

Objection Letter - Ian Buchanan

As the owner of property affected by previous flooding and likely to be adversely affected by the proposed scheme, I wish to record my objection to the proposed scheme in its entirety.

It is clear that little effort has been put in to considering the many possible less damaging mitigation that have been suggested by residents of the town who have lived with the river and its vagaries all their lives.

Anyone who lived through the more recent flood events can see that both the ridiculous island and fish ladder at the green bridge and the angles the rocks armour at the estuary have greatly exacerbated the problem in both the 2009 and 2012 events. Indeed, breaches on the riverbank only ever occurred on the Carron Terrace bank and affected only that street and lower parts of Cameron Street before the islands creation.

The scheme as proposed is far more extensive and damaging to the amenity of the town than it needs to be and fails to address the reasons why the lower parts of the river do not always manage to contain the flow of water. It includes no efforts to hold water back from entering the town, thus requiring these ugly concrete walls which should simply not be needed.

Although it was earlier said that the walls along Carron Terrace would be no higher than the existing fence, it now transpires that they might be as high as 1.8 metres? This would obscure the view of the river and damage the amenity of this popular area. The planned of felling of many of the 150 year old avenue of European Lime trees, and the proposed concrete wall themselves would drastically damage this pleasant area, which is much admired by both residents and visitors.

In short, we would be destroying the green heart of the town, for no good reason. It has already been admitted that the scheme would not guarantee that the Old Town would be free from flooding so there really is no point in it.

The many minor mitigating suggestions made by residents and ignored by the engineers in often cavalier fashion, would amply satisfy the requirement to contain the river without this extravagant scheme.

Response

1. Scope of Evidence

- 1.1. This is the scope of my evidence regarding the objection to Stonehaven Flood Protection Scheme from Mr Buchanan
- 1.2. This evidence will discuss the scheme developments and storage was ruled out in the option development process.
- 1.3. The evidence will discuss how the environment has been considered in the design including protecting the majority of trees on Carron Terrace
- 1.4. This evidence will explain the hydrological studies undertaken for the scheme, identifying the magnitudes of the design flows used in the scheme and that river capacity is a problem for the entire length of the river downstream of the Red Bridge.
- 1.5. The design flows have been used to derive the heights of the flood walls and this evidence will describe how this has been undertaken and how modifications to the river corridor have been considered to minimise wall heights including a discussion on how the existing rock armour has been considered in the design.

2. Scheme development & Storage

- 2.1. The scheme has been developed over a number of years with key decisions made at the following stages
 - 2009 scheme development commenced
 - 2010 option development consultation
 - April 2013 review of the scheme following 2012 flooding event
 - Nov 2013 Preferred scheme report
 - June 14 Stakeholder workshop
 - June 2015 FPO advertised
- 2.2 In 2010, a public consultation was undertaken and a range of options presented to the community.
 - Direct defences (walls & embankments)
 - Direct defences (walls & embankments) with channel modifications
 - Direct defences (walls & embankments) with channel modifications and bridge raising
 - Upstream Storage
 - Combination of upstream attenuation and direct defences (walls & embankments)

The information gathered from this consultation indicated strongest support for direct defences (walls & flood embankments) through the town or storage upstream of the town. Public opinion was taken forward and options for upstream storage and/or direct defences were investigated in more detail.
- 2.3 The design flooding event has a flow magnitude of 78m³/s in combination with the Carron Water and Burn of Glaslaw (equivalent to a 0.5% flood or a 1 in 200 year flood). Flooding has occurred on the Carron Water on a number of occasions, as identified in Appendix A: Stonehaven December 2012 Flood Event Review. In comparison to the design flood event,

flow magnitudes of 31m³/s and 42m³/s were estimated for the 2012 and 2009 events, respectively.

- 2.4 Appendix B: Option Development and Economic Appraisal compares the options of direct defences, upstream storage and a combination of storage and walls. The report identifies that a storage only option on the Carron Water would not be sufficient to alleviate flood risk in the town without some further work. Chapter 5 economic appraisal indicated that a storage option would cost in the order of £26m, compared to the £16m direct defences costs. The storage option considered was not economically viable with a benefit cost ration of less than 1 and was not considered further.
- 2.5 Solutions put forward by members of the public have been considered, and where it has been found to provide a benefit they have been implemented. However, the proposed scheme is designed to accommodate a larger flood event than recently experienced, it will also take account of likely increases in flood flow and volume associated with climate change predictions.

3. Environmental & Visual Impact

Appendix E: Environmental Summary Report

A large proportion of the scheme is within a conservation area and a number of existing walls and structures in the vicinity or directly affected by the scheme are classified as listed by Historic Scotland.

- 3.1 A screening opinion was sought both under the Town and Country planning (Environmental Impact Assessment)(Scotland) regulations 2011 and under the Flood Risk Management (Scotland) (Flood Protection schemes, Potentially Vulnerable Areas and Local Plan Districts) regulations 2010. It was confirmed that an Environmental Impact Assessment would not be required. However a variety of environmental assessments were undertaken to address potential effects associated with the scheme.
- 3.2 It is recognised that the introduction of walls along the river will have an impact on the visual environment and the wildlife. All proposals will take account of legislative requirements when constructing around protected species.
- 3.3 A significant number of investigations have been undertaken to ensure we have a baseline record of what species are located within the scheme area. We have also been working closely with statutory and non-statutory bodies to ensure the scheme can blend with the environment.
- 3.4 Extensive discussions have taken place with SEPA, Dee Fisheries Trust and Stonehaven Angling Association regarding the impact of the proposals on the river both in a permanent state and also during construction. Various mitigation measures have been implemented including amendments to fish passes/ladders.
- 3.5 On Carron Terrace, the proposed wall height directly in front of property windows that front onto the River Caron has been kept at around 1.2m high. However, it is recognised that from No 6 to No 1, in front of garages, the wall will raise from 1.2m to 1.8m (over a distance

of 70m). Following consideration of objections it is proposed to modify the scheme so that this the top 1/3 in height of this 70m section of wall be constructed of glass material to improve light/ visual aspects. This proposed modification was accepted by several objectors and by Aberdeenshire Council.

- 3.6 The detailed design of the scheme has minimised wall heights as much as possible. Where this is not possible self-raising barriers have been used where wall heights are considered particularly sensitive such as to the rear of properties in Cameron Street and in the locality of St James' Church, which is a dominant feature in this area and the preservation of its setting is a critical consideration as part of its listed building category A status.
- 3.7 A Public Consultation was also held in May 2015, which gave residents the opportunity to view and provide comment on photomontages and drawings illustrating the proposed scheme including details of proposed wall finishes.
- 3.8 The majority of the Lime Trees on Carron Terrace are to remain and the proposed walls have been designed to avoid the root network. Significant investigative work has taken place both to establish the location of the tree roots and also to assess the health and viability of the existing trees. Where it is necessary to remove trees, offset planting will be taken elsewhere on the scheme.
- 3.9 The scheme proposes to enhance the avenue on Carron terrace by creating a riverside walkway between the trees and the river.

4 Hydrological Studies and Design Flows

- 4.1 The scheme is for alleviating fluvial flooding from the Carron Water and Burn of Glaslaw in Stonehaven.
- 4.2 Scottish Government provides guidance on how to appraise Flood Protection Schemes and allows economically beneficial schemes to be constructed. The 1 in 200 year level of protection has been the desired target as it aligns with current guidance on development within Scottish Planning Policy and would allow for future development within areas protected to the 200 year standard from all flooding.
- 4.3 The scheme is influenced by Scottish Planning Policy (Appendix O: Scottish Planning Policy) which sets out the risk framework for flooding and flood risk to development.
- 4.4 SPP states "All land is to some degree susceptible to flooding. The likelihood of a site being flooded is measured in terms of probabilities per annum, which range from very low (close to 0% probability) to very high (up to 100% probability)." SPP identifies that land with an annual probability of flooding less than 0.5% is suitable for development, i.e. a low to medium risk area. The proposed flood defences for Carron Water are designed for the 0.5% Annual Probability flood event in line with SPP. The design event is the 0.5 %AP flood (200 year flood) from the River Carron and the Glaslaw Burn. That is an event that could be expected to be met or exceeded 0.5 % of any years.
- 4.5 The design flood magnitude has a 0.5% chance of being met or exceeded in any year.

- 4.6 SEPA recommend an allowance for future climate change to be included in a flood protection scheme design. In line with the Government UK Climate predictions (UKCP09) for the Stonehaven area, the design flow includes a 33% increase in flows as described in Appendix B: Option Development and Economic Appraisal.
- 4.7 The assessment of river flows originating upstream on Carron Water was made using procedures given in the Flood Estimation Handbook (FEH). This handbook is acknowledged as the current best practice guide for hydrological studies in the UK. The assessment is described in Appendix F: Hydrology and Hydraulic Report
- 4.8 The FEH Statistical Method was used for Carron Water with the observed data from the local SEPA river gauging station on the Carron Water upstream of the red and Green Bridge. The FEH rainfall runoff method was used for the Burn of Glaslaw, due to the size of the catchment and the lack of a river gauge on the Burn. These methods are used as standard practice and the methodology was agreed with SEPA.
- 4.9 The design flooding event, combining flow from Carron Water and Burn of Glaslaw, has a flow magnitude of $78\text{m}^3/\text{s}$ downstream of the confluence. In comparison to the design flood event, flow magnitudes of $31\text{m}^3/\text{s}$ and $42\text{m}^3/\text{s}$ were determined for the 2012 and 2009 events, respectively. Flow in the River Carron was estimated to be $24\text{m}^3/\text{s}$ and $37\text{m}^3/\text{s}$ for 2012 and 2009 event respectively (based on flows at Carron Gauge). Flow in the Glaslaw Burn was estimated to be in excess of $5.7\text{m}^3/\text{s}$ for 2012 event based on anecdotal evidence.
- 4.10 Flooding is not new to Stonehaven and has been recorded as far back as 1829.
- 4.11 In table 4-1 in Appendix A: Stonehaven December 2012 Flood Event Review 21 flood events are recorded from 1829 to 2012, including occasions in 1829, 1934, 1979, 1985, 2009 and 2012 where it was recorded that properties in Cameron Street were flooded from Carron Water.
- 4.12 A number of these recorded flood events predate the works to Bridgefield Bridge and the rock armour, demonstrating that flooding has occurred prior to these changes.
- 4.13 The proposed scheme is for walls along the full length of the river between Red Bridge and Beach Bridge and not only downstream of the White Bridge. The requirement for flood walls along this whole length demonstrates that the capacity of the existing channel is not sufficient where the scheme is required.

5 Hydraulic Modelling, Rock Armour and Waves

- 5.1 Widening the rock armour at the outlet was one of many options considered and additional evidence was presented during the period of objection to the scheme (Appendix H: Hydrology and Hydraulic Modelling Addendum A). The report identified that widening the rock armour had a similar effect on flood water levels, in the Arbuthnott Street section, as raising Beach Bridge. The TUFLOW model showed that whilst Beach Bridge could be retained if the channel was widened by 5m or more downstream of Beach Bridge, Aberdeenshire Council chose to raise Beach Bridge instead of widening.
- 5.2 The predicted 0.5% annual Probability tidal level is 3.92m AOD including an allowance for climate change (Appendix G: River Carron Rock Armour Study). The wall heights on Carron Water must be higher than this, plus an allowance for climate change and freeboard.

- 5.3 Whilst widening the rock armour does lower the water level between Bridgefield Bridge and the Beach Bridge, the wall level is retained due to this tidal influence.
- 5.4 The topographic survey shows that the crest level of the rock armour is at approximately 3.83mAOD. The peak flood level under Beach Bridge is predicted to be 4.3mAOD with a design level of 4.6mAOD (the level including freeboard). Therefore, during an extreme flood event the water level is much higher than the rock armour and limiting water level increases due to flow.
- 5.5 The existing rock armour alignment protects against direct waves propagating in the channel by reducing the wave energy. The effect of an open channel can be observed to the north of Carron Water at the mouth of the River Cowie, where larger waves can be observed in the mouth of the channel because there is no rock armour.
- 5.6 Straightening the channel would expose properties to greater wave heights as the wave energy would not be dissipated by the rock armour. To allow for this the wall heights would need to be higher if the rock armour was removed.