood barrier that once rolled out self-deploys as a defence as water enters the barrier sections. It uses the weight of the water to keep it in place and hold the water back. The water lifts the top of the barrier whilst at the same time weighing the base down, forming a seal. By utilising this unique self-opening method, it can reduce the time, effort and number of people required to install it”.

The barrier comprises of 11 sections that cover a length of approximately 100 meters. In addition, 3 high volume pumps are deployed behind the barrier as a contingency back up option.



Figure 1: Watergate aerial view & map showing location of pumps: Credit Briggs Marine Services

Good Practice Point: Engaging the community as equal partners in the process can help to overcome problems and create joint solutions.

What were the key issues to consider in developing a temporary flood barrier?

“At the concept stage we thought that members of the community could deploy the barrier as part of their own resilience actions. It quickly became apparent that this was not feasible due to the size and complexity of the deployment plan and issues of insurance and liability for volunteers. It was decided therefore to appoint a standby contractor whose job it would be to deploy the barrier in an emergency. The next stage involved working with KPFG to determine how it would work, agree the optimum route and the best place for storage.”

“Before KPFG agreed to proceed with the project we consulted with all of our flood group members and although there were some reservations most people agreed that temporary protection was better than no protection”.

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Good Practice Point: For a barrier of this size establish a standby contractor at an early stage in the process and consider how you will involve the community in key decisions.

The temporary flood barrier is used to create an artificial wall blocking flood water from the River Don getting near the houses. However, to be successful, there needed to be an effective plan developed by the Council for the deployment of the barrier.

Deployment Plan:

The deployment plan had to fully consider operational, strategic and tactical issues, with limitations at each level considered. Testing of the deployment plan at an early stage was beneficial to KPFGB, Council flood risk engineers, the standby contractor and emergency planning staff as this allowed practical issues to be ironed out.¹



Figure 2: Deployment: Credit Briggs Marine Services

Good Practice Point: Consider storage of a temporary flood barrier at an early stage to explore the location is appropriate for rapid deployment, easy access and maintenance.

What aspects of the development of the barrier could be done better or what would you consider doing differently?

“Thinking through the storage location more carefully and limiting access to the barrier by third parties is an important lesson that we have learned as part of the process”.

What challenges did you come across and how did you overcome these?

“There were many project issues to discuss with the Council and we did not always agree and even had different ideas. Through negotiation and consultation in a non-confrontational manner agreement was reached on all the issues which had to be tackled”.

“The community was sceptical at first and we needed to engage with people to discuss the flood risk management process and doing that with KPFGB proved to be very effective”.

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What top tip would give to another community or organisation considering their use of temporary barriers?

“Engage positively with the local authority at an early stage to ensure their involvement in finding a solution to the problem. Avoid confrontation and playing a blame game”.

Good Practice Point: It’s important to consider the different kinds of triggers that will activate deployment of a temporary flood barrier such as SEPA flood alerts, flood warnings and local knowledge.

Is there anything else you would like to add about the case study?

“We always advise that homeowners have the primary responsibility for protecting their properties from flooding. The temporary barrier offers a unique solution because standard property level protection products will not work in Kembhill Park due to timber frame/timber cladding house construction. While this is not something we would likely wish to add at other locations, in this instance the temporary flood barrier and standby contractor offers a fast and reliable solution to the flood risk in the area.”

What are the next steps in developing the temporary barrier?

“As the local authority we will continue to monitor the deployment contract for the next three years, carry out an annual trial deployment and liaise with KPFGB and SEPA to improve our understanding of flood warnings and River Don water levels data”.

“KPFGB will continue to look for funding opportunities to purchase additional sections of the barrier just in case they are needed to protect our community”.

Good Practice Point: Consider the logistics behind site preparation and barrier route at an early stage in the process and involve the local community.

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¹ [Cartwright A, Tsavdaris A, Burton R and Matthews D \(2019\)](#)

Delivering temporary flood defence deployment plans: lessons learned from case studies in the UK.