

Agenda Item	15
Report No	EDI/77/19

HIGHLAND COUNCIL

Committee: Environment, Development and Infrastructure

Date: 7 November 2019

Report Title: Flood Schemes Updates and Future Options

Report By: Executive Chief Officer Infrastructure and Environment

1. Purpose/Executive Summary

- 1.1 This report presents an update on the progress being made on the development of Flood Protection Schemes at Smithton and Culloden, Caol and Lochyside and Drumnadrochit, and the Flood Studies which have been identified within the Highland and Argyll, and the Findhorn, Nairn and Speyside Local Flood Risk Management Plans, Cycle 1 (2016 – 2022). In addition, the report seeks Members approval to submit the following Preferred Options to SEPA for national prioritisation of flood schemes:
- Golspie Flood Protection Scheme
 - River Thurso Flood Protection Scheme
 - Mill Burn (Inverness) Flood Protection Scheme
 - River Peffery Flood Protection Scheme
- 1.2 Historically, Scottish Government has provided 80% grant funding for construction of prioritised Flood Protection Schemes. The current Scottish Government funding cycle for existing prioritised schemes is 2016 – 2026. Currently, The Highland Council have benefited from receipt of this funding for construction of the Smithton and Culloden FPS, the proposed Caol and Lochyside FPS, and Drumnadrochit FPS.
- 1.3 SEPA has called for Preferred Options for all new Flood Protection Schemes to be submitted for national prioritisation in December 2019. This prioritisation process will feed directly into Scottish Government allocation of funding for their next grant funding cycle for Flood Protection Schemes. The next opportunity to submit Preferred Options to SEPA for prioritisation is anticipated to be in 2025.

2. Recommendations

- 2.1 Members are asked to:
- i. note the progress to date on the development of Flood Protection Schemes at Smithton & Culloden, Caol and Lochyside and Drumnadrochit, and the Flood

Studies which have been identified within the Local Flood Risk Management Plans; and

- ii. approve the submission of the Preferred Options for Golspie, Thurso, Mill Burn and River Peffery Flood Protection Schemes to SEPA for national Flood Protection Scheme prioritisation.

3. Implications

- 3.1 Resource – Following award of Scottish Government grant funding for Flood Protection Schemes being submitted to SEPA for prioritisation, a separate report to Committee will be made which will include a full review of capital allocation on each flood project. This will include resource implications on capital funding and future maintenance cost implications.
- 3.2 Legal - The Council has duties under the Flood Risk Management (Scotland) Act 2009 to assess bodies of water with regard to flood risk and have powers under this Act to promote Flood Protection Schemes. Duties and responsibilities in regard to flooding are set out in the Highland Council's web site at: <https://www.highland.gov.uk/info/1226/emergencies/81/flooding/2> .
- 3.3 Community (Equality, Poverty and Rural) - The effects of flooding on people and property are significant, with potential impacts across the entire community.
- 3.4 Climate Change / Carbon Clever - It is recognised that flooding events will become more frequent and the flood studies in response to existing flood risk make an allowance for climate change implications.
- 3.5 Risk - Until a Flood Protection Scheme can be implemented in an area, there is a risk that flood events will occur with greater frequency. It should be recognised that a Flood Protection Scheme alleviates flooding and reduces the risk, but the risk cannot be eliminated. Severe weather and flooding are risks on the national community risk register and the Highland Council's Corporate Risk Register includes participation in multi-agency planning and exercising for emergencies based on the national community risk register.
- 3.6 Gaelic – None

4. Progress update on actions in Local Flood Risk Management Plans

- 4.1 There are two Local Flood Risk Management Plans which cover the Highland Council area: Highland and Argyll LFRMP and Findhorn, Nairn and Speyside LFRMP. These Plans have identified actions to reduce the impact of flooding, setting out how and when the actions are to be delivered within the Plan cycle (2016-2022). The following update is provided for those actions which capital allocation has been provided allowing progress within the capital programme budget profile. The purpose of each Study is to identify the extent and scale of flooding, assess a range of options to reduce the flood risk and identify the Preferred Option for each Study. Options are assessed at various return periods to determine which return period provides the most viable scheme. Whilst a 1 in 200-year standard of protection has been assumed in the past, the most economically viable scheme may be to provide protection from only the most frequent floods. As a result, the Preferred Option for each of the Studies below may vary one from the other. To ensure consistency, SEPA and Scottish government have identified the style and level of information for the Flood Studies and

the information to be provided for prioritisation. For the Preferred Options that are proposed to be submitted to SEPA for prioritisation, benefit-cost, present value costs and damages avoided are provided. It should be noted that the present value costs are for evaluation purposes only and do not represent the full costs of delivering the scheme.

4.2 **Smithton and Culloden Flood Protection Scheme - Works**

The Smithton and Culloden FPS commenced construction on site in June 2018. Works are well underway and it is currently estimated that the majority of construction works will be completed by December 2019. Elements of landscaping, including grass seeding and tree planting will continue beyond this date, but are due to be finished by the Completion Date – June 2020.

4.3 **Drumnadrochit Flood Protection Scheme – Works**

4.3.1 Following the promotion of the formal Flood Protection Scheme - no objections were received, however SEPA raised some queries. SEPA has now confirmed that they are content, following provision of additional flood modelling data.

4.3.2 EDI committee, on the 15 August 2019 (Report EDI 50/19), confirmed the Drumnadrochit Flood Protection Scheme, this providing the construction consents and land access required to facilitate construction.

4.3.3 Detailed design progresses and it is anticipated that the tender will be invited early next year with completion by Summer 2021, i.e. complete before the end of Local Flood Risk Management Plan cycle of March 2022. Note this project is 80% grant funded by Scottish Government and finalisation of grant will be established following tender return.

4.4 **Caol Flood Protection Scheme – Works**

4.4.1 Following the publication of the Flood Protection Scheme (to obtain the necessary construction consents), one objection was received. Following the unresolved objection a hearing took place on the 28 March 2019 and the reporter has concluded and has found in the Council's favour - which facilitated the confirmation of the formal Flood Scheme.

4.4.2 EDI committee, on the 15 August 2019 (Report EDI 51/19), confirmed the Caol and Lochyside Flood Protection Scheme, this providing the construction consents and land access required to facilitate construction.

4.4.3 Detailed design progresses and it is anticipated that the tender will be invited early next year with completion by late 2021, i.e. complete before the end of Local Flood Risk Management Plan cycle of March 2022. Note this project is 80% grant funded by Scottish Government and finalisation of grant will be established following tender return.

4.5 **Mill Burn (Inverness) Flood Protection Scheme – Study**

4.5.1 Consultants, Mott MacDonald, were commissioned in 2019 by the Highland Council to assess options to alleviate flooding from the Mill Burn, Inverness, building on a previous study undertaken in 2015 and potentially protecting up to 69 properties.

4.5.2 The 2019 study updates the previous 2015 hydrology and hydraulic work by: updating design flows using new methods and extended data sets: updating the hydraulic model using recent cross-sections and 2D modelling of out of bank flow based on LiDAR; updating the economics following the updated flows and model.

4.5.3 The Preferred Option is described as follows:

- at Old Edinburgh Road, a new floodwall is proposed to protect Castle Heather Area from out of bank flows;
- the updated 2D modelling predicts that the majority of the flood water spilling onto Diriebught Road will remain on Diriebught Road, however, in Mill Burn Court the flow is contain behind an existing wall, backing up and putting properties at risk. It is proposed to breach the wall which removes the flood risk to most properties. A small number of properties will remain at risk of flooding; and
- a new wall is proposed to protect Harbour Road, temporary bridges removed, the channel widened and Harbour Road Culvert will be replaced. Widening is needed to keep the road level low enough to get under the railway bridge.

4.5.4 Costs estimates for the 2019 update have not been completed to date, but the financial details are currently under preparation and will be finalised prior to the December submission date.

4.5.5 The Committee is recommended to approve the submission of the preferred option for the Mill Burn Flood Protection Scheme to SEPA for national prioritisation.

4.6 River Peffery, Dingwall & Blairninich – Study

4.6.1 Consultants, CH2M (now Jacobs), were appointed in March 2016 to develop a study to alleviate flood risk in Dingwall and Blairninich. The project aims were to investigate measures to reduce flood risk at Dingwall and Blairninich through both conventional engineering methods as well as through Natural Flood Management. In so doing the project aims to improve the ecological status under the Water Framework Directive (WFD) of the River Peffery as well as reducing flood risk to Dingwall and Blairninich.

4.6.2 The study has undertaken topographic and environmental surveys, a detailed hydraulic model of the River Peffery, identification of areas at risk of flooding and identification of options to alleviate the flood risk to communities of Dingwall and Blairninich. The identified options were shared with stakeholders and through public consultation prior to assessing the options to establish a Preferred Option. Various influencing factors have been assessed including environmental impact, community benefits, river morphology, benefit-cost analysis as well as technical feasibility of each measure.

4.6.3 The Preferred Option is described as follows:

- Blairninich (providing 200yr+Climate Change Standard of Protection). Measures consists of:
 - meandering of existing channel to replace existing straightened channel. This provides improvement to the morphological status of the burn whilst slowing down the flow velocities;
 - set back embankment providing a barrier to overland flow path from the Peffery Burn towards properties in Blairninich; and
 - culvert improvement at Gate lodge road crossing to increase capacity.
- Dingwall (providing 75yr Standard of Protection). Measures consists of:-
 - reconnecting flood plain through breaches of existing agricultural embankment (Between Fodderty and railway crossing of Peffery);
 - new culvert to carry tributary under Strathpeffer Rd;
 - new enlarged culvert under Docharty Rd;
 - new direct defence (wall) at Bridgend;

- widening of channel along left bank behind Burns Crescent;
- improvement of existing screen where Knockbain Burn enters into storage tank just upstream of Blackwells Court; and
- new coarse debris screen in upstream catchment of the Knockbain Burn.

4.6.4 The benefit-cost ratio of the Preferred Option is 1.7. The present value cost is £3.6M and damages avoided is £6.1M.

4.6.5 **The Committee is recommended to approve the submission of the preferred option for the River Peffery Flood Protection Scheme to SEPA for national prioritisation.**

4.6.6 During the process of undertaking the Flood Study, flooding from the Knockbain Burn (a tributary to the River Peffery) occurred in July 2019, resulting in internal flooding to properties in Dingwall. A contributory factor to the flooding was due to blockage of the existing trash screen at Blackwells Street, which is at the inlet to a culvert running under Dingwall. The Council has the opportunity to construct the identified measures on Knockbain Burn (coarse debris screen and screen at Blackwells Street) in advance of the full Flood Protection Scheme which would be, optimistically, 5-6 years away. Landowners have indicated support of suggested measures. It is estimated that the coarse debris screen could be constructed for circa £30k whilst a new improved inlet screen at the culvert inlet could be constructed for approximately £220k. The funding was considered in the Capital Report earlier in the agenda.

4.7 **Golspie Flood Protection Scheme – Study**

4.7.1 AECOM has been commissioned by the Highland Council to undertake a Flood Protection Study (FPS) for the Golspie Coast. Work has been carried out to understand the flood mechanisms affecting Golspie and to identify constraints and opportunities for potential flood protection measures and mitigation options. The results of the hydraulic modelling indicate that large areas of Golspie Town are at risk of flooding. These indicate that Main Street and south of the town at the Golf Course, Caravan Park and Kart Track are at risk from coastal flood events. At Main Street, flood water from overtopping waves would flow along the lanes leading from the promenade during storms with expected return periods of 1 in 5 years without including any allowance for future climate change. Significant areas within the links are at risk of inundation during the 1 in 2-year events and greater.

4.7.2 During present day conditions, sea levels do not reach coastal defence crests levels. However, with the predicted increase in sea levels as a result of climate change over 100-year period, inundation from extreme still water levels would occur at the Golf Course.

4.7.3 A Long List of possible flood alleviation measures to address flood risk was developed. These ranged from Direct Defences to Natural Flood Management to Property Level Flood Protection. A Short List of suitable options was agreed through scoring of measures based on the Technical, Legal and Economic perspectives. The options were assessed in a holistic manner to include social, environmental and economic factors together to ensure the option selection process is not unfairly weighted towards economics. Many of the options with the greatest impact on flood risk have similar environmental and social benefits in terms of protecting properties and reducing flooding on access routes and local amenities. Weighing these considerations together the appraisal has indicated that the Preferred Option for alleviating flood risk to Golspie would involve direct defences through raising of existing defences along the present defence line.

4.7.4 This option has an estimated Standard of Protection of the present day 1 in 20-year. The benefit-cost ratio for this scheme is 1.53. The present value cost is £1.3M and damages avoided is £2m. Options were considered which provided a higher standard of protection, however these options had significantly higher costs and benefit-cost ratios were not as favourable.

4.7.5 **The Committee is recommended to approve the submission of the preferred option for the Golspie Flood Protection Scheme to SEPA for national prioritisation.**

4.8 **River Thurso**

4.8.1 AECOM has been commissioned by the Highland Council to undertake a Flood Protection Study for the River Thurso. Significant work has been carried out to understand the flood mechanisms affecting Thurso and to identify constraints and opportunities about potential flood protection measures and mitigation options.

4.8.2 The results of the hydraulic modelling indicate that areas of the River Thurso are at risk from combinations of both fluvial (river flooding) dominant flood events and coastal dominant flood events. Fluvial flooding occurs on the right bank upstream of the Road Bridge, reaching Millbank Road during extreme events. Coastal flooding occurs on both the left and right banks but is particularly prominent at the Pier and Riverside Road. Climate Change, including for the effects of increased flows in the river and increased sea levels, shows an increase in frequency of flooding, flood extent and depth. This is particularly apparent at Millbank Road and Riverside Road.

4.8.3 A Long List of possible flood alleviation measures to address flood risk for both fluvial and coastal flooding was developed. These ranged from direct defences to Natural Flood Management to Property Flood Protection. Workshops were used by the Council and AECOM to establish a Short List of suitable options. The assessment was agreed through scoring of measures based on the Technical, Legal and Economic perspectives. The resultant Short List measures were then evaluated in a holistic manner to include social, environmental and economic factors together to establish a Preferred Option. The Preferred Option at Thurso is a combination of direct defence measures to be provided along sections of both banks of the river within the town. On the left bank a new floodwall would be provided on the seaward side of Riverside Road extending from the road bridge downstream to a point south of Wilson Lane. On the right bank on the downstream side of the road bridge a new floodwall would be provided around the properties at Bridgend. On the right bank upstream of the road bridge a new flood embankment would be provided protecting the properties adjacent to the river and fire station. This embankment would extend from the road bridge to the Squash Courts. At this point a new floodwall would be provided extending along the footpath on Millbank Road to meet the higher ground at the Swimming Pool.

4.8.4 This option has an estimated Standard of Protection of the present day 1 in 200 year (most elements also include for climate change). The benefit-cost ratio for this scheme is 0.36. The present value cost is £7.9m and damages avoided is £2.8m. Whilst the Preferred Option does not provide a benefit-cost ratio greater than one, there are additional non-monetary benefits of the scheme which have also been taken into account in establishing the Preferred Option. Options were considered which provided a lower standard of protection, however these options had marginally lower costs whilst providing significantly lower value of damages avoided, thus benefit-cost ratios were not as favourable.

4.8.5 **The Committee is recommended to approve the submission of the preferred option for the River Thurso Flood Protection Scheme to SEPA for national prioritisation.**

4.9 **Gynack Burn Flood Protection Scheme – Study**

A Flood Study for the Gynack Burn in Kingussie has recently commenced. This study is at a preliminary stage and seeks to determine the extent of areas at risk of flooding. A subsequent study will determine options to reduce flood risk and develop a Preferred Option to be submitted for national prioritisation in cycle 2 of the LFRMP.

4.10 **River Nairn and Auldearn Burn Flood Protection Scheme – Study**

A Flood Study for the Nairn area has not yet been started. Following review of the capital programme in March 2018, commencement of the study is programmed to commence in 2020/21. A study will determine options to reduce flood risk and develop a Preferred Option to be submitted for national prioritisation in cycle 2 of the LFRMP.

4.11 **Surface Water Management Plans**

SWMPs are studies into overland flow from intense rain events and also flooding from small watercourses. SWMPs are proposed for seven locations across The Highland Council area: Newtonmore, Inverness, Dingwall and Strathpeffer, Fort William, Corpach, Smithton and Culloden, and Halkirk. Work on the Plans will commence shortly, with consultation to be undertaken with affected communities to determine the scale and extent of the surface water issues in each of the identified areas.

Designation: Executive Chief Officer Infrastructure and Environment

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Background Papers: PDI 33/16 – Approval of the Local Flood Risk Management Plans