

PERTH AND KINROSS COUNCIL**Environment Committee****9 November 2016****Flood Protection Schemes - Bankfoot and Coupar Angus****Report by Executive Director (Environment)**

This report describes the Council's investigations into potential flood protection schemes in two separate areas – Bankfoot and Coupar Angus. The report recommends that flood protection schemes are not taken forward in both areas as they are not economically viable. The report also notes that the Council will continue to manage flood risk in the Bankfoot and Coupar Angus areas by implementing the actions set out in the published Tay Flood Risk Management Strategy and Local Flood Risk Management Plan.

1. BACKGROUND / MAIN ISSUES

- 1.1 Under the Flood Risk Management (Scotland) Act (the 2009 Act), SEPA and lead local authorities recently published new Flood Risk Management (FRM) Strategies and Local FRM Plans. These documents set out a range of structural and non-structural actions that SEPA and responsible authorities will take to manage and, where possible, reduce the risk of flooding over the next six years.
- 1.2 The Environment Committee approved the publication of the Tay Local FRM Plan on 1 June 2016 (Report 16/241 refers). The final documents can be viewed at the following links:
 - <http://apps.sepa.org.uk/FRMStrategies/tay.html>
 - <http://www.pkc.gov.uk/frmplans>
- 1.3 The 2009 Act provides local authorities with discretionary powers to promote new flood protection schemes. Only those flood schemes which have been included in the FRM Strategies, the Local FRM Plans and the national priority list will be taken forward in the next six years.
- 1.4 Although public authorities are expected to take a proactive role in managing and, where achievable, lowering flood risk, the primary responsibility for avoiding or managing flood risk still remains with land and property owners. The 2009 Act does not alter this. Individuals, businesses and communities must, therefore, play a critical role in making themselves more resilient and helping to reduce the impact of flooding.

Bankfoot

- 1.5 Bankfoot is located in the River Tay catchment area within Potentially Vulnerable Area (PVA) 08/08.

- 1.6 Bankfoot is at risk of flooding from two main sources - the Garry Burn and the Glenshauch Burn. Other minor watercourses and surface water at various locations, including Smiths Brae, Dunkeld Road and Tulliebelton Place, also present a less significant risk of flooding.
- 1.7 On 24 October 2007, the Council's Enterprise & Infrastructure Committee approved the promotion of a flood scheme for Bankfoot subject to the availability of finance (Report 07/681 refers). This was following a previous flood study by consulting engineers, Mouchel, that had indicated that a flood scheme may be economically viable.
- 1.8 When funding was made available, consulting engineers, CH2M (formerly Halcrow), were engaged in 2009 to promote a flood scheme. Their investigations involved a thorough and comprehensive exercise including extensive data gathering and analysis, topographic surveys, ground investigations, a hydrological assessment, hydraulic modelling, ecological/habitat surveys, consultations, environmental reports, an optioneering study, an economic appraisal and the production of final reports.
- 1.9 The investment in this work was considered to be justified by the strong economic case put forward in Mouchel's earlier study and the intention to promote a scheme quickly.
- 1.10 CH2M considered eleven potential options for managing flood risk within Bankfoot and these were evaluated against various technical, environmental and economic criteria. The flood risk management options considered within their report, and the estimated costs and benefit cost ratios, are summarised in Appendix A.
- 1.11 Unfortunately during the course of the project, CH2M reported that their investigations had shown that a flood scheme was no longer economically viable. Work was therefore stopped and CH2M were instructed to produce their final reports.
- 1.12 The work on the flood scheme has therefore not progressed to the design stage and does not form part of the published Tay FRM Strategy or Local FRM Plan.
- 1.13 In managing flood risk, the Council is required to have regard to the economic, social and environmental impact of its actions. The Scottish Government's guidance recommends that a project appraisal (including a cost-benefit analysis) is the most appropriate approach to determine whether a flood protection scheme is worthwhile and represents value for money.
- 1.14 In general, the cost of flood damage avoided over time must be greater than the cost of building the flood defences, i.e. they must achieve a benefit/cost ratio of greater than 1.0.

- 1.15 In the case of Bankfoot, the table in Appendix A shows that almost all of the potential options considered have benefit/cost ratios of below 1.0.
- 1.16 None of the potential options considered for the Glenshauch Burn have benefit/cost ratios greater than 1.0.
- 1.17 For the Garry Burn, Options 3c and 3d involve the replacement of the Tulliebelton Road Bridge, the construction of flood walls and embankments and the provision of an alternate flow path for flood water to the south of the village. These options have benefit/cost ratios which are marginally greater than 1.0; however this means that any slight increase in cost going forward could easily result in either of these ratios reducing to less than 1.0.
- 1.18 Despite the extensive work carried out to date, there are a number of unforeseen risks and uncertainties associated with taking forward either Option 3c or 3d at this stage. The work carried out by CH2M is essentially a feasibility study. The proposals and cost estimates would therefore still have to be developed through a long process of further investigations, outline design, the statutory process, detailed design, tendering and construction. Experience on other similar schemes has invariably shown that the costs estimated at feasibility stage always increase.
- 1.19 Options 3c and 3d would only provide flood protection to a small number of homes and businesses and a number of properties would remain at risk. CH2M have therefore not recommended taking these options forward as a scheme.
- 1.20 The Council must also balance the potential further cost of developing these proposals against the high likelihood of the benefit/cost ratio reducing to below 1.0, as well as the need for funding to progress flood defences in other areas.
- 1.21 Other options, such as dredging and natural flood management, were found to be either not technically feasible or would not reduce flood risk substantially enough, or provide adequate protection to properties. There is no economically viable flood scheme which could provide flood protection to the whole village.
- 1.22 CH2M's final report therefore clearly recommends that a flood scheme in Bankfoot is not economically viable.
- 1.23 Although a wider flood scheme for the area may not be economically viable, the Council has other powers under the 2009 Act to manage flood risk. Some localised action has already been undertaken in recent years to manage flood risk in the area such as clearance works on the burns, culvert repairs, road works and minor drainage improvements.

- 1.24 Scottish Water has also recently undertaken some survey work on sewers in the area. Some debris and obstructions were removed from the sewer network, although these are unlikely to have been significant causal factors in the performance issues that have been experienced in the village. Scottish Water's investigations are on-going.
- 1.25 The flood scheme investigations have also informed other on-going actions to manage flood risk under the 2009 Act. Bankfoot is one of the 254 Potentially Vulnerable Areas in Scotland that have been identified as being at significant risk of flooding and where flood risk management actions should be prioritised. The published Tay FRM Strategy and Local FRM Plan include the following actions for Bankfoot:-
- Strategic flood mapping and modelling (Scottish Water);
 - Flood forecasting (SEPA);
 - Awareness raising;
 - Self-help measures;
 - Maintenance (clearance and repair works);
 - Emergency plans/response;
 - Managing flood risk through the application of development planning policy.
- 1.26 The recommendations and conclusions within CH2M's final report are largely in line with those also identified in the Tay Local FRM Plan.
- 1.27 Linked to the responsibilities outlined in paragraph 1.4, the Tay Local FRM Plan includes actions which are intended to enable communities to take action and to become more resilient to flooding.
- 1.28 To this end, the final consulting engineers report on the flood scheme investigations, information on the public authorities' on-going action to manage flood risk, and the actions that the local community can take were the subject of two community drop in sessions in Bankfoot on 23 August and 7 September 2016. Further details are provided in Section 4 of the Annex to this report.
- 1.29 The Council's flooding team has also met with the Auchtergaven Community Council and the Bankfoot Resilience Group to hold further discussions regarding watercourse clearance works and other community resilience activity. The Council will continue to raise awareness of flooding and encourage the local community to become more prepared and resilient to deal with flooding in the future.

Coupar Angus

- 1.30 Coupar Angus is located within the River Tay catchment area and is located within PVA 08/07.

- 1.31 Flooding occurred in the George Street area of Coupar Angus in August 2004 when the Coupar Burn burst its banks. Flooding is reported to have affected six properties with two requiring evacuation
- 1.32 The Council subsequently engaged term consulting engineers, Mouchel, to investigate the flooding and produce a flood study. Mouchel's final report of January 2007 concluded that a flood protection scheme may be economically viable and recommended a flood wall along the Coupar Burn behind George Street.
- 1.33 The consultant's findings were reported to the Council's Enterprise and Infrastructure Committee on 24 October 2007 (Report No. 07/681 refers). The Committee agreed to the promotion of a flood scheme, subject to the availability of finance.
- 1.34 In 2013, when funding and resources became available, consulting engineers, Capita, were engaged to promote a flood protection scheme. Capita developed and updated the previous Mouchel flood study into a more comprehensive investigation of flooding issues in George Street and the surrounding area. This was required to support the promotion of a formal flood protection scheme and included a re-evaluation of the catchment hydrology, a more detailed hydraulic model (based on LIDAR and topographical data), consideration of other potential options to mitigate flooding and a re-assessment of costs and flood damages in accordance with national guidance.
- 1.35 Capita initially considered a long list of seven potential options (A – G) for managing the risk of flooding. This long list was refined by a technical, environmental and economic appraisal until the following short list of four potential options (as shown in Appendix B) was selected for detailed analysis:
- 1.36 **Option A:** Flood embankment and flood wall – this option involves a new flood wall behind the properties along George Street and a new flood embankment adjacent to Candlehouse Lane. The estimated cost is £1,009,360.
- 1.37 **Option B:** Flood embankments and channel enlargement – this option involves a new flood embankment adjacent to Candlehouse Lane and the enlargement of the channel upstream of the George Street Bridge. The estimated cost is £584,840.
- 1.38 **Option C:** Flood embankment, channel and bridge enlargement – this option involves a new flood embankment adjacent to Candlehouse Lane and the enlargement of the George Street Bridge and the channel upstream. The estimated cost is £1,324,485.

- 1.39 **Option G:** Dredging of Coupar Burn – this option involves dredging the channel of the Coupar Burn, the Kinnochtry Burn and the Kettins Burn. The estimated cost is £1,875,358. Note that this estimate includes on-going costs for regular (5 yearly) dredging of the burns to maintain the standard of flood protection.
- 1.40 Of the four options considered, Option A is the only scheme that provides the standard of flood protection required. Options B, C and G would not provide the required standard of flood protection to some properties at risk of flooding.
- 1.41 The basic requirements regarding cost benefit analysis are as noted above at paragraphs 1.13 and 1.14. The calculated benefit/cost ratios for the short listed options are:
- Option A – 0.19
 - Option B – 0.33
 - Option C – 0.15
 - Option G – 0.06
- 1.42 Capita concluded that none of the options considered have a benefit/cost ratio greater than 1.0 and a flood protection scheme for the Coupar Angus area is therefore not economically viable.
- 1.43 Work on the flood scheme has therefore not progressed to the design stage and does not form part of the published Tay FRM Strategy or Local FRM Plan.
- 1.44 The flood scheme investigations have also informed other on-going actions to manage flood risk under the 2009 Act. Coupar Angus is one of the 254 Potentially Vulnerable Areas (PVAs) in Scotland that have been identified as being at a significant risk of flooding and where flood risk management actions should be prioritised. The published Tay FRM Strategy and Local FRM Plan include the following actions for Coupar Angus:-
- Strategic flood mapping and modelling (SEPA and Scottish Water);
 - Flood forecasting (SEPA);
 - Awareness raising;
 - Self-help measures;
 - Maintenance (clearance and repair works);
 - Emergency plans/response;
 - Managing flood risk through the application of development planning policy.
- 1.45 The recommendations and conclusions within Capita's final report align with the actions proposed as part of the Tay FRM Strategy and Local FRM Plan.

- 1.46 Linked to the responsibilities outlined in paragraph 1.4. The Tay Local FRM Plan includes actions which are intended to enable communities to take action and to become more resilient to flooding.
- 1.47 In order to disseminate the work carried out by Capita and to outline how flood risk will be managed in the Coupar Angus area in future, two community drop in sessions were held in Coupar Angus on 25 and 31 August 2016. Further details are provided in Section 4 of the Annex to this report.
- 1.48 The Council's Health, Safety and Wellbeing Manager is currently in discussions with Coupar Angus and Bendochy Community Council in order to set up a community resilience group.
- 1.49 The Council will continue to raise awareness of flooding and encourage the local community to become more prepared and resilient to deal with flooding in the future.

2. PROPOSALS

- 2.1. In view of the fact that the consultants' reports have demonstrated that flood protection schemes in both Bankfoot and Coupar Angus are not economically viable, it is proposed that no further work should be undertaken on the development of these schemes. This is consistent with the published Tay FRM Strategy and Local FRM Plan.
- 2.2. The Council will continue to manage flood risk in the Bankfoot and Coupar Angus areas by implementing the actions set out in the published Tay FRM Strategy and Local FRM Plan.

3. CONCLUSION AND RECOMMENDATION(S)

- 3.1. The Council has engaged consulting engineers to carry out detailed investigations into possible flood protection schemes for Bankfoot and Coupar Angus.
- 3.2. In both instances, the consulting engineers have concluded that flood protection schemes are not economically viable and therefore no flood schemes are proposed.
- 3.3. Unfortunately, it is never evident if a flood scheme is technically feasible or economically viable until consulting engineers are engaged to carry out the necessary, and often lengthy, study work and investigations.
- 3.4. The consultants have recommended a number of actions to mitigate flood risk in the areas of Bankfoot and Coupar Angus in the future. These actions align with those outlined in the published Tay FRM Strategy and Local FRM Plan.

3.5. It is recommended that the Committee:

- i. Agrees to stop work on the Flood Protection Schemes for Bankfoot and Coupar Angus as the schemes cannot be economically justified.
- ii. Notes that the Council will continue to manage flood risk in the Bankfoot and Coupar Angus areas by implementing the actions set out in the published Tay Flood Risk Management Strategy and Local Flood Risk Management Plan.
- iii. Notes that this position is consistent with the published Tay Flood Risk Management Strategy and Local Flood Risk Management Plan.

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1. IMPLICATIONS, ASSESSMENTS, CONSULTATION AND COMMUNICATION

Strategic Implications	
Community Plan / Single Outcome Agreement	Yes
Corporate Plan	Yes
Resource Implications	
Financial	None
Workforce	None
Asset Management (land, property, IST)	None
Assessments	
Equality Impact Assessment	Yes
Strategic Environmental Assessment	Yes
Sustainability (community, economic, environmental)	Yes
Legal and Governance	Yes
Risk	Yes
Consultation	
Internal	Yes
External	Yes
Communication	
Communications Plan	None

1. Strategic Implications

Community Plan/Single Outcome Agreement

1.1 The proposals in this report relate to the delivery of the Perth and Kinross Community Plan / Single Outcome Agreement in terms of following the priorities:

- (ii) Developing educated, responsible and informed citizens
- (iii) Promoting a prosperous, inclusive and sustainable economy
- (iv) Supporting people to lead independent, healthy and active lives
- (v) Creating a safe and sustainable place for future generations

Corporate Plan

1.2 The proposals in this report relate to the achievement of the following Corporate Plan Priorities:

- (ii) Developing educated, responsible and informed citizens;
- (iii) Promoting a prosperous, inclusive and sustainable economy;
- (iv) Supporting people to lead independent, healthy and active lives; and
- (v) Creating a safe and sustainable place for future generations.

2 Resource Implications

Financial

- 2.1 There are no resource implications arising directly from the recommendations in this report.

Workforce

- 2.2 There are no workforce implications arising directly from this report.

Asset Management (land, property, IT)

- 2.3 The proposals in this report have no asset management implications.

3 Assessments

Equality Impact Assessment

- 3.1 Under the Equality Act 2010, the Council is required to eliminate discrimination, advance equality of opportunity, and foster good relations between equality groups. Carrying out Equality Impact Assessments for plans and policies allows the Council to demonstrate that it is meeting these duties. The Equality Impact Assessment undertaken in relation to this report can be viewed clicking [here](#).
- 3.2 The function, policy, procedure or strategy presented in this report was considered under the Corporate Equalities Impact Assessment process (EqIA) with the following outcome.
- 3.3 Following an assessment using the Integrated Appraisal Toolkit, it has been determined that the proposal is assessed as **relevant** and actions taken to reduce or remove the following negative impacts:
- The effects and aftermath of flooding could have a greater impact on mobility impaired, sight impaired or blind people, learning disabled people, children, the elderly and infirm, pregnant women or nursing mothers and families with young children in relation to adverse psychological, physical and health impacts.
- 3.4 The following actions have been taken to mitigate negative impacts:
- The published Tay FRM Strategy and Local FRM Plan include other on-going actions to manage flood risk in Bankfoot and Coupar Angus.

Strategic Environmental Assessment

- 3.5 The Environmental Assessment (Scotland) Act 2005 places a duty on the Council to identify and assess the environmental consequences of its proposals.

- 3.6 The matters presented in this report were considered under the Environmental Assessment (Scotland) Act 2005 and no further action is required as it does not qualify as a PPS as defined by the Act and is therefore exempt.

Sustainability

- 3.7 Under the provisions of the Local Government in Scotland Act 2003 the Council has to discharge its duties in a way which contributes to the achievement of sustainable development. Under the Climate Change (Scotland) Act 2009 the Council also has a duty relating to climate change and, in exercising its functions must act:
- in the way best calculated to delivery of the Act's emissions reduction targets;
 - in the way best calculated to deliver any statutory adaptation programmes; and
 - in a way that it considers most sustainable.
- 3.8 Following an assessment using the Integrated Appraisal Toolkit, it has been determined that the proposal is likely to contribute **negatively** to the following corporate sustainable development principles:
- Equality & Diversity

Justification:

- 3.9 The effects and aftermath of flooding could have a greater impact on mobility impaired, sight impaired or blind people, learning disabled people, children, the elderly and infirm, pregnant women or nursing mothers and families with young children in relation to adverse psychological, physical and health impacts.

Mitigation:

- 3.10 There are on-going actions to manage flood risk in Coupar Angus and Bankfoot identified in the Tay FRM Strategy and FRM Plan.

Legal and Governance

- 3.11 The Head of Legal and Governance has been consulted on this report.
- 3.12 The legal basis for the proposals set out in this report is the Flood Risk Management (Scotland) Act 2009.

Risk

- 3.13 Flooding is a natural phenomenon that can never be entirely prevented. However the Council is required to manage and, where possible, reduce flood risk.

- 3.14 There is a risk associated with not implementing flood schemes in Bankfoot and Coupar Angus. Flooding is likely to continue in these communities, however the actions set out within the Tay FRM Strategy and Local FRM Plan will help to mitigate this risk.

4 Consultation

Internal

- 4.1 The Head of Legal and Governance, the Head of Democratic Services and the Head of Finance have been consulted in the preparation of this report.

External

- 4.2 SEPA were consulted during the early stages of the study work in both Bankfoot and Coupar Angus to provide technical advice in relation to hydrology and the hydraulic modelling. SEPA were also consulted on the consultants findings for both locations during the work to develop the Tay FRM Strategy and Local FRM Plan.
- 4.3 Scottish Water has been made aware of the outcome of the consultant's work for Bankfoot. The Scottish Flood Forum has also been made aware of the findings for both Bankfoot and Coupar Angus.

Bankfoot

- 4.4 Two community drop-in sessions were held in Bankfoot on 23 August and 7 September 2016. The aim of these events was to provide the community with further information on the risk of flooding; the outcome of the Council's investigations into a flood scheme; work to raise awareness of flooding and help the community become more resilient to it and other action being taken on flood risk.
- 4.5 A letter was issued to elected members, the Community Council and the resilience group summarising the work carried out by the consulting engineers and how flood risk will be managed in the future. 481 letters were also sent to local residents and businesses within the community to advertise the events. Approximately 40 people attended the sessions.
- 4.6 The drop-in sessions included a presentation and other information was on display. Representatives from the Council's flooding team, SEPA, Scottish Water, the Scottish Flood Forum and the Council's Health, Safety and Wellbeing Manager were available to answer questions and provide further information. Those attending were given an opportunity to record their views and questions on comment forms. A written response to any questions raised has been prepared and issued to the community, summarising the discussions held during the events.

Coupar Angus

- 4.7 Two community drop-in sessions were held in Coupar Angus on 25 and 31 August 2016. The aim of these events was to provide the community with further information on the risk of flooding; the outcome of the Council's investigations into a flood scheme; work to raise awareness of flooding and help the community become more resilient to it and other action being taken on flood risk.
- 4.8 A letter was issued to elected members and the Community Council summarising the work carried out by the consulting engineers and how flood risk will be managed in the future. 185 letters were also issued to local residents and businesses within the community to advertise the events. Approximately 20 people attended the sessions.
- 4.9 The drop-in sessions included a slide show, display boards and an information leaflet. Representatives from the Council's flooding team, SEPA, the Scottish Flood Forum and the Council's Health, Safety and Wellbeing Manager were available to answer questions and provide further information. Those attending were given an opportunity to record their views and questions on comment forms. A written response to any questions raised has been prepared and issued to the community summarising the discussions held during the events.

5 Communication

- 5.1 The communication arrangements were as noted in Section 4 above.

2. BACKGROUND PAPERS

- 2.1. The following background papers, as defined by Section 50D of the Local Government (Scotland) Act 1973 (and not containing confidential or exempt information) were relied on to a material extent in the preparation of the above report;

- PKC – Enterprise and Infrastructure Committee – 24 October 2007, Flood Mitigation Schemes and Flood Studies (Report No. 07/681)
- PKC – Environment Committee – 9 September 2015, The Flood Risk Management (Scotland) Act 2009, Selected Actions and Prioritisation (Report No. 15/359)
- PKC – Environment Committee – 1 June 2016, The Flood Risk Management (Scotland) Act 2009, Publication of Local Flood Risk Management Plans (Report No 16/241)

3. APPENDICES

- 3.1 Appendix A – Bankfoot Flood Protection Options and Cost Benefit Ratios
3.2 Appendix B – Coupar Angus Flood Protection Options

Bankfoot Flood Protection Options and Cost Benefit Ratios

Appendix A

The flood risk management options, and sub-options, considered within CH2M's report have been summarised below, along with the estimated costs and benefit/cost ratios.

No	Sub-Option No	Option	Estimated Cost (£)	Benefit/Cost Ratio
0	0b	Proactive Maintenance	290,373	0.52
	0c	Dredging to a depth of 0.5m	4,806,624	0.84
1	-	Conveyance/containment	13,660,266	0.40
2	a1	Tulliebelton Road Replacement + Wall (Bridge to 200yr + cc)	1,783,130	0.40
	a2	Tulliebelton Road Replacement	1,370,364	0.47
	b	Tulliebelton Road Replacement + Wall (Bridge to 50yr + cc)	1,601,442	0.42
3	a	Tulliebelton Bridge + Garry Relief Channel	2,859,507	0.95
	b	Tulliebelton Bridge + Garry Relief Channel	2,899,304	0.94
	c	Informal Escape Route + Tulliebelton Bridge	2,346,097	1.10
	d	Informal Escape Route + Engineered channel + Tulliebelton Bridge	2,551,522	1.04
4	-	Garry Burn – upstream storage	2,925,368	0.89
5	-	Glenshauch Burn – Local Conveyance Improvements	370,317	0.79
6	a	Glenshauch Burn – Upstream Storage	3,386,470	0.51
	b	Glenshauch Burn – Upstream Storage + Conveyance	3,683,210	0.48
7	a	Glenshauch Burn – Coral Burn Storage	997,469	0.45
	b	Glenshauch Burn – Coral Burn storage + Conveyance	1,288,438	0.41
8	-	Local Improvements – Perthshire Visitors Centre	289,187	*

No	Sub-Option No	Option	Estimated Cost (£)	Benefit/Cost Ratio
9	-	Upper and Lower Gauls Protection	385,931	*
10	a	Natural Flood Management – Reforestation of Upper Catchments	11,487,771	*
	b	Natural Flood Management – Flood Wave Attenuation	2,173,256	0.20
	c	Natural Flood Management – Re-meandering and Restoration of Flood Plains	458,147	*

** Options 8, 9, 10a and 10c have not been considered as standalone options and therefore no separate appraisal of damages, potential benefits, or Benefit/Cost Ratio has been calculated.*

Appendix B

Coupar Angus Flood Protection Options



