

REPORT TO INFRASTRUCTURE SERVICES COMMITTEE – 28 JANUARY 2016

STONEHAVEN FLOOD PROTECTION SCHEME

1 Recommendations

The Committee is recommended, in accordance with the requirements of the legislation, to:

- 1.1 Make a preliminary decision that the proposed scheme should be progressed with modification (as detailed in 2.09); and**
- 1.2 Notify Scottish Ministers of the decision.**

2 Background / Discussion

- 2.1 Reports on the above project, to reduce future flood risk from the River Carron and the Glaslaw Burn in lower Stonehaven, have previously been considered by the Kincardine and Mearns Area Committee, the Infrastructure Services Committee and the Policy and Resources Committee.
- 2.2 On 5 Dec 2013, Infrastructure Services Committee (Item 9, Page 1004) approved, in principle that the scheme be taken forward to the statutory legal order stage.
- 2.3 On 11 September 2014, approval was given by Policy and Resources Committee (Item 22, Page 724) for the funding of the Stonehaven Flood Protection Scheme from the Capital allocation at a current provisional estimated value of £14 - £16 million. It also agreed to continue to pursue all possible funding opportunities from the Scottish Government.
- 2.4 On 14 May 2015, the Infrastructure Services Committee (Item 13, Page 2072) approved the promotion of a Flood Protection Scheme for Stonehaven under the terms of the Flood Risk Management (Scotland) Act 2009.
- 2.5 The Stonehaven Flood Protection Scheme Order was promoted and advertised during July and August 2015. Due to the holiday period the objection period was extended from 28 days to 56 days, double the normal minimum statutory period, to ensure all interested parties were given opportunity to consider the information and to formally object to the proposals. Scheme documents were available for inspection in Council offices both in Stonehaven and Aberdeen as well as the Stonehaven Library and the Councils website.
- 2.6 As a result of this process eleven objections were received. Officers invited all those who had made objections to meet and discuss the issues raised. Subsequently seven objectors met with officers.

- 2.7 Appendix 1 summarises the objections raised and Officers responses to the objections. Copies of the full objection letters are attached as Appendix 2.
- 2.8 Having considered the individual objections, there is potential to alter the proposals to mitigate the issues raised in some of the objections as detailed in the table below (2.09). There is no impact on overall scheme cost or delivery should these mitigations be approved. If the mitigations are approved, there are indications that four of the objectors would withdraw their objections, some mitigations may address more than one objection.

2.9 Mitigation table

	Existing Proposal	Proposed Mitigation
a	Green Bridge location infront of No 14 Carron Terrace	Relocate the bridge 18m-20m upstream to the junction of Arduthie Street, therefore between properties
b	Solid masonry walls alongside the River Carron, from no 1 – no 6 Carron Terrace. Ranging in height from 1.8m tapering to 1.3m	Replace the top 1/3 (at maximum height) of the masonry section with glass type finish to allow views/light to be maintained. The clear section would taper in height over the 70m length.
c	Proposed wall heights between White Bridge & Bridgefield Bridge. The orientation of the existing Rock Armour at the river mouth.	No physical mitigation is suggested to reduce the proposed wall heights. The production of Addendum to the Hydraulic report (submitted to support the Flood Protection Order in July 15) details some of the additional modelling undertaken and discounted. This may resolve some queries raised via objections. See Appendix 3

- 2.10 As objections have been received and not withdrawn, in accordance with the legislation, the Committee must make a preliminary decision to:
- Confirm the proposed scheme without modification,
 - Confirm the proposed scheme with modification, or
 - Reject the proposed scheme
- 2.11 Should the Committee approve a preliminary decision to proceed with the scheme (with or without) modification, we require to notify Scottish Ministers of our decision.
- 2.12 Scottish Ministers will then decide whether they wish to consider the scheme or refer it back to the Council. This decision must be taken within 56 days.

- 2.13 If the Scottish Ministers decide to consider the scheme then they will arrange for a public local inquiry to be held, unless all objections have been withdrawn. Following the inquiry Scottish Ministers would then decide to:-
- a) confirm the scheme without modification
 - b) confirm the scheme with modifications
 - c) reject the scheme
- 2.14 Should Scottish Ministers decide not consider the scheme then the matter will be referred back to Aberdeenshire Council for a final decision. As there are still outstanding objections there will be a requirement for the Council to hold a hearing to consider these objections and the proposed scheme. While the hearing is less formal than a public local inquiry each objector is still required to be notified of the hearing and invited to present their objection. Following the hearing the Council would then decide to:-
- a) confirm the scheme without modification
 - b) confirm the scheme with modifications
 - c) reject the scheme.
- 2.15 The Head of Finance and the Monitoring Officer within Business Services have been consulted and their comments incorporated into this report.

3 Equalities, Staffing and Financial Implications

- 3.1 An equality impact assessment is not required because this report relates to the implementation of an approved statutory process which provides opportunities for representations to be made by any groups with protected characteristics.
- 3.2 There are no staffing implications arising from this report.
- 3.3 Currently the Harbours, Coast Protection and flooding line in the Capital Plan contains a gross allocation of £22,662,000 through the period to 2030. While this is sufficient to fund the project fully, this allocation also has to cover major works at Huntly, other smaller scale interventions on Harbours and Coast Protection structures, as well as more minor flood protection works. Funding the scheme from this budget line will also require the existing expenditure profile of the allocation to be amended to bring budget allocation forward from future years.
- 3.4 The inclusion of such a major scheme as Stonehaven will also severely limit the potential to carry out other works of this nature within the current Capital Plan.

- 3.5 It is hoped that funding assistance could be secured from the Scottish Government. However, the mechanism for future funding for flood protection schemes is currently undefined, but is likely to be strongly linked to the delivery of the emerging Flood Risk Management Plans being developed under the Flood Risk Management (Scotland) Act 2009.

Ritchie Johnstone
Director of Business Services
Report prepared by:- Rachel Kennedy
Date: 12 January 2016

Appendix 1 – Summary of Objections and Officer responses

Objection No 1 – Dr W Munro
Objection No 2 – Mr & Mrs Allan
Objection No 3 – Mr Buchanan
Objection No 4 – Ian Duncan
Objection No 5 – Mr Craig
Objection No 6 – Mr Latto
Objection No 7 – Ms Burns
Objection No 8 – Mr & Mrs Gorrara
Objection No 9 – Mr & Mrs McIntosh
Objection No 10 – Mr I McDonald
Objection No 11 – Mr J Briggs (FG Burnett)

Appendix 2 – Letters of Objection

Objection No 1 – Dr W Munro
Objection No 2 – Mr & Mrs Allan
Objection No 3 – Mr Buchanan
Objection No 4 – Ian Duncan
Objection No 5 – Mr Craig
Objection No 6 – Mr Latto
Objection No 7 – Ms Burns
Objection No 8 – Mr & Mrs Gorrara
Objection No 9 – Mr & Mrs McIntosh
Objection No 10 – Mr I McDonald
Objection No 11 – Mr J Briggs (FG Burnett)

Appendix 3 – Addendum report

Appendix 1 – Summary of Objections and Officer Responses

Objector	Summary of objection	Officers response
Dr W Munro	<p>Dr Munro welcomes the work done to date but objects to wall heights between White Bridge and Bridgefield Bridge and believes these could be lower if other measures were to be undertaken. He believes the walls are 60cm higher than shown at the public consultation and suggests these will have a severe visual impact.</p> <p>He suggested options that could reduce these heights if undertaken;</p> <ul style="list-style-type: none"> • The removal of material and old abutments from beneath Bridgefield Bridge • Modification of rock armour <ul style="list-style-type: none"> – Widening of channel - Appendix F Fig 2.7 shows a reduction when widened by 2m. A request for further modelling has been refused. - lowering of rock armour – little can be deduced from Fig 2.6 in Appendix F as no details of dimensions were provided. 	<p>The public consultation in May 15, had an artist's impression which was supposed to provide an indication as to the type/finish of the wall material rather than an indication as to the wall height known at that time. No actual levels were shown, however it is recognised that this image could have been interpreted incorrectly.</p> <p>The flood order drawings had the final levels shown on them and at this location, sensitivity modelling, (which takes account of uncertainties immediately upstream of the bridge structure), has indicated that we should increase the height of the walls by around 60cm. This kind of modelling is normal industry practice.</p> <p>The removal of material and old abutments from beneath Bridgefield Bridge is proposed.</p> <p>Modification of rock armour</p> <p>Officers have undertaken substantial amounts of hydraulic modelling, some of which was detailed in Appendix F to the Flood Protection Order. However not all parameters tested were detailed in this report as modelling is an iterative process and the report details the recommended proposals. Officers have established that raising the existing wooden footbridge on the beach provides a similar effect on upstream water level to removing the rock armour. This is the current proposal.</p>

<p>MITIGATION</p> <p>The Hydrology and Hydraulic Modelling Addendum Report is presented in Appendix 3. This report illustrates the hydraulic effect of lowering a section of rock armour and also widening by the rock armour channel by 2m, 5m and 10m. The report also considers the effect of straightening the outlet to the River Carron downstream of Beach Bridge to the sea.</p> <p>The lowering of the existing sewer across the mouth of the river has been modelled, however this area is heavily influenced by sediment and tide therefore any changes to the bed level at this location is marginal.</p> <p>A separate study undertaken on the alignment of the Rock Armour has demonstrated that in a 1:200 year river event, the current alignment provides a level of protection from tidal waves entering the channel, whilst not detrimentally effecting downstream flow.</p> <p>Officers are confident that the modelling undertaken by two respected engineering consultants is adequate and robust.</p>

<p>Dr Munro suggests the construction of new wall on the south side of the river between White Bridge and Bridgefield Bridge rather than reinforcement existing walls will cause a narrowing at the pinch point at Bridgefield Bridge.</p>	<p>A number of the existing walls and structures that currently provide the river wall boundary between White Bridge and Bridgefield Bridge are listed structures. Officers have undertaken significant discussion with Scottish Natural Heritage (SNH) and Aberdeenshire Council planning officers regarding the wall proposals. The riverwall just upstream of Bridgefield Bridge is part of the building at 19 Bridgefield. This building is category B listed and the priority from SNH is to protect the building from continued flooding. They have indicated that the integrity of the building must be a priority, therefore external interventions would be the preferred option. The existing walls on the river are not structurally strong enough so there needs to be engineering intervention. There is a proposal to provide a culvert under the rear gardens of Cameron Street to provide additional capacity in the river at this location.</p>
	<p>Dr Munro is against the narrowing of the channel downstream of the Bridgefield Bridge and further narrowing by Beach Bridge abutments. He suggests that widening the river channel and the rock armour would reduce water levels upstream of Bridgefield bridge.</p>

2 – Mr & Mrs Allan – Mr & Mrs Allan are not in favour of the proposed flood scheme to construct walls along River Carron and Glaslaw Burn. They suggest that upstream attenuation with a “hydrobrake” on both watercourses would have been a better solution.	<p>Optioneering was carried out prior to the preferred scheme being taken forward in 2013. Upstream storage was investigated as part of this. It was established that there was insufficient land available to accommodate the volumes of water required. Walls would still be required in the lower section of the town to accommodate the flows from the Glaslaw Burn. Therefore this option was ruled out by Infrastructure Services Committee at its meeting on 5 December 2013 (Item 9).</p> <p>Walls</p> <p>They object to a 1.8m high wall at the eastern end of Carron Terrace and the proposal to remove trees to accommodate this. They believe the 1.8m wall will significantly affect the existing encompassing environment; Carron Terrace the Carron River and the tree, grassed and footway area across the River, as well as the view to the White Bridge.</p> <p>MITIGATION: Following consideration of objections it is proposed that the top 1/3 in height of this section of wall be constructed of glass material to improve light/view. This will be a self-cleaning material and the design will complement the similar type of proposal at Bridgefield Bridge. Planning officers have been consulted and are content with the proposal</p>
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	<p>Place Setting – “Designing Streets”</p> <p>The footpath from Dunnottar Avenue meets the River Carron across from the area of proposed wall and creates a “sense of place”. Mr & Mrs Allan have stated that this setting is a “high place function”, where pedestrian activity plays a high importance. Designing Streets, encourages a positive sense of place. The introduction of a high wall at this point will remove this.</p> <p>There is a bench at the eastern edge of Carron Terrace which provide the opportunity to sit and take in the visual quality of the river running towards White Bridge.</p>	<p>Place Setting - Designing Streets</p> <p>Officers recognise that the scheme will have an impact of the surrounding area and all endeavours are being made to minimise the day to day visual impact. From downstream of the Green Bridge, the area is a conservation area. “Place setting” is an integral part of the scheme and landscape architects are working with engineers to ensure the scheme delivers opportunities to enhance the area where possible – such as the wider walkway along Carron Terrace or the improvements to the pedestrian facilities adjacent to the Green Bridge.</p>
	<p>Security</p> <p>Mr & Mrs Allan are concerned that a 1.8m high wall will cause an enclosed environment and may cause security issues, especially for those walking in the evening and night time. They suggest that there is no reason why the walls can't be 1.1m – 1.2m high with the floating sections raising to 1.8m high when needed, as similar to that further downstream.</p>	<p>Security</p> <p>Officers initially investigated the possibility of the “floating” wall sections along Carron Terrace. However due to the proximity of the tree root network it would not be possible to construct walls of this type. The foundations and width of these type of walls are much greater than standard masonry walls. To construct in this location would mean the removal of all the street trees which are subject to a Tree Preservation Order.</p>
	<p>Trees</p> <p>Mr & Mrs Allan are concerned regarding the proposed removal of 4 trees along Carron Terrace and feel that this is excessive and has a negative impact.</p>	<p>Trees</p> <p>It is recognised that the existing trees on Carron Terrace are of significant importance. This is reinforced by the fact that individual Tree Preservation Orders are place along the terrace. Any removal will be made in conjunction with approved procedure and consultation with the Councils Environmental Planners.</p> <p>The scheme is designed to minimise the removal where possible, however it is necessary to remove a small number to accommodate the proposed new Green Bridge</p>

		<p>and flood walls. It is proposed to replace/offset tree removal elsewhere in the area.</p> <p>An arboriculturist has examined all the trees in the area and provided a condition report, including root network details which is being used to develop the scheme.</p>
3	Mr Buchanan	<p>Mr Buchanan objects to the proposed scheme in its entirety. He feels that consideration has not been given to the less damaging mitigation measures put forward by residents in the town.</p> <p>Many options were considered between the commencement of the investigation works in 2009 and the approval of a preferred scheme in 2013. These were explained at the public consultation in November 2013 prior to developing the recommended scheme, as currently advertised in July 2015.</p> <p>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.</p> <p>The scheme as proposed is designed to accommodate a larger flood event than recently experience, it will also take account of proposed increases in water level attributed to climate change.</p>
		<p>Island and Fish Ladder</p> <p>Mr Buchanan claims the Island and the Fish ladder at the Green Bridge and the rock armour at the river mouth have exacerbated the flooding in 2009 and 2012 events. He claims that the breaches on the riverbank only ever occurred on Carron Terrace bank and lower parts of Cameron Street before the islands creation.</p>

<p>Upstream Storage</p> <p>Mr Buchanan believes the proposed scheme is more extensive and damaging to the amenity of the town than it needs to be. He states that it includes no effort to hold water back from entering the town, thus requiring “ugly concrete walls which should simply not be needed.”</p>	<p>Upstream Storage</p> <p>Optioneerering was carried out prior to the preferred scheme being taken forward in 2013. Upstream storage was investigated as part of this. It was established that there was insufficient land available to accommodate the volumes of water required. Walls would still be required in the lower section of the town to accommodate the flows from the Glaslaw Burn. Therefore this option was ruled out by Infrastructure Services Committee on 5 December 2013 (Item 9).</p> <p>The proposed walls in the conservation area will be faced in stone following extensive consultation with Landscape Architects, Scottish Natural Heritage and Aberdeenshire Council Planners.</p> <p>Visual and Environmental Impact</p> <p>It is claimed the proposed 1.8m high wall will obscure the view of the river and damage the amenity of this area. The planned felling of the 150yr old European Lime tree and the proposed concrete wall would drastically damage this area. Mr Buchanan claims that it was said earlier that walls along Carron Terrace would not be higher than the existing fence, it now transpires they might be as high as 1.8m.</p>	<p>Visual and Environmental Impact</p> <p>On Carron Terrace, the proposed wall height directly in front of property windows has been kept at around 1.2m high. 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).</p> <p>MITIGATION: Following consideration of objections we are proposing that this the top 1/3 in height of this section of wall be constructed of glass material to improve light/view. This will be a self-cleaning material and the design will complement the similar type of proposal at Bridgefield Bridge. Planning officers have been consulted and are content with the proposal.</p>
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		We are working with Landscape Architects, Scottish Natural Heritage and Planners to ensure that the scheme can blend with the surrounding environment. Any proposed tree removal on Carron Terrace will be restricted to an absolute minimum. The scheme also looks to provide landscaping enhancement to the green area on Low Wood Road (opposite Invercarron Resource Centre)
4 – Mr Duncan	Mr Duncan has submitted two letters relating to different areas of the scheme. He believes the reason for the rise in water level at the south bank of the River Carron is due to mismanagement of previous construction work and ill thought interventions.	<p>The scheme as proposed is designed to accommodate a larger flood event than recently experience, it will also take account of proposed increases in water level attributed to climate change.</p> <p>The scheme design water level is determined by fluvial flow coming from the top of the river catchment.</p> <p>1. The island will be altered in the proposed design. Whilst this will improve flow, there is insufficient capacity under the existing Green Bridge to accommodate the proposed design flows. Therefore a new structure has been proposed just downstream</p> <p>2. The weir structure is a concrete cover to the existing Scottish Water sewer that runs beneath the River at this location. This will be altered in the proposed scheme.</p> <p>3. The rock wall just downstream of the existing Green Bridge will be altered in the proposed scheme. This is the where the River Carron changes direction and by altering this wall a smoother transition can be achieved.</p>

<p>In his second letter, Mr Duncan has suggested that along Carron Terrace, the wall should be constructed between the bank and the tree line. The established bank will support the north face of the wall and will camouflage the enormity of the wall.</p>	<p>The proposed wall on Carron Terrace is located far enough from the tree line so as to minimise the impact on the root network whilst providing the river capacity, without significantly raising the wall height. Officers are working with Landscape Architects to ensure that the scheme will blend with the existing environment.</p> <p>Mr Duncan is concerned regarding the demolition and construction of garages at 18 & 19 Carron Terrace. This will cause a reduction of parking spaces and restriction of turning area. Reconstruction of garages will industrialise the area.</p> <p>Demolition of garages at 20 & 21 Carron Terrace. Unnecessary, as outlined in the point above. Parking, turning space and passage to 21 Carron Terrace will be reduced and there is a safety risk to pedestrians.</p>
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	<p>Mr Duncan feels that the raising of the wall on the south boundary of the river is over engineering. Lowering of the river bed by a metre is the same as raising the banks by a metre on the approach to the Green Bridge. He feels that the river bed will require cleaning regardless of scheme. He has suggested that a program of deepening the river bed as removal of material will increase the natural flow capacity of the river should be considered.</p> <p>The proposed wall heights may appear excessive when comparing with current flow. However the predicted design flows are significant and the proposals also make an allowance for climate change (to 2080). Climate change during this period is predicted to increase water level in the River Carron by 30%.</p> <p>Dredging is often not the best long term or economic solution compared with other flood risk measures. Rivers find their natural equilibrium, so dredging would be required frequently and would have an environmental impact to the health of the river. Furthermore in this situation it would not provide sufficient additional capacity.</p>
5 - Mr A Craig	<p>Mr Craig objects to the scheme, in particular the wall along Carron Terrace. However he agrees that an engineering solution is required.</p> <p>On Carron Terrace, the proposed wall height directly in front of property windows has been kept at around 1.2m high. 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 around 70m).</p> <p><u>MITIGATION:</u> Following consideration of objections we are proposing that this the top 1/3 in height of this section of wall be constructed of glass material to improve light/view. This will be a self-cleaning material and the design will complement the similar type of proposal at Bridgefield Bridge. Planning officers have been consulted and are content with the proposal.</p>

	<p>The higher levels of the river is attributed to man made features along the channel including;</p> <ul style="list-style-type: none">- Concrete casings passing under the river- Excessive exit flow restriction cause by the rock armour- Channel narrowing caused by residential incursions- flow restriction cause by the island at green bridge and associated rock structures- Lack of usage of historical drainage systems- Poor maintenance of drainage systems- Development planning allowing excessive building within planning area- Poor farming practice leading to excessive run off	<p>The higher levels in the river are dictated by what is entering the catchment upstream. Many of the issues raised by Mr Craig are either being address by the scheme or are being investigated separately.</p> <ul style="list-style-type: none">- Concrete casings passing under the river – this will be amended in the proposed scheme- Excessive exit flow restriction cause by the rock armour – the rock armour has been investigated and there are no restrictions on exit flow in periods of high flow- Channel narrowing caused by residential incursions<ul style="list-style-type: none">- all existing incursions will be removed with the scheme construction- Flow restriction cause by the island at green bridge and associated rock structures – The area around the Green Bridge and Island has been redesigned in the proposals- Lack of usage of historical drainage systems – this has been investigated previously and has been ruled out- Poor maintenance of drainage systems – Aberdeenshire Council are progressing Surface Water Management Plans under their obligations under the Flood Risk Management (Scotland) Act 2009. The Surface Water Management Plan for Stonehaven will set out a long-term vision of how surface water flood risk will be managed and integrated drainage will be delivered, then identify and plan the steps needed to achieve the vision. In the meantime where we are aware of problems with drainage
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systems, maintenance works will be carried out as necessary	<p>The existing wall on Cameron Street will be replaced with a self-raising wall which is around 300mm higher than the current wall (when closed). In the middle section of Carron Terrace the walls are 1.2m in height however at the end of Carron Terrace, (adjacent to No 1) the wall needs to link with the self-raising sections therefor it is 1.8m in height. The predicted water levels provide the design height for the walls. Where possible, the impact of these has been minimised with the introduction of the self-raising barriers however it is not possible to install these on Carron Terrace. This is due to the location and sensitivity of the existing tree root network. The trees at this location have</p>
	<p>Mr Craig states that the existing wall from White Bridge to Carron Terrace is in need of repair but it sets a level that provides a balance between river overflowing and allowing the natural beauty of the river to be enjoyed. He suggests that this wall should be repaired and extended at a similar height along Carron Terrace.</p>

		individual protection orders on them and they must be retained where possible.
6 – Mr Latto	Mr Latto supports the proposals to raise the Red & Green bridges having seen how debris can be caught underneath and cause the river to break its banks. However he objects to visual and environmental impact of the scheme.	<p>It is recognised that the introduction of walls along the river will have an impact to the visual environment. However we are working with landscape architects, planners and Scottish Natural Heritage to ensure that the scheme can blend with the surrounding environment.</p> <p>Mr Latto objects to the proposal to remove 1200 square metres or riverbed/riverbank and to wall in the river. He is concerned that this will turn the river into a culvert and it will impact the quality of life of the residents and wider community and have a negative impact on the wildlife.</p> <p>The impact on wildlife is a major concern of any scheme and a significant number of investigations have already been undertaken to establish what is located within the scheme area. All proposals will take account of the impact and legislative requirements when designing and constructing around protected species. We are working closely with the statutory bodies to ensure the scheme does not detrimentally affect wildlife.</p>

		The majority of the scheme is located in the Conservation area and officers are working many bodies including SEPA, The Dee Fisheries Trust, Scottish Natural Heritage, Landscape Architects and Aberdeenshire Council Planning team to ensure the scheme is sympathetic to the existing environment.
7-Burns	Ms	<p>Two letters have been received from Ms Burns.</p> <p>Letter one</p> <p>Ms Burns has stated that the scheme had been altered since the public viewing of plans this year, the walls are 2 ft higher. This has implications for residents and for eventual costs and the public need to be made aware of changes from the plans shown at the public consultation. She states that the change in plans is misleading</p> <p>The scheme has changed and developed since its commencement in 2009. The public consultation in May 2015 gave an indication as to the scheme at that moment in time. At the consultation, on display was an artist's impression which was to provide an indication as to the type/finish of the wall material rather than an indication as to the wall height known at that time. No actual levels were shown, however it is recognised that this image could have been interpreted incorrectly.</p> <p>Only when the publication and advertisement of the Flood Order statement does the proposal become the recognised scheme. This design is not altered once publicised, unless mitigation is approved by Committee.</p> <p>All those directly impacted by the scheme or those with a land interest would have received an individual plan and direction where to view the full scheme documents.</p>
		<p>Ms Burns also objects on grounds of costs. She claims that residents who have expertise in flow of rivers have presented cost effective and more immediate solutions. These need to be considered as the flood alerts have been issued several times this year already. A speedier and cheaper solution is needed.</p> <p>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. The scheme as proposed is designed to accommodate a 1 in 200 year flood event rather than those recently experienced, it will also take account of proposed climate change.</p>

<p>Ms Burns states that a listed building on the River Carron is to have its outer wall removed from sight. She highlights that the building is of historic value to the town and needs to be preserved, not hidden behind "faced" walls. She is also concerned that nature of the river will change. She claims that the river embankment will be spoiled and this will be detrimental to the character of the town.</p>	<p>A number of the existing walls and structures that currently provide the river wall boundary between White Bridge and Bridgefield Bridge are listed structures. Officers have undertaken significant discussion with Scottish Natural Heritage (SNH) and Aberdeenshire Council planning officers regarding the wall proposals. The riverwall just upstream of Bridgefield Bridge is part of the building at 19 Bridgefield. This building is category C listed and the priority from SNH is to protect the building from continued flooding. They have indicated that the integrity of the building must be a priority, therefore external interventions would be the preferred option. The existing walls on the river are not structurally strong enough so there needs to be engineering intervention. The proposed solution will not damage the building, but it is recognised that it will prevent it from being viewed externally.</p> <p>There are occasions in periods of low river flow and low tide when the beach sediment moves and restricts the exit flow of river channel. This results in the appearance of high river levels downstream of the Beach Bridge. This is likely to be the situation Ms Burns describes. The sedimentation of the River mouth was the original reason for the rock armour to be implemented (HR Wallingford report 1998).</p> <p>A separate study undertaken on the alignment of the Rock Armour has demonstrated that in a 1:200 year river event, the current alignment provides a level of protection from tidal waves entering the channel, whilst not detrimentally effecting downstream flow.</p>
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<p>Ms Burns states that plans appear to show the river narrowing at key points and with velocity and volume of water would increase chances off flooding not reduce.</p> <p>Ms Burns states that the proposed scheme is unnecessary in scale and cost.</p>	<p>The narrowest point on the River Carron is between White Bridge and Bridgefield Bridge. The design flows take account of roughness of channel, velocities and flow rates. This is what dictates the height of the proposed structures to prevent out of channel flow.</p> <p>Letter two</p> <p>Ms Burns is concerned that only one model exists showing the channel breadth increase of 2m. Further models of greater increases up to and including a 'natural outlet' should be included in the Flood Order</p>	<p>Officers have undertaken substantial amounts of hydraulic modelling. In the past year over 130 modelling tests were undertaken. Not all parameters tested were detailed in the Hydraulic report provided to support the Flood Protection Order. Modelling is an iterative process and as such only the supporting information is published.</p> <p>MITIGATION</p> <p>An addendum to the Hydraulic report has been completed to explain the test results of the modelling undertaken to widen the rock armour by 5m, 10m, providing a straight channel, and lowering the front section of the existing wall. This is detailed in Appendix 3.</p> <p>Ms Burns suggests that although upstream storage was investigated and discounted, it should be examined again to assess the impact on the design flow and design defence levels. This should be modelled and a full review of storage options should be presented within the Flood Order for consideration.</p>
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	<p>by Infrastructure Services Committee on 5 December 2013 (Item 9).</p> <p>The Flood Protection Order only details the final scheme that is being proposed. It is not a further consultation on options, nor does it require to detail what has been ruled out.</p>	<p>Ms Burns believes that the reports do not quantify the effect of lowering the riverbed at road bridge. She suggests that there is no model analysis of the effect of the breadth of the proposed lowering.</p> <p>“What effects on upstream levels would there be for a range of lowered breadths and for its proposed cross-section at the bridge”</p>	<p>The Hydraulic report (Appendix F to Flood Protection Order) does provide some detail regarding the effected of the proposed bed lowering (Figure 2.3). Bed lowering can only be taken so far as it will naturally silt to a desired level. Rivers find their natural equilibrium, so dredging would be required frequently and this would have an environmental impact to the long term health of the river. Aberdeenshire Council is not proposing to undertake further modelling.</p>	<p>Ms Burns has stated that the whole area is reclaimed from the sea, and she asks what impact driving piles into the river bed will have on the river bed and surrounding properties sub structures.</p>	<p>Extensive ground investigation and ground water monitoring has been undertaken to ensure the design of any piles has no detrimental effect on surrounding ground conditions.</p>	<p>Ms Burns states that the Flood Order has been presented while geophysics studies are ongoing. She states that, if not all relevant studies were complete then the order should not have been presented at this time.</p>	<p>The Flood Order only requires us to publish the heights of the scheme and the limits of deviation. It does not have a requirement to detail the surrounding ground conditions, nor the foundation design, as this does not have a bearing on finished heights or extents. The information from the geophysics surveys included details of underground utility locations and house foundations so we can ensure no conflicts at the construction stage as well as providing</p>
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		<p>information on water seepage, ground strata and the construction strength of the existing bridge foundations. The information has no bearing on the overall scheme parameters.</p>
8 – Mr & Mrs Gorrara	<p>Mr and Mrs Gorrara object to wall height at Carron Terrace and location of replacement Green Bridge. They suggest alternatives to the proposed Green Bridge location.</p> <p>They welcome the introduction of a wall along Carron Terrace. However stress that if too high, it will take away a lot of character from the area. They object to a wall higher than that further downstream, opposite Carron Tea Rooms.</p> <p>In their view, the wall higher should be no more than 600mm above street level so it can be used to sit on and can still access the river bank.</p>	<p>It is recognised that the introduction of walls along the river will have an impact to the visual environment. However we are working with landscape architects, planners and Scottish Natural Heritage to ensure that the scheme can blend with the surrounding environment.</p> <p>As part of the supporting documents for the Flood Order, Appendix D presented the Flood Order Drawings. These detailed the height of the proposed walls in relation to the ground level. There are six cross sections relating to Carron Terrace.</p> <p>The proposed wall heights may appear excessive when comparing with current flow (in non-event state). However the predicted design flows are significant and the proposals also make an allowance for climate change (to 2080). Climate change during this period is predicted to increase water level in the River Carron by 30%.</p>

	<p>Mr & Mrs Gorrara strongly object to proposed new location of the Green Bridge directly outside of their property. They suggest that people on the bridge will have a direct view into the property, at living room and bedroom level. The proposed concrete ramp runs full length in front of the property, significantly altering their view.</p> <p>They have suggested a slightly altered position from that proposed, to move the bridge upstream of the existing island, at the end of Arduthie Street. Their proposed drawing can be seen with objection in Appendix 2. This would save more trees and the green area on Low Wood Road</p>	<p>The proposed new location of the Green Bridge was derived from the predicted water flow levels. Due to the topography, there is the opportunity to remove the bridge structure from the proposed design water levels by moving it downstream from its current location. This would mean that in a flooding event water would not be throttled by this structure which is currently a significant issue.</p> <p>It is recognised that this new elevated position would possibly result in pedestrians on the bridge being at eye line height with Mr and Mrs Gorrara living room windows. There is the opportunity to provide some planting and screening however this would not fully obscure the bridge from view.</p> <p>MITIGATION</p> <p>Mr and Mrs Gorrara have suggested a slight relocation from the proposed location, by moving the bridge upstream by around 30 metres. Officers have considered this and whilst it is not possible to proceed with Mr and Mrs Gorrara's proposal there is the opportunity to relocate the bridge slightly further upstream from the proposed location by around 18-20m. At this location there would be no impact to design water levels, and it would result in an elevated position facing onto Arduthie Street. It would however move the ramp structure closer to No 15 Carron Terrace from that shown in the original Flood Protection Order details.</p>
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9 – Mr & Mrs McIntosh	<p>Mr and Mrs McIntosh object to the proposed measures to speed the flow of the burn as they are negated by the extremely restrictive rock armour at the river mouth.</p> <p>They urge the Council to open up the river mouth to its full width to allow the water to flow straight out to the sea. They feel that this work could be done now, and state that if the Council are concerned about sea waves coming up the river, they have lived by the river for over 70 years and they have only seen waves in the channel since the construction of the rock armour.</p>	<p>A separate study was undertaken in 2014 regarding the alignment of the existing Rock Armour. This report has demonstrated that in a 1:200 year river event, the current alignment provides a level of protection from tidal waves entering the channel, whilst not detrimentally effecting downstream flow. This report also detailed the effect of different river outfall orientations. It recommended that that straight channel should not be constructed as, in a weather event, it would allow sea waves to travel, at significant height, upstream.</p> <p>There is no concern regarding “backing up” of water. The wall height is dictated by what is coming downstream.</p> <p>MITIGATION</p> <p>An addendum to this report has been completed to explain the effects of widening by 5m, 10m, providing a straight channel and lowering the front section of the existing wall. As detailed in Appendix 3</p> <p>Mr and Mrs McIntosh state that the Council seem to accept that the backing up of water from the rock armour occurs and an inordinately high wall is proposed at great expense and massive visual impact.</p> <p>Mr & Mrs McIntosh are concerned about the self-raising barrier at the end of Arbutnott Street being struck by turning vehicles and the consequences of it being inoperable.</p> <p>Mr & Mrs McIntosh are concerned that upstream storage has been dismissed too readily. Developers will develop on land that drains to the Carron and the SUDS are only effective if maintained properly. Developers should be forced to contribute meaningfully to the town.</p>
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<p>Mr and Mrs McIntosh would like information regarding interim protection when the scheme is being constructed.</p>	<p>by Infrastructure Services Committee on 5 December 2013 (Item 9). All development has to take consideration of drainage. It is a planning requirement for developers to carry out drainage impact assessments. SUDS design is part of that assessment.</p>	<p>The contractor shall provide adequate protection during the works if they remove walls. This will be a contractual issue.</p> <p>10 – Mr McDonald objects to the proposals in the scheme. He feels that the increases flood heights experienced along the low river are caused by the rock armour at the river mouth. This in turn causes the proposed flood walls (from the White Bridge to the sea) to be at an increased height.</p> <p>A separate study was undertaken in 2014 regarding the alignment of the existing Rock Armour. This report has demonstrated that in a 1:200 year river event, the current alignment provides a level of protection from tidal waves entering the channel, whilst not detrimentally effecting downstream flow. This report also detailed the effect of different river outfall orientations. It recommended that that straight channel should not be constructed as, in a weather event, it would allow sea waves to travel, at significant height, upstream.</p> <p>There is no concern regarding “backing up” of water. The wall height is dictated by fluvial flow.</p> <p>MITIGATION An addendum to this report has been completed to explain the effects of widening by 5m, 10m, providing a straight channel and lowering the front section of the existing wall. As detailed in Appendix 3</p>
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	<p>He states that this stretch of river has been free from domestic flooding events for many generations. This was done by ensuring the width of the section of river downstream of Bridgefield Bridge being significantly greater than the upstream channel allowing unrestricted release of flood waters on to the beach as soon as the end of the channel was reached. As such the river height was dictated by the tide height and upstream levels never reached dangerous levels. This also allowed flood waters to flow at a greater velocity than which allowed the river to self erode the bed in flood conditions.</p> <p>Hr refers to the flood event in 1948 and links the fact that the Carron water did not enter riverside dwellings to the practice of mechanically grading the river bed.</p> <p>A history of flooding events in Stonehaven was undertaken for the 2013 consultation. Evidence from national and local newspapers has demonstrated that since 1829 there has been periodic flooding of Stonehaven. The rock armour channel was constructed and modified between 1998 & 2004, with some modification around 2007.</p> <p>The proposed design height is dictated by downstream flow. The predicted design flows are significant and the proposals also make an allowance for climate change (to 2080). Climate change during this period is predicted to increase water level in the River Carron by 30%.</p> <p>Dredging is often not the best long term or economic solution compared with other flood risk measures. Rivers find their natural equilibrium, so dredging would be required frequently and would have an environmental impact to the health of the river. Furthermore, in this situation it would not provide sufficient additional capacity.</p>
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<p>Mr McDonald states that the first evidence of flood height increase was immediately after construction of Beach Bridge. He states that rather than support the bridge on piles or piers the bridge is supported on rock armour. This has reduced the low level flood escape capacity on to the beach by at least 20%.</p> <p>He also states that the construction of the Scottish Water sewer with inspection head close to the upstream side of the bridge further reduced free water escape.</p>	<p>The Beach bridge is built on concrete abutments, not the rock armour.</p> <p>There are two sewers in this location. There is a gravity sewer, running under the existing rock armour, on the seaward side of the river towards the Harbour. There is also a high pressure pumped sewer running under the Beach bridge deck, this flows from the Harbour towards Cowie. We are proposing to alter the height of the Beach bridge to remove the sewer from any predicted flow.</p>	<p>There is no record of the road bridge being designed to accommodate any future predicted flood flow.</p> <p>Mr McDonald states that when the road bridge was rebuilt in early 1960s previous flood heights were taken into account and a safe increased flood flow safety margin factored into construction. This should have alerted authorities to increased flood heights at this location with no similar increased levels upstream indicating that river mouth interventions were causing the increased heights.</p> <p>He states that he has been informed by officers that the rock armour channel can carry similar or greater volume of water than the upstream channel. However he feels that this is only when the channel is filled to capacity at which point the surface water in the channel is at least 8 feet higher at the end of the flood walls than when the water was free to escape over the full river mouth at beach level.</p> <p>The narrowest part of the River Carron is between White Bridge and Bridgefield Bridge. The design capacity on this section is the same as the rock armour channel. It is highly unlikely that a river flooding event would happen in isolation and there is likely to be some activity at the sea. The 2014 Rock Armour study has investigated the possibility of changing the outfall and it has recommended that allowing the River Carron to exit across the beach would result in sea waves travelling up the channel</p>
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	<p>Mr McDonald states that he has been told that the narrow rock armoured channel was constructed to prevent waves entering and flowing up the river. However he states that no wave action had been recorded in the last two centuries. Local residents testify that no waves occurred in the river previous to the councils intervention. He states that wave action occurs due to the construction of the rock armoured wall in a shallow curve below the high tide mark with the most easterly end reaching out in line of incoming waves. These "running" waves can be easily controlled.</p> <p>There are occasions in periods of low river flow and low tide when the beach sediment moves and restricts the exit flow of river channel. The sedimentation of the river mouth was the original reason for the rock armour to be implemented. (HR Wallingford report 1998). It was not related to waves entering and flowing up the river.</p>
11 – Mr J Briggs (FG Burnett)	Mr Briggs has engaged the services of FG Burnett to represent his interests. They have indicated that, in principle, Mr Briggs is in favour of an appropriate flood scheme. However he objects to the proposed scheme.

<p>Mr Briggs feels that definitive and detailed plans with regards to his property have not been produced as further research and analysis from engineering surveys are still required. He states that the dotted lines on the drawings are indicative not definitive.</p>	<p>Mr Briggs has been provide a cross section of the proposed scheme adjacent to his property. It shows the proposed height and location of the proposals. The dotted line referred to in the objection letter is not indicative as suggested but a line delineating "limits of deviation" which is standard for any construction scheme of this type.</p> <p>The Flood Order only requires us to publish the heights of the scheme and the limits of deviation. It does not have a requirement to detail the surrounding ground conditions, nor the foundation design, as this does not have a bearing on finished heights or extents. The information from the geophysics surveys included details of underground utility locations and house foundations so we can ensure no conflicts at the construction stage as well as providing information on water seepage, ground strata and the construction strength of the existing bridge foundations. The information has no bearing on the overall scheme parameters.</p>	<p>Mr Briggs is concerned regarding the proposed height of the self-raising walls on the north side of the River.</p> <p>He has stated that as the plan is not definitive, the distance of the gap between his property and flood defence wall is not known and there is a concern of damp ingress to the building.</p> <p>The plans show the proposed height of the defences, in both open and closed positions relative to his property.</p> <p>Mr Briggs has been provided details of the gap distance (this ranges from 0.065m at top of wall to 0.120m at bottom) and also a proposal from historic building specialists to explain how damp would be dealt with.</p>
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<p>Mr Briggs is concerned that the construction of new wall outside his property raises issues relating to access and responsibility for the future repair and maintenance of new wall and existing wall.</p>	<p>The maintenance of the new wall would be the Council's responsibility. Prior to construction, the existing property wall will require to be repointed using conservation skills and materials appropriate to preserve the historic structure. Any future maintenance of this wall could then be undertaken internally.</p> <p>Mr Briggs stated that the construction of new walls on both sides of the river will narrow the channel and this results in excessive wall heights.</p> <p>Mr Briggs considers that the self-raising walls rely on mechanical elements and could fail and exacerbate flooding issue</p> <p>He is also concerned about the height of the self-elevating barriers on the wall opposite his property</p> <p>A number of the existing walls and structures that currently provide the river wall boundary between White Bridge and Bridgefield Bridge are listed structures. The riverwall just upstream of Bridgefield Bridge is part of the building at 19 Bridgefield. This building is category C listed and the priority from SNH is to protect the building from continued flooding. They have indicated that the integrity of the building must be a priority, therefore external interventions would be the preferred option.</p> <p>The existing walls on the river are not structurally strong enough so there needs to be engineering intervention. There is a proposal to provide a culvert under the rear gardens of Cameron Street to provide additional capacity in the river at this location.</p> <p>The proposed type of barriers have been used in other schemes and there hasn't been a report of failure to date. Once the scheme is constructed it will have a rigorous maintenance and testing regime.</p>
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<p>Mr Briggs questions what rock armour modification has been omitted and refers to Appendix F Hydraulic report and states that “a 2 metre widening would have a noticeable effect on lowering the flood heights downstream of the White Bridge”</p>	<p>This report goes on to say that raising the existing footbridge provides the same effect and also provides additions benefit of raising the existing high pressure sewer out of the predicted flood water. The rock armour also provides a level of protection from sea waves entering the channel.</p> <p>Officers have undertaken substantial amounts of hydraulic modelling. In the past year over 130 modelling tests were undertaken. Not all parameters tested were detailed in the Hydraulic report provided to support the Flood Protection Order. Modelling is an iterative process and as such only the supporting information is published.</p>	<p>MITIGATION An addendum to the Hydraulic report has been completed to explain the test results of the modelling undertaken to widen the rock armour by 5m, 10m, providing a straight channel, and lowering the front section of the existing wall. This is detailed in Appendix 3.</p> <p>The study referred to was from an early period of the scheme development. Optioneering was carried out prior to the preferred scheme being taken forward in 2013. Upstream storage was investigated as part of this. It was established that there was insufficient land available to accommodate the volumes of water required. Walls would still be required in the lower section of the town to accommodate the flows from the Glaslaw Burn. Therefore</p>

	<p>this option was ruled out by Infrastructure Services Committee on 5 December 2013.</p>	<p>The detail of how much material will be removed from underneath Bridgefield Bridge has not been included in the plans and has not been modelled to show the effect. Mr Briggs wishes to inspect the model analysis of the proposed lowering. Requests that the Council produce figures to quantify the effect on upstream levels for a range of lowered breadths and the proposed cross section at the bridge.</p>	<p>The Hydraulic report (Appendix F to FPO) does provide some detail regarding the effected of the proposed bed lowering (Figure 2.3). Bed lowering can only be taken so far as it will naturally silt to a desired level. Rivers find their natural equilibrium, so dredging would be required frequently and this would have an environmental impact to the long term health of the river.</p> <p>Aberdeenshire Council is not proposing to undertake further modelling. It is confident that the modelling undertaken is sufficient and robust.</p>	<p>The scheme has changed and developed since its commencement in 2009. The public consultation in May 2015 gave an indication as to the scheme at that moment in time. At the consultation, on display was an artist's impression which was to provide an indication as to the type/finish of the wall material rather than an indication as to the wall height known at that time. No actual levels were shown, however it is recognised that this image could have been interpreted incorrectly.</p> <p>Only when the publication and advertisement of the Flood Order statement does the proposal become the recognised scheme. This design is not altered once publicised, unless mitigation is approved by Infrastructure Services Committee.</p>
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	<p>All those directly impacted by the scheme (including Mr Briggs) or those with a land interest would have received an individual plan and direction where to view the full set of documents relating to scheme.</p>	<p>As previously stated upstream storage was investigated and ruled out by Infrastructure Services Committee on 5 December 2013 (Item 9).</p> <p>Mr Briggs has reiterated his opinion that upstream storage should be considered and is of the view that the Council should provide all data and modelling results showing the effect of storage situation.</p> <p>Mr Briggs is of the view that it is incumbent on the Council to review and report on all reasonable options considering sustainability and managing flows before they reach urban/built up areas.</p> <p>Reconstruction of walls and banks should be seen as a last resort as the consequences of them being overtopped are disastrous and flood defences that rely on mechanical operation or human action are not sustainable in his view.</p> <p>Walls and embankments are one method of controlling flood waters, amongst others that have been explored prior to developing the preferred scheme as proposed. The recommended scheme requires to balance a day to day quality of life issue with the competing issue of occasional high river levels that cannot be economically addressed by upstream storage. This is why the Council are proposing the self-raising barriers in locations where a solid masonry wall to the required height would be have a significant visual impact to residents.</p> <p>The proposed type of barriers have been used in other schemes and there hasn't been a report of failure to date.</p>

1) Dr Munro

Dr Will Munro
13 Cameron Street
Stonehaven
Aberdeenshire
AB39 2BL

27 August 2015

To: Head of Legal & Governance
Aberdeenshire Council
Woodhill House
Westburn Road
Aberdeen
AB16 5GB

Dear Sir/Madam

I refer to Rachel Kennedy's letter of 29 June 2015 consulting on the proposed Stonehaven Flood Protection Scheme (River Carron).

I am a statutory consultee, as my property at 13 Cameron is adjacent to the River Carron and around the lowest point in Cameron Street. I was flooded in the 2009 flood, whilst in the 2012 flood my own flood defences succeeded in protecting my property (though my garden, shed & contents suffered damage). I have also been a member of the Stonehaven Flood Action Group since its inception and am currently Deputy Chair of the group.

Whilst I welcome the work done by Aberdeenshire Council in bringing the flood protection scheme to this stage, there are certain aspects which I am concerned about and which I believe must be addressed if Stonehaven is to achieve effective and proportionate flood protection.

Therefore, as an individual, I wish raise an objection to the proposal which primarily centres on the proposed wall heights between White Bridge and Bridgefield Bridge and the possibility that these could be lower if certain options which have been suggested to the Council concerning the lower stretch of the River Carron were considered and acted upon.

- Removal of material and old abutments from beneath Bridgefield Bridge

The Council has recently indicated verbally that approx. 0.3m of material will probably be removed. However the Mott MacDonald report (Appendix F) pre-dates this decision and although it indicates that re-profiling of the river bed would take place, this is specifically *between* the bridges and no mention is made or evidence presented in the report to indicate that the effect of removing material from beneath the bridge was modelled.

- Modification of rock armour at river mouth

Mott MacDonald modelled a scenario (Appendix F, Figure 2.7) based on widening the channel by 2 metres which shows a marked reduction in water levels between

White Bridge and the Beach Bridge of around 0.3 – 0.5 meters. Despite this the proposals do not consider any widening or modification of the rock armour which could lower required wall heights upstream. Requests that wider/more natural river mouth configurations should be modelled have also been refused, including the configurations originally proposed by HR Wallingford in their original design for the rock armour (which the current 'S-bend' design doesn't follow). Lowering of the rock armour was modelled (Figure 2.6) but little can be deduced from this since no details were provided as to how long a section was lowered or by how much.

Some modelling was carried out on this S-bend section, to examine the effect of lowering the sewer pipe at the river mouth. This showed only a slight effect, however it is my understanding that this model did not take into account the fact that the river gradient would change as a result, steepening and increasing flow rates.

- Narrowing of the river channel

The proposals now include a new wall on the south side of the river from White Bridge to Bridgefield Bridge rather than using & reinforcing existing structures where possible. These walls as now proposed are substantially higher – by approx. 60cm – than those as displayed at the public exhibition and would have a severe impact on the visual amenity of this part of Stonehaven. The walls also cause a narrowing of the river at the 'pinch point' at Bridgefield Bridge.

Below Bridgefield Bridge the proposals also narrow the channel and there is a further narrowing by the Beach Bridge abutments. This is despite the Mott MacDonald report (Figure 2.4) stating that narrowing the channel at this point 'has the effect of increasing water levels upstream of Bridgefield Bridge'. If narrowing the channel raises water levels then surely widening it – including the rock armour – would lower them?

A hope that these concerns can be addressed and look forwards to hearing from you in due course.

Regards,

Dr Will Munro

2) Mr & Mrs Allan

RECEIVED 28 AUG 2015

Mr & Mrs Allan
3 Carron Terrace
STONEHAVEN
Kincardineshire
AB39 2HX
27th August 2015

Your Ref: RK/1/175/5

For the attention of:
Head of Legal and Governance
Aberdeenshire Council
Woodhill House
Westburn Road
Aberdeenshire Council
AB16 5GB

Dear Sirs

Stonehaven Flood Protection Scheme (River Carron), Flood Risk Management (Scotland) Act 2009 and The Flood Risk Management (Flood Protection Scheme, Potentially Vulnerable Areas & Local plan Districts) (Scotland) Regulations 2010.

We refer to the Stonehaven Flood Protection Scheme (River Carron) and the proposals within the supporting documentation.

We are not in favour of the overall Flood Protection Scheme proposals to construct walls along the River Carron and Glaslaw Burn within the town of Stonehaven and feel that a scheme of attenuation with a 'hydrobrake' up stream of both watercourses would be a better solution overall.

However, we wish to object to the 1.8 metre high masonry/stone wall proposed to be erected adjacent to the River Carron at the easternmost end of Carron Terrace extending from the southern extended kerb line of Cameron Street in a westerly direction for approximately 80 metres, or thereby, and the proposal to cut down the trees to accommodate this wall. A 1.8 metre high masonry/stone wall and the associated tree removal will significantly affect the existing encompassing environment; Carron Terrace, the Carron River, the tree and grassed park area and the footpath from Dunnottar Avenue to the White Bridge via Arbuthnott Street.

The view looking down Carron Terrace overlooking the river and recreational grassed area centring on the White Bridge will be obstructed by the proposed wall.

These views have been photographed by many including tourists to Stonehaven and have been the subject of numerous paintings. The significance and importance of the view is even recognised by the consultants employed by the council as it has been given precedence on the front cover of their reports on this scheme.

'Place Status'

The footpath from Dunnottar Avenue effectively meets both the river and Carron Terrace at the same place creating a 'high place function'. This is where residents of Stonehaven walking towards the town centre either down the footpath from Dunnottar Avenue or Carron Terrace see each other and talk across the 'burn' and/or continue in conversation down each route until they meet at the White Bridge. This area together gives a 'sense of place' by giving 'local distinctiveness', 'visual quality' and 'encourage social activity' - Designing Streets, a Scottish Government Policy document, encourages a 'positive sense of place' which is 'fundamental to a richer and more fulfilling environment'. The proposed 1.8 metre high wall will remove this.

There is a bench on the eastern end of Carron Terrace which encourages and gives the opportunity to sit down and take in the visual quality of the river running down between the trees of Carron Terrace and the tree and grassed area on the southern side of the river bank towards the White Bridge centred between its pillars. From the bench, one can also watch the ducks going about their business and regularly observe two herons who nest in the nearby Dunnottar Woods fishing in the river.

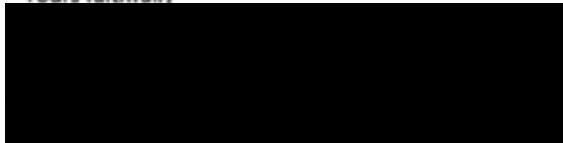
Security

A 1.8 metre high wall will create an enclosed environment and may cause security issues for the many who walk up the street from the town to their homes in the evening and night time especially at the weekend.

If it is considered necessary to have a wall of an overall height of 1.8 metre along the eastern stretch of Carron Terrace, as part of the preferred proposal then there should be no reason why the wall cannot be a maximum height of 1.1 to 1.2 metres with a self closing barrier rising to 1.8 metres high during a flood event, as is proposed for the area of the river which is overlooked by the Carron Restaurant; between the White Bridge and Carron Terrace.

In our view the cutting down of four trees along Carron Terrace from its junction with Cameron Street is excessive and will also have a significant effect on the environment.

Yours faithfully



Stuart Allan and Kim Allan

3) Mr
Buchanan

RECEIVED 28 AUG 2015

Ian Buchanan
51 Cameron Street

Stonehaven
AB30 2HS

27 August 2015

Head of Legal and Governance
Woodhill House
Westburn Road
Aberdeen
AB16 5GB

Dear Sir,

Stonchaven Flood Protection Scheme

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 measures that have been suggested by residents of the town who have lived with the river and its vagaries all their lives.

Anyone who has lived through the more recent flood events can see that both the ridiculous island and fish ladder at the green bridge and the angles of the rock 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 the 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

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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.

Sincerely yours,

[REDACTED]
Ian Buchanan

4) Mr
Duncan

Oak Villa
20 Carron Terrace
Stonehaven
Aberdeenshire
AB39 2HX
14-08-2015

Head of Legal & Governance
Aberdeenshire Council
Woodhill House
Westburn Road
Aberdeen AB16 5GB

Stonehaven Flood Protection Scheme (River Carron)

Dear Sir/Madam,

I am objecting to the proposals on Drawing MMD-345087-C-DR-00-XX-8004. I believe the main reason for the water level to rise to the extent of breaking over the current banking is due to previous ill thought interventions that has led to the situation we now have during high levels of prolonged rainfall.

1. Removal of the manmade island would be more effective in allowing the natural flow of water to exit from beneath the Green Bridge. I have watched the backwash created by the obstruction of the island on the two occasions we have recently had flooding.
2. The manmade weir approximately three metres downstream of the Green Bridge requires to be removed and piping re-routed to allow the river bed upstream of the weir to be lowered.
3. The wall created to the north side of the river downstream of the Green Bridge requires realignment to widen the mouth and create a more natural flow. This is the narrowest part of the river at the Green Bridge location

Lessons should be learned from previous interventions to prevent a reoccurrence of the mistakes made in the past. All of the issues contributing to the flooding have been made due to manmade interventions. A programme of cleaning the riverbed and removal of dead wood along the river banks also needs to be addressed.

Regards,

[REDACTED]
Ian Duncan.

5) Alan Craig	<p>Head of Legal and Governance Aberdeenshire Council Woodhill House Westburn Road Aberdeenshire Council AB16 5GB</p> <p>8 Carron Terrace Stonehaven AB39 2HX</p> <p>24 August 2015</p>
	<p>Ref: Stonehaven Flood Protection Scheme (River Carron) - Objection</p> <p>To whom it may concern.</p> <p>In response to the letter of 29th June 2015 from Rachel Kennedy I write to express my objection to the scheme.</p> <p>It is clearly understood that flooding events have had a significant impact on the residents of Stonehaven in the past few years and that an engineering solution is required, in part, to try to prevent any future events from occurring. However, much of the causes of the higher levels of the river can be attributed to man made features along the length of the channel. A great deal of evidence has been provided by others to support this point of view. Issues such as concrete casings passing under the river, excessive exit flow restrictions caused by the rock armour, channel narrowing by residential incursions, flow restrictions caused by the island at the green bridge and associated badly designed rock structures in the surrounding area, lack of usage of historical drainage systems, poor maintenance of drainage systems, development planning allowing excessive building within the catchment area, poor farming practice leading to excessive run off - the list goes on and on.</p> <p>The building of a wall ranging in height from 1.8m to 1.15m along Carron Terrace is going to have a significant negative impact on the aesthetic of Carron Terrace and will ruin what is a beautiful area in the town that is enjoyed by many people not just residents. The heights proposed will result in a claustrophobic environment.</p> <p>The historical wall that runs from the White Bridge to the start of Carron Terrace is in need of repair but sets a level that provides a balance between river overflow protection and allowing the natural beauty of the river to be enjoyed by all. This wall should be repaired and extended at a similar height allow the length of the terrace.</p> <p>Man made factors have had a hugely significant impact on the river levels in the Carron. Much could still be done to correct the mistakes of the past. The architects of this scheme need to be careful that they do not go down in history as the people that completely ruined the heart of this beautiful old town.</p> <p>Your's sincerely</p> <p>Alan Craig</p>

6) Mr Latto

|
10 Carron Terrace
Stonehaven


Dear Ms Kennedy

I am writing to lodge my objection to the proposed Carron Flood Prevention works currently under public consultation.

I am happy enough with the proposal to raise the red & green bridges having seen firsthand how debris can be caught underneath and cause the river to break its banks, at the green bridge in particular. Though I note there are already effective measures in place to catch large debris further upstream at Woodcot Brae.

My objection is to the plans to remove 1200 square metres of riverbed (and presumably riverbank) and to effectively wall in the river, both in terms of the riverbank itself and up to six feet above road level.

To my mind this in fact turns the river, a much valued local beauty spot into a culvert, seriously impacting the wildlife and the quality of life of those of us who live by it as well as the wider community to who walk along it, fish in it or just sit quietly beside it eating their lunch. At present people can access the water and experience a little bit of nature – local kids safely play in it.

More selfishly I do not want to sit looking out of my window at a wall for the next 30 or whatever years. I personally chose to live beside a river for the benefits it brings in terms of enjoyment, health and quality of life and I would rather accept the consequences of that choice than have those benefits removed.

I appreciate there have been floods in the past and will no doubt be floods in the future but that's to be expected if you live beside a river...

Yours sincerely

Derek latto

7) Ms Burns

I.S. - Carlton House	
Ref.	S11175/4
Reply	R&B51
Date	28 JUL 2015
Assign To	RJC
Copies	
Signatures	

2 Rickarton Cottages
Bridgefiled
Stonehaven
AB39 2FY

Dear Sir/Madam,

I wish to register an objection to the flood plans presented by Aberdeenshire Council re the River Carron and surrounds.

In the first instance the scheme has been altered since the public viewing of the plans earlier in the year – the walls are now two feet in height higher than was presented to the public. This has implications for residents and for eventual cost and as modifications have been made the public need to be made aware accordingly. Many residents will have seen the exhibition at the Bowling club and will take those plans as the ones that have to be considered. This is misleading when the plans have already been modified.

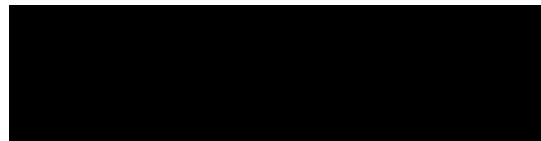
Further to this I wish to object on grounds of cost. Several residents with knowledge – expertise even in the flow of the river have presented cost effect and more immediate solutions to the problems faced by residents in the old town and surrounds. These needed to be more carefully considered as flooding is possible now at any time. (Alyth is surely an example of this) Flood alerts from SEPA have been issued several times this year already and after heavy rains in July the river has swollen several times to alarming heights. The council's plans will take several years to implement – a more speedy solution is needed now and these speedier and cheaper solutions have been presented to the council.

A listed building along the Carron is to have a wall which will virtually remove the outer wall of the building from sight. The buildings of historic value in this town need to be preserved and not hidden behind 'faced' walls. Also the nature of the river will change. At present it is full of wild life enjoyed not only by myself daily but also to visitors to the town. The spoiling of this river embankment is, I feel, detrimental to the character of the town. As a culvert under the gardens of Cameron Street is planned I cannot understand why a culvert and removal of the rock armour at the mouth of the river cannot be implemented. On 17 July with a low tide and the sea out some considerable distance the river water which was very high after rain was not getting out to the sea – the layout of the armour and height of the armour makes the river – on occasion flow back on itself.

Finally the plans appear to narrow the river at key points and with velocity and volume of water would in fact increase the chances of flooding not reduce them.

I have been flooded twice. I now have a number of flood gates and sump pumps below my property but feel the scheme proposed is unnecessary in scale and cost.

Yours sincerely,

A large black rectangular redaction box covering the signature area.

RECEIVED 27 AUG 2015

2 Rickarton Cottages
Bridgefield
Stonehaven AB39 2FY

26 August '15

Dear Sir/Madam,

Further to my initial letter of objection re Flood Order I wish to add the following points:

It appears only one model exists to show increasing the channel breadth of the river by 2M to allow freer discharge of the river to the sea results in lower upstream levels. Surely further models of greater increase up to and including a 'natural outlet' should be included in the Flood Order for consideration.

Upstream storage although, investigated but rejected, should also be examined to assess impact on the design flow and hence design defence levels. This again should be modelled and the storage situation studied and full review of storage options again should be presented within the Flood Order and for consideration

Lowering of the river bed at the road bridge again would indicate lower design water levels upstream. The reports do not appear to quantify the effect. There also does not appear to be a model analysis of the effect of the breadth of the proposed lowering. What effects on upstream levels would there be for a range of lowered breadths and for its proposed cross-section at the bridge.

The whole area is reclaimed land from the sea. What impact will driving pilings into the river bed have on the river bed itself and surrounding properties sub structures?

The Flood Order has been presented and time allowed for perusal and objections yet geophysic study is still ongoing. If not all relevant studies are/were complete then this order should not have been presented at this time.

Yours sincerely,

(Mrs C.F Burns)

8) Mr & Mrs Gorrara

Head of Legal and Governance
Aberdeenshire Council
Woodhill House
Westburn Road
Aberdeenshire Council
AB16 5GB

cc: Rachel Kennedy, Alan Craig

Andrew and Sandra Gorrara
14 Carron Terrace
Stonehaven
AB39 2HX

26 July 2015

REF: Stonehaven Flood Protection Scheme (River Carron) - OBJECTIONS

To whom it may concern.

In reply to the letter from Rachel Kennedy dated 29 June 2015, we would like to express some specific objections and make a positive suggestion for some minor modifications to the scheme.

We have owned our house in Carron Terrace since 2004 and are therefore well invested in the area and keen to maintain or improve the area. During that time we have experienced the two flooding events and are well aware of the issues that need to be addressed.

As you are probably aware I wrote to the council following the last flooding event with some suggestions for addressing current weaknesses in infrastructure.

The scheme that is described in your documents is clearly well thought out technically and addresses many of the concerns for the future and whilst I do not disagree with the direction of the improvements there are some ideas that could be approached differently, and some details that are not clear from the documentation. It should also be remembered that Carron Terrace is a conservation area, and therefore all changes should be done with that in mind.

1. The wall along Carron terrace is long overdue and could be a welcome improvement to the current chain-link fence. However if it is too high then it will take away a lot of the character and pleasure of living by a river and will make the terrace claustrophobic. I therefore strongly object to a wall significantly higher than the existing wall along the river by the Carron Tea Room on Cameron St. A wall higher than that would be a great disservice to the residents of Carron Terrace and the Stonehaven community as a whole. The document does not make clear what height the wall is above street level, some artist impressions at different places along the street should be provided, with the view from 1.5m height standing on the pavement to show the impact of the wall. In my view this wall should be kept to around 600mm above street level, so it is a suitable height to sit on and not difficult to climb over and walk by the river. This would be a similar height to the existing wall on Cameron Street outside the Carron Tea Rooms. There is no evidence to suggest that the river water level will ever get higher than that if all other aspects of the river are designed properly to allow the water to flow freely.

2. I also STRONGLY OBJECT to the fact that the Green Bridge has been moved from its current position where it does not visually impact on any residence, to a position directly opposite 14 Carron Terrace in an elevated position. Whilst it would be beneficial to have an elevation view from the doorway of 14 Carron Terrace towards the bridge in the new position to show what impact the bridge will have for 14 and 15 Carron Terrace, it will be an invasive change. It is high, so that people on the bridge will have a direct view into the cottage, probably both at living room and bedroom levels, and the concrete ramp now runs full length in front of the cottage so that the view from the door changes from a pretty, wild river to a concrete monstrosity. I have attached a modified diagram showing the Green Bridge in an alternative position, directly at the end of Arduthie Street thereby not impacting any residence, with the ramp at the wide area available and instead of ruining the green, access could be from the existing bridge area. In this position several more trees will be saved in Carron Terrace and the green area by the river that is currently used by many local residents as a recreational area would not be significantly changed which would be another loss, especially the younger residents.

I understand that it is not easy to keep everyone happy when starting a large engineering project in a residential area, but I believe that my suggestions are reasonable, and would be happy to discuss them with you at a mutually convenient time.

Yours sincerely

[REDACTED]
Andrew and Sandra Gorrara

9) Mr & Mrs
McIntosh

RECEIVED 25 AUG 2015

13 Arbuthnott Street
Stonehaven
Kincardineshire
AB39 2JB

Head of Legal and Governance
Aberdeenshire Council
Woodhill House
Westburn Road
Aberdeen
AB16 5GB

21 August 2015

Dear Sir/Madam

Stonehaven Flood Protection Scheme (River Carron)

As the owners of the wall bordering The Carron between Nos. 15 and 5 Arbuthnott Street, we formally object to the above scheme on the grounds that measures taken by the Council to speed the flow of the burn are negated by the extremely restrictive rock armour at the river mouth.

The Council seem to accept that water will back up during extreme spates and are erecting an inordinately high wall – much higher than originally planned – at our side of the river causing great expense and massive visual impact.

We therefore urge the Council and their contractors to have a rethink and open up the river mouth to its full width so allowing the water to flow straight out to sea. This work could be done now and would reassure us that we could face a flooding event with relative confidence knowing that the burn was not restricted by the rock armour and its 'double bends'. If there is concern by the Council about sea waves coming up the burn if the rock armour was opened up, then we can assure you that, having lived by the riverside for over 50 years – my wife for over 70 years - the only waves which have attracted attention are the ones which have occurred since the rock armour was put in place.

We are also concerned about the self-closing flood barrier at the White Bridge end of Arbuthnott Street as it will be vulnerable to being struck by turning vehicles thus possibly rendering it inoperable when needed. The failure of this barrier could have catastrophic consequences in our street and beyond. Perhaps some protection bollards could be put in place and an inspection regime initiated to deal with this potential problem.

We also feel that upstream storage has been dismissed too readily and this should be looked at again in view of the developers waiting in the wings to get 'the nod' to develop land which drains into The Carron. Development in these

areas would certainly pressurise the Flood Protection Scheme despite all the smooth talk of SUDS etc. which are only effective if they are maintained. Has the Council not got powers to force developers to contribute meaningfully to the protection of our town?

Finally, what plans are there to protect our property when our walls are demolished? We feel that apart from the security issue, we are vulnerable to our land being eroded by a flash flood, for instance.

Yours faithfully

[REDACTED]
Mr JD and Mrs F McIntosh

10) Mr
McDonald

RECEIVED 27 AUG 2015

1

Mr Ian Gent McDonald.
2, Castle Square,
Stonehaven.
AB39 2LB

My objection to Stonehaven Flood Protection Scheme.

My objection to the flood scheme is confined to explaining that the council-built river mouth diversion and confining rock built channel are responsible for the increased flood heights now experienced along the lower river. These increased levels we are now being informed, require the proposed greatly increased heights of replacement flood walls that are to be installed all along the lower river from the White Bridge to the sea.

This stretch of river had enjoyed a history completely free from any domestic flooding events for many generations. This situation had been ensured by the width of the final section of walled river channel from the road bridge to the sea being greatly in excess of any upstream channel widths. This ensured full width unrestricted release of flood waters on to the open beach at an absolute minimum depth as soon as the ends of the channel walls were reached. From this point on all flood waters were free to spread out unrestricted over the open beach as they flowed onwards into the sea. The flood waters within the channel could not reach a height greater than high tide level as reaching high tide level implies having reached the sea and flood waters cannot make a bulge or hill on top of the sea surface level. Only spring high tides had any effect on the river mouth flood heights and then only for a maximum period of at most two hours in any 12 hour tidal cycle. Even these increased levels were never recorded as being enough to raise the water levels in the upstream channel to any potentially dangerous level.

We have plenty reliable evidence confirming that this situation was maintained over many generations. One of our main witnesses is a local born and educated man who when he had achieved his first degree became the Kincardine County Council's assistant county sanitary and river inspector for most of the 1960s. He was responsible for all flood prevention on the River Carron and the southern half of Kincardineshire. In those times the comprehensive historic archive then maintained by Kincardine County Council and Stonehaven town council was still available for reference. For his own benefit he studied this material in detail and

has reported to us that he could find no trace of any domestic flooding incidents on the lower Carron ever taking place from the early eighteen hundreds when the archive collection was started. In addition we have one family providing evidence to us who have been continuous owner occupiers of several various properties on both banks of the lower river since 1871 and they testify that no flooding of any of their properties ever took place prior to council river mouth interventions in the nineteen eighties.

One of the greatest floods ever recorded in recent times took place in 1948 which resulted in the River Cowie breaking directly through the beach and establishing its own independent river mouth. I was living in Cameron Street at the time and know for certain by personal observation that no flooding took place on the lower Carron from the White Bridge to the sea. I watched the river from the road bridge and it certainly never reached a height of even approaching entering any river side dwellings. At that time the river bed was mechanically graded periodically when deemed necessary under the direction of Stonehaven town council from a point just upstream of the White Bridge downstream to the old road bridge. This practice is clearly remembered even today by several long time local residents and even a serving local councillor. All have given us testimonies recording these events.

It is interesting to note that Mott MacDonald are now recommending in their most recent report that similar river bed lowering actions should be carried out along this same stretch of river.

Because of the wide channel's direct opening on to the beach without any possible obstruction, flood waters then flowed at a greater velocity than we witness today and in flood conditions the increased flow continuously self-eroding an ever deeper channel in the river bed between the channel walls at the river mouth and out across the beach for the duration of the flood.

The first evidence of increasing flood heights was recorded and reported to the council by concerned riverside residents immediately following the construction of the foot bridge across the river linking the open beach on the north bank to exit directly on to the south bank of the river in order to allow pedestrians to cross the river and walk along the shingle towards the harbour. It was not the footbridge itself that caused any problem. It was the manner in which the council chose to support it that was immediately responsible for a greatly reduced low level flood escape capacity on to the beach. In preference to supporting the bridge on piles

or narrow piers the council decided to support it on rock armoured support embankments built under both ends of the bridge with the further addition of a channel-reducing rock bank being installed along the south wall of the river channel upstream of the foot bridge to guide the water flow to pass under the bridge rather than impacting on the southern supporting rock embankment. These developments had the immediate combined effect of reducing the former free water low level escape capacity on to the open beach by at least 20% with a resultant flood height increase.

The concerned residents continued pressurising the council on their concerns on the increased flood heights being observed and eventually the council responded to them in 1994. A copy of the council's letter has been made available to all interested parties. In it the council official admits that there is a problem but points out that the bridge construction was the responsibility of the former Kincardine and Deeside District council who had installed the bridge without reference to higher authorities. He went on to explain that yet another change of administration was imminent and that the new authority would have suitably qualified staff to rectify the problem. Nothing happened for several years and the residents continued to complain regularly on the ever more serious potential flooding situation. Eventually in Dec 1998 the authority got round to replying to the worried residents. Again admitting that there was a concerning problem which had been further increased by Scottish Water installing a new sewage pipe running from the north end of the bridge towards the harbour buried at a safe depth under the beach and river so that it would not cause any potential river flow problems. They had however installed an inspection head close to the upstream side of the bridge just in front of the rock armour embankment thus further reducing free water escape. The council official further informed the worried residents that things would soon be getting better as work was about to start on building the proposed and approved rock armoured beach and shingle conservation barrier running directly down the beach from close to the north end of the foot bridge gently swinging in a southerly curve to reach a point almost at low water level. This new barrier had been recommended to be built by HK Wallingford the leading coastal erosion consultants following a three year detailed study of Stonehaven bay and beach as a means of reducing the accelerating shingle loss from the beach due to the natural strong north south shore line drift. Wallingford's plan was for the river mouth to remain wide open to the sea as recorded during their study period but with a wide area of open beach being left completely clear of obstructions between this new

barrier and the top of the beach so that the river in their words could meander unhindered seawards.

With this long flood-free record available to them why does it appear that no serious consideration was ever given to reinstating the full width low level proven high capacity flood escape on to the beach. The authorities certainly never even appeared to have modelled what the effect of fully restoring the historic river mouth could have on upstream flood heights.

When the road bridge was rebuilt in the early 1960s previous flood heights were obviously taken fully into account and what was thought to be a safe increased flood flow safety margin was factored into its design and construction. This alone should have been enough to alert the authorities to recognise that when increased flood heights were being experienced in this stretch of river at times when no similar increased flood levels were in evidence elsewhere up-stream then it was very likely that their restrictive interventions at the river mouth were causing the increased flood heights backing up the river.

We have been informed by the flood engineers that their confining rock armour channel can carry a similar or greater volume of water than the upstream channel. However this is only possible if their channel is filled to capacity as has been the case in the last two serious floods. When this channel is filled to capacity the surface water in this channel and backing up the river is at least eight feet higher than flood waters could ever have reached at the end of the still existing original river bank walls at which point all floods were previously free to escape over the full wide river mouth at beach level.

We have been told that the narrow rock armoured channel at the river mouth had to be built to prevent potentially damaging waves from entering and flowing up the river. No wave action had ever been recorded effecting the river despite its wide open river mouth over the last two centuries. Certainly since the 1948 flood when the totally independent river mouth was established for the first time we have many local residents who all testify that no waves in the river had ever occurred prior to the council's intervention. They built the rock armoured retaining wall to prevent the wave erosion of the raised shingle bank behind the old town which was raised to carry their safe walkway to the harbour. Their engineers undertook to build this long rock armoured wall sited well below high tide mark on the open beach. If you undertake any construction below high tide mark on any open marine beach you have to be prepared for consequences. In this case the wall was constructed in a shallow curve

with the most easterly end reaching much further out into the line of incoming waves or swells than at the river mouth end. As soon as this wall was completed for the first time in history created waves were recorded entering the Carron. These were not natural marine waves but were man-made diverted waves or running waves as they are commonly known as. Any incoming wave obviously impacts on the eastern seaward end of the rock wall first but due to the sharp angle of impact it is not halted but is diverted to run along the wall gathering mass and velocity as the wave is ever more compressed until it reaches the open river mouth where it gains release by charging up the river. These running waves are easily controlled and stopped in all other locations by simple low cost measures. However in the case of Stonehaven they chose uniquely to block of the natural proven river mouth and divert the entire river flow into a narrow rough rock walled channel which is only capable of carrying any increased flow by greatly increasing the flood height level.

This in my opinion is why we are being told that ever higher flood walls have to be built only to contain the created flood heights now being recorded at the river mouth where all the latest obstructions to flood flow and capacity have been built below high tide level on the previously open beach where in all earlier times the floods were already spreading out and flowing seawards down the open beach ensuring greatly reduced flood heights all along the lower river.

We are now being advised in this new flood protection scheme that to enable the construction of the new flood protection walls that the river channel is to be reduced further in width with this reduction in flow capacity directly causing the walls to be built to an even greater height. The channel width between the still existing original walls from the road bridge to the beach is 16.2 meters. Mott MacDonald's latest report now tells us that it is to be reduced to 10.5 meters to enable construction of the recommended new walls. Even Mott MacDonald in their report advises us that this will result in increased flood heights all along the river channel above the road bridge. In my opinion all this ever increasing high cost construction project has only been devised to contain the increased flood levels that the council's river mouth diversion and channelling are causing.

Yours faith

Ian G. McDonald

11) Mr J
Briggs
(FG
Burnett)



Our Ref: SFPW15/KP/JB

26 August 2015

RECEIVED 27 AUG 2015

Property Consultants
33 Albyn Place
Aberdeen AB10 1YL
T 01224 572661
F 01224 593496
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Recorded Delivery
Head of Legal Governance
Aberdeenshire Council
Woodhill House
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AB16 5GB

Dear Sirs

Stonehaven Flood Protection Scheme (River Carron)

Flood Risk Management (Scotland) Act 2009

The Flood Risk Management (Flood Protection Scheme, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Regulations 2010

Property: 19 Bridgefield, Stonehaven

Statutory Consultee: Mr John Briggs T/A John Briggs Furniture

I refer to the above proposed public work and, in particular, the letter dated 29 June 2015 from Rachael Kennedy, Principal Engineer, Infrastructure Services, Aberdeenshire Council.

I write to confirm that the above-named statutory consultee has instructed my Company to act on his behalf in respect of this matter. Mr Briggs is the owner-occupier of 19 Bridgefield, Stonehaven which comprises a commercial property from which he undertakes his business. The property will be directly affected by the above-stated scheme – recent discussions with Ms Kennedy refer and I also attach a relevant plan showing the proposals at this property.

As you are aware, Stonehaven in the recent past has suffered two serious floods and, as a consequence, your Council has instigated investigations into designing and delivering an appropriate alleviation scheme; indeed, 19 Bridgefield, Stonehaven has directly suffered from these floods. Thus, whilst Mr Briggs is, in principle, in favour of an appropriate flood alleviation scheme for Stonehaven he has nevertheless a number of concerns with your Council's proposals and thus wishes to formally object to the proposed scheme. The statement of reasons for this objection are set out below:-

- It would appear that, at this time, your Council cannot produce definitive and detailed plans with regard to the proposed works at 19 Bridgefield – the enclosed plan refers – as further research and analysis from engineering surveys is still required. The dotted line on the attached plan is understood to be indicative but not definitive.
- As a consequence of the above, Mr Briggs has concerns with regard to the proposed height of the proposed new self-elevating wall on the north side of the Carron Water opposite his property. In addition, due to the fact that the enclosed plan is not definitive, the distance of the gap between the proposed new flood wall on the south side of the Carron Water and the northmost wall of 19 Bridgefield, Stonehaven is unknown; however, such a gap could give rise to potential damp ingress problems to the building.

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- It is noted that this proposed new flood wall to the north of Mr Briggs' existing northmost wall would be constructed primarily of concrete with stone cladding and Mr Briggs has concerns with regard to access to and responsibility for the future repair and maintenance of both this new wall as well as his existing northmost wall.
- In essence, the effect of your Council's proposed works will be to narrow the Carron Water which at times of high rainfall/potential flood will subsequently result in a high water level – hence an excessive proposed height for the walls to both the north and south sides of the Carron water. Further, Mr Briggs considers that your Council's proposals with regard to the self-elevating walls will require to rely on mechanical elements- which could fail and may indeed exacerbate the situation.
- Mr Briggs questions why rock armour modification has been omitted, particularly as Appendix F of the Matt for M MacDonald Report indicates that a 2 metre widening would have a noticeable effect of lowering flood heights downstream of The White Bridge.
- Mr Briggs questions why there has been no modelling or possible river mouth modification e.g. at other widths up to 16.2 metres, the original width of the river mouth at mean tide levels including effects of flow and velocity to upstream water levels and including also the modelling of the HR Wallingford preferred option. It is noted that "some material" will be removed from below The Bridgefield Bridge including the old bridge buttresses: however, Mr Briggs asks how much material will indeed be removed and why has this re-profiling not been detailed in the plans or modelled to show its effect.
- The Flood Alleviation Study indicates that upstream storage is possible at several points and whilst it is accepted that this would not in itself prevent flooding, it would nevertheless offer a degree of protection and thus would help attenuate peak flow and thus "reduce the height and extent of direct defences required in the town." Mr Briggs questions why whilst the Study indicates that more detailed investigations will be needed to assess the feasibility of this option, why these investigations have not been pursued. Mr Briggs suggests a possible solution of a "spending surface" which would be created by introducing a "bulge" in the rock armour – this being an area of lower-lying loose material where wave energy can dissipate - this would help attenuate upstream waves on the assumption that the rock armour remains.
- Whilst it does seem likely that lowering the bed level at The Bridgefield Bridge by removing part of the erosion protecting invert would result in lower design water levels upstream, the documentation appears not to quantify that effect: further, Mr Briggs has not seen any model analysis of the effect of the breadth of this proposed lowering. Thus, Aberdeenshire Council is requested to produce a similar figure to that available for other changes showing the effect on upstream levels for a range of lowered breadth and also for the proposed cross-section at The Bridgefield Bridge.
- There appears to be some model evidence that by allowing the Carron Water to discharge more freely into the sea results in lower upstream water levels. The results of a model run with an increase in channel breadth of 2 metres is available but Mr Briggs questions what is the effect on an even greater increase up to the point where there is no channelling and just a "natural outlet". Thus, Aberdeenshire Council is requested to re-examine this modelling through a range of openings.
- Mr Briggs is of the view that some of the information within the documentation now presented was not available at the Public Consultation exercise earlier this year and / or the information presented at that time is now inconsistent with the formal proposals. Accordingly, these inconsistencies are, at the very least, misleading.
- Mr Briggs is of the view that all modern flood alleviation schemes should examine and, where possible, maximise the use of upstream storage so as to reduce design flows downstream and hence design defence levels. Whilst there is reference to upstream storage having been investigated (see bullet point above) but dismissed, Mr Briggs is of the view that Aberdeenshire Council should provide data and model results showing the

effect of the storage situations studied together with a full review of the storage options considered.

- Mr Briggs is of the view that it is incumbent on Aberdeenshire Council to review all reasonable options and to report on these as there is considerable emphasis nowadays on sustainability and managing flows before they reach urban / built-up areas. Further, reconstruction of walls and banks should be regarded as a last resort as if they are over-topped or otherwise fail than the consequences can be somewhat disastrous. Flood defences which require to be operated, and thus rely on a mechanical operation and / or a human action are not, in Mr Briggs view, sustainable.

As stated above, there have been previous recent discussions with Ms Kennedy and a further meeting to discuss the above-stated reasons for objection would be welcomed with a view to effecting a satisfactory resolution to this matter.

I look forward to hearing from you in early course but, in the interim, I would be obliged if you would acknowledge safe receipt of this formal objection to the above-named flood protection scheme.

Yours faithfully

A solid black rectangular box used to redact a handwritten signature.

Keith Petrie FRICS
RICS Registered Valuer
Consultant
For and on behalf of FG Burnett Limited
Agent for and on behalf of Mr John Briggs T/A John Briggs Furniture

E-mail: jill.scott@fburnett.co.uk

Encl: Plan



Stonehaven Flood Protection Scheme

Hydrology and Hydraulic Modelling

Addendum A to Revision A

December 2015

Aberdeenshire Council

Stonehaven Flood Protection Scheme

Hydrology and Hydraulic Modelling
Addendum A to Revision A

December 2015

Aberdeenshire Council

Carlton House,
Arduthie Road,
Stonehaven,
AB39 2QP

Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
Addendum A to Rev A	21 December 2015	M Nekula	L Cload	S Robertson	Final

Information class: Standard

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Contents

Chapter Title	Page
1. Introduction	2
1.1 Purpose of this report	2
2. Additional Hydraulic Modelling	3
2.1 Alteration of rock armour at the Carron Water channel outlet	3
2.2 Straightening up the river outlet	7
Conclusion 8	
Appendices	9
Appendix A. Optioneering	10

1. Introduction

1.1 Purpose of this report

This is an addendum to the Hydrology and Hydraulic Modelling report issued in June 2015 (Report reference 345087_015_A), and should be read in conjunction with this report.

This addendum presents the additional modelling undertaken as a result of discussions that arose following publication of the scheme. It considers the hydraulic effect of widening of rock armour channel at outlet and straightening up the river outlet downstream of Beach Bridge.

2. Additional Hydraulic Modelling

2.1

Alteration of rock armour at the Carron Water channel outlet

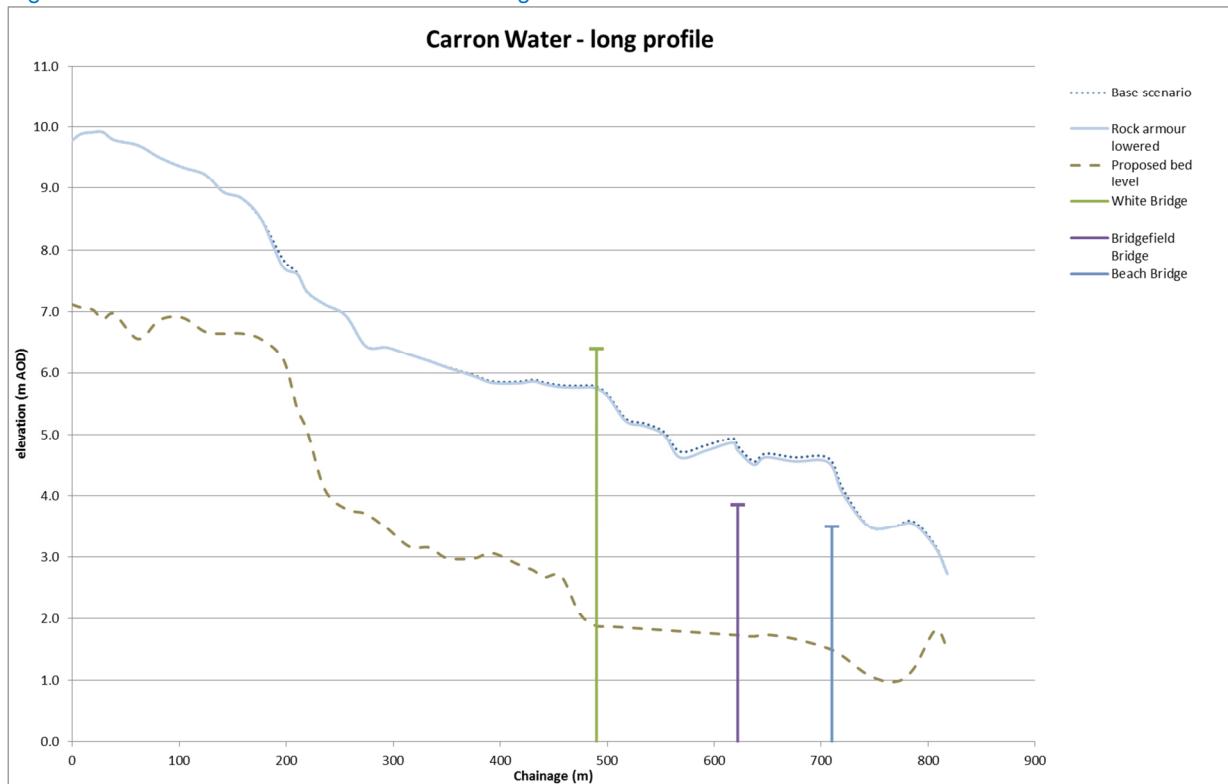
The alteration of the outlet channel at the Carron Water was investigated, firstly by lowering a section of rock armour and secondly by widening the rock armour channel by 2m, 5m and 10m.

It is highlighted that there are otter holts located within the rock armour channel which would make channel modifications more difficult.

Rock armour lowering

An opening in the rock armour was introduced, as displayed in Figure A.1 in Appendix A. The opening had a width of 12m (as the main channel) and a sill level of 3.5mAOD. The results (Figure 2.1) show that lowering the rock armour had little effect on flood water levels.

Figure 2.1: Effect on water levels from lowering rock armour

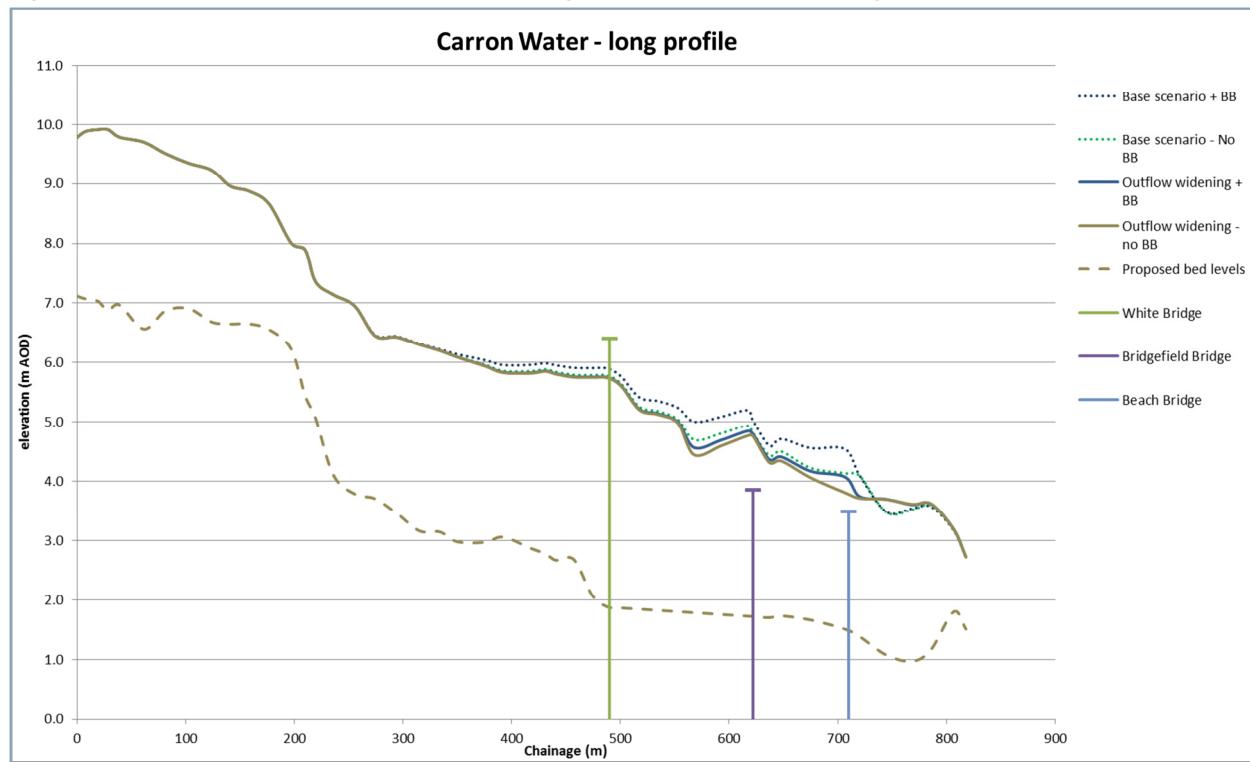


Widening by 2m

The channel downstream of Beach Bridge was widened by 2m, and assessed with both Beach Bridge raised and at its existing level as shown in Figure 2.2. The hydraulic modelling indicates that:

1. Widening the channel by 2m while keeping Beach Bridge ("Outflow widening + BB") has a similar effect to raising Beach Bridge without widening ("Base scenario - No BB").
2. If the channel is widened by 2m, the raising of Beach Bridge has little effect on flood water levels.
3. The 2m widening does not reduce flood water levels below the soffit level of the existing Bridgefield Bridge or Beach Bridge, so these bridges remain at risk.

Figure 2.2: Effect on water levels from 2m widening downstream of Beach Bridge

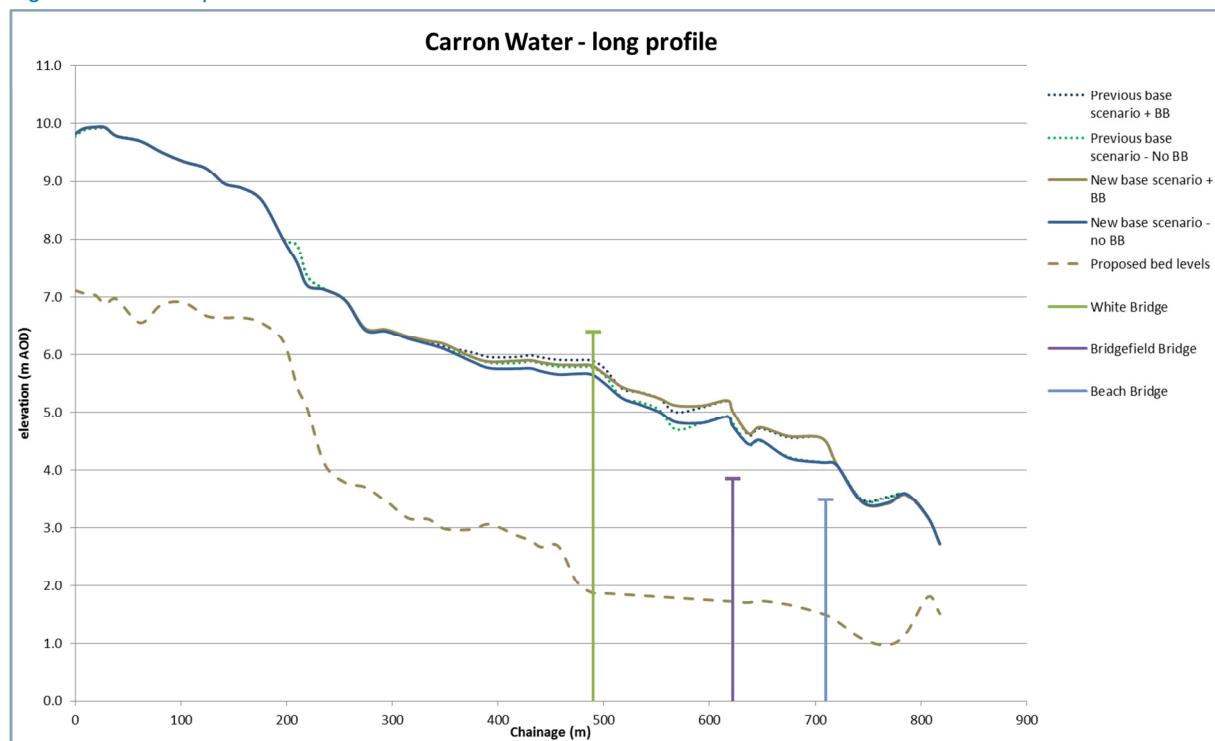


Notes: BB = Beach Bridge, Base scenario + BB (Model 105), Base scenario - no BB (Model 106), Outflow widening + BB (Model 107), Outflow widening - no BB (Model 108)

Update of base scenario

The base scenarios (“Previous base scenario”) have been updated with minor adjustments to the hydraulic model to reflect the design development of the scheme, including a slight (<1m) widening of the channel between Bridgefield Bridge and Beach Bridge, and the refinement of the widening works around the existing Green Bridge. The updated base scenario models (“New base scenario”) have been used to compare the remaining options assessed downstream of Beach Bridge. A comparison of the changed levels between the base models can be seen in Figure 2.3.

Figure 2.3: Comparison of base scenarios



Notes: BB = Beach Bridge, Previous base scenario + BB (Model 105), Previous base scenario – no BB (Model 106), New base scenario + BB (Model 112), New base scenario – no BB (Model 114)

Widening by 5m and 10m

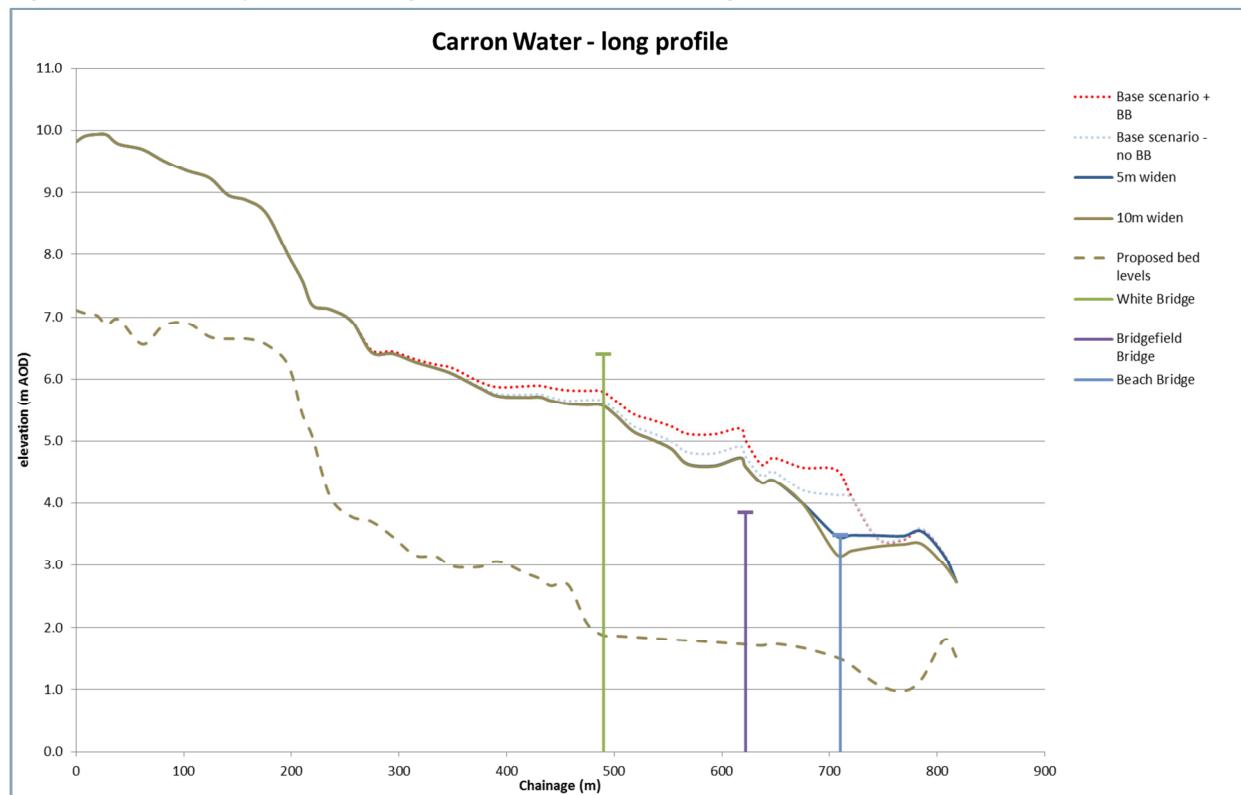
The channel downstream of Beach Bridge was widened by 5m and 10m, and assessed with both Beach Bridge raised and at its existing level as shown in Figure 2.4. The layout of the modelled scenarios are shown in Figure A.3 in Appendix A. The hydraulic modelling indicates that:

Stonehaven Flood Protection Scheme

Hydrology and Hydraulic Modelling Addendum A to Revision A

1. Widening the channel downstream of Beach Bridge by 5m reduced the flood water levels around the location of the Beach Bridge by up to 0.85m.
2. Modelling of a channel widened to 10m showed no significant further impact on flood water levels when compared to the 5m widening.
3. When compared to the flood water level of the proposed flood protection scheme with Beach Bridge raised (“Base scenario + no BB”), the reduction is limited to near Beach Bridge (0.85m) and Bridgefield Bridge (0.15m), however, when Beach Bridge is not raised (“Base scenario + BB”) the reduction is higher and also continues to further upstream of White Bridge.
4. For both the 5m and 10m widening, flood water levels are predicted to be below the soffit level of Beach Bridge, which means that potentially Beach Bridge could be retained in its existing position. However, the difference between the predicted flood water level and the soffit of the bridge would be less than the recommended freeboard value (0.6m).

Figure 2.4: Summary of Beach Bridge removal and outlet widening



Notes: BB=Beach Bridge, Base scenario + BB (Model 112), Base scenario – no BB (Model 114), 5m widening (Model 122), 10m widening (Model 123)

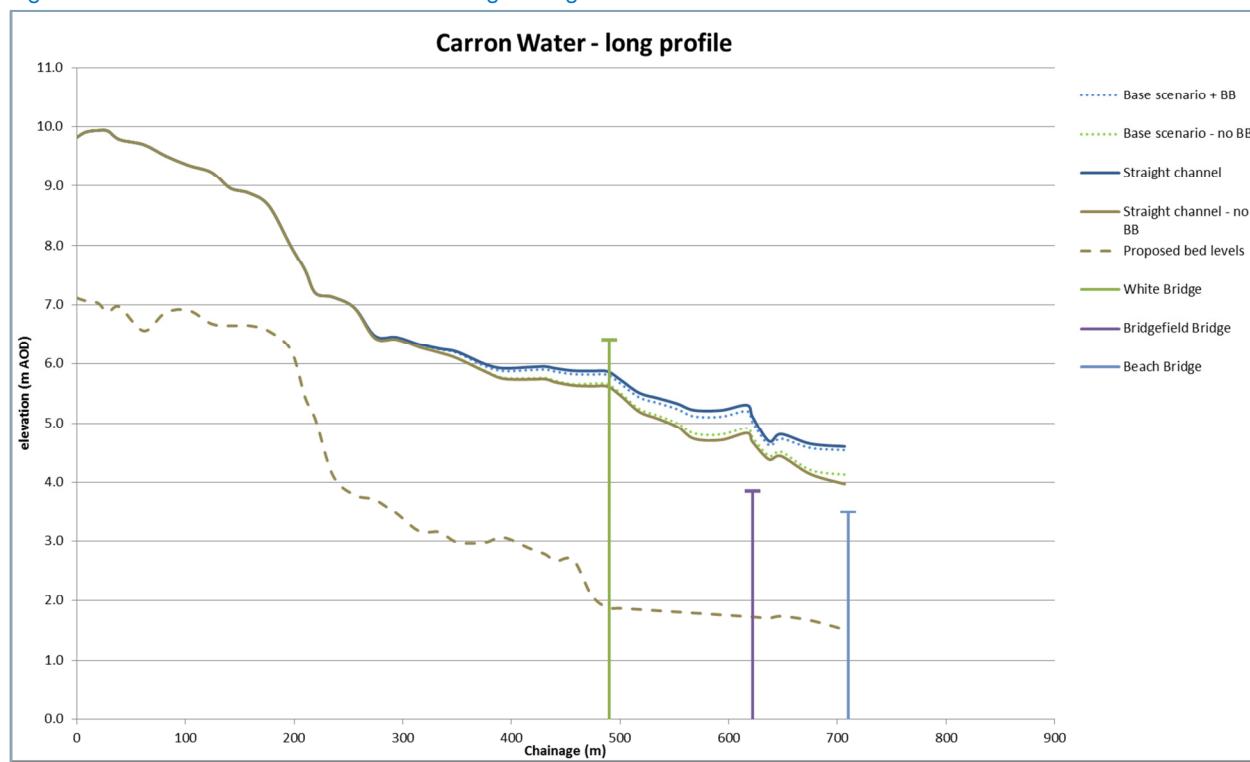
2.2**Straightening up the river outlet**

The effect of straightening the outlet to Carron Water downstream of Beach Bridge to the sea has been investigated. Figure A.2 in Appendix A shows the layout of the examined arrangement of the outlet.

The width of the channel was retained in line with the bottom section, i.e. 12m width. The bed level of the straightened channel has set at a peak level of approximately 1.6m AOD, similar to the average level of the bed upstream. The hydraulic modelling results shown in Figure 2.5 indicate that straightening the channel had little effect on flood water levels in the upstream channel.

It is noted that there is a Scottish Water pipe running along the coastline in this location with an elevation of approximately 1.8m AOD. The potential effect of the pipe on the flood water levels was assessed in the hydraulic model, which indicated that there will be no significant effect on flood water levels from lowering the pipe.

Figure 2.5: Effect on water levels from straightening the outlet channel



Notes: BB=Beach Bridge, Base scenario + BB (Model 112), Base scenario - no BB (Model 114), Straight channel (Model 120), Straight channel – no BB (Model 121)

Conclusion

The additional hydraulic investigations show that:

1. Straightening the channel downstream of Beach Bridge had no significant impact on flood water levels.
2. Lowering the Scottish Water pipe had no significant effect on predicted flood water levels.
3. 10m of widening downstream of Beach Bridge had no additional significant effects on flood water levels than 5m widening.
4. The effect of widening downstream of Beach Bridge on flood water levels is similar to the effect of raising Beach Bridge on its own. When comparing to when Beach Bridge is raised the difference from widening by 5m is limited to immediately upstream of Beach Bridge (0.85m) and immediately upstream of Bridgefield Bridge (0.15m).

Aberdeenshire Council have chosen to raise Beach Bridge in order to protect the pipe crossing. This addendum shows that widening of the rock armour downstream of Beach Bridge, in addition to raising Beach Beach, only shows localised improvements to flood water levels and so is not considered to provide a significant enough improvement to justify the additional widening works.

As a result of the increase in soffit level of Beach Bridge, the designed water levels between Beach Bridge and White Bridge are between 500mm and 100mm lower (respectively) than indicated on the Flood Protection Order drawings. However, on the left bank looking downstream, the walls have to accommodate the self-raising barrier within them, which has a minimum height of 1.2m. So whilst the raised height of the barrier can be lower, the base height cannot be reduced lower than the proposed 1.2m high.

A minimum height for a parapet wall is 1.2m. It is noted that in some places downstream of Bridgefield Bridge the wall height is dictated by this minimum height rather than the flood water level. Therefore there is limited scope in some areas to reduce wall levels to reflect the change in flood water levels resulting from raising Beach Bridge.

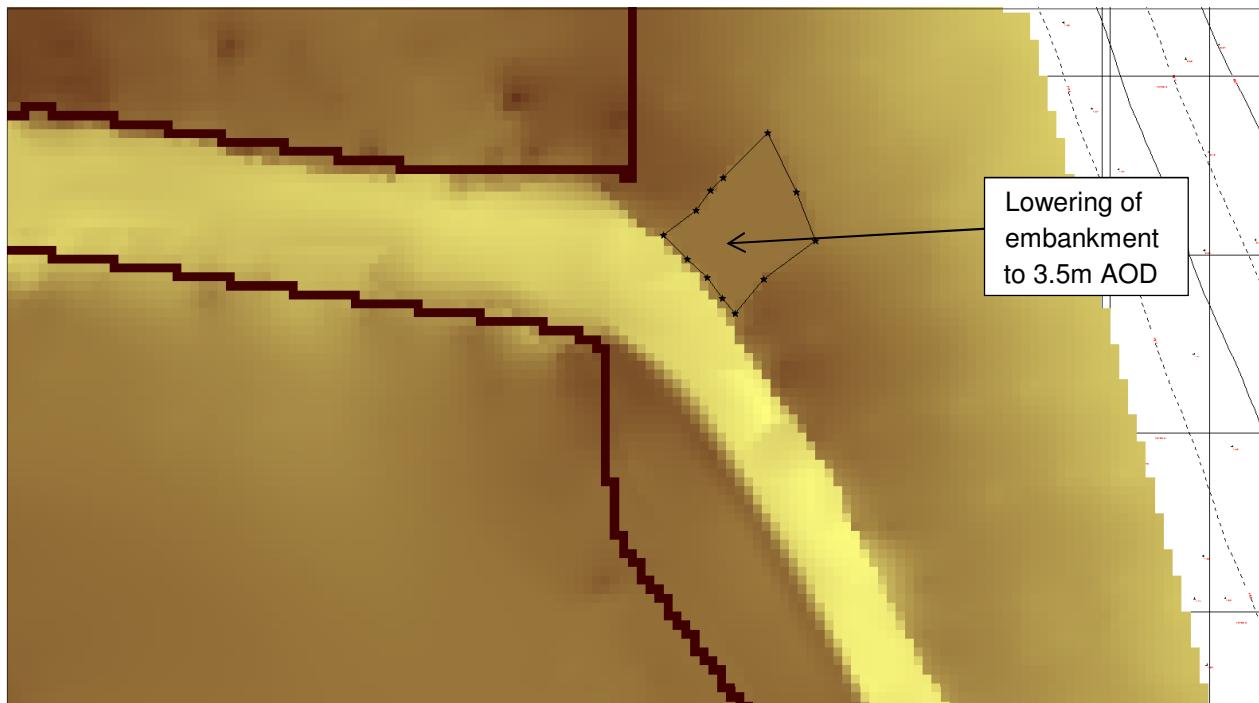
Aberdeenshire Council have chosen to maintain the design level assuming Beach Bridge is in place which also allows for a contingency with regards to waves in the channel.

Appendices

Appendix A. Optioneering 10

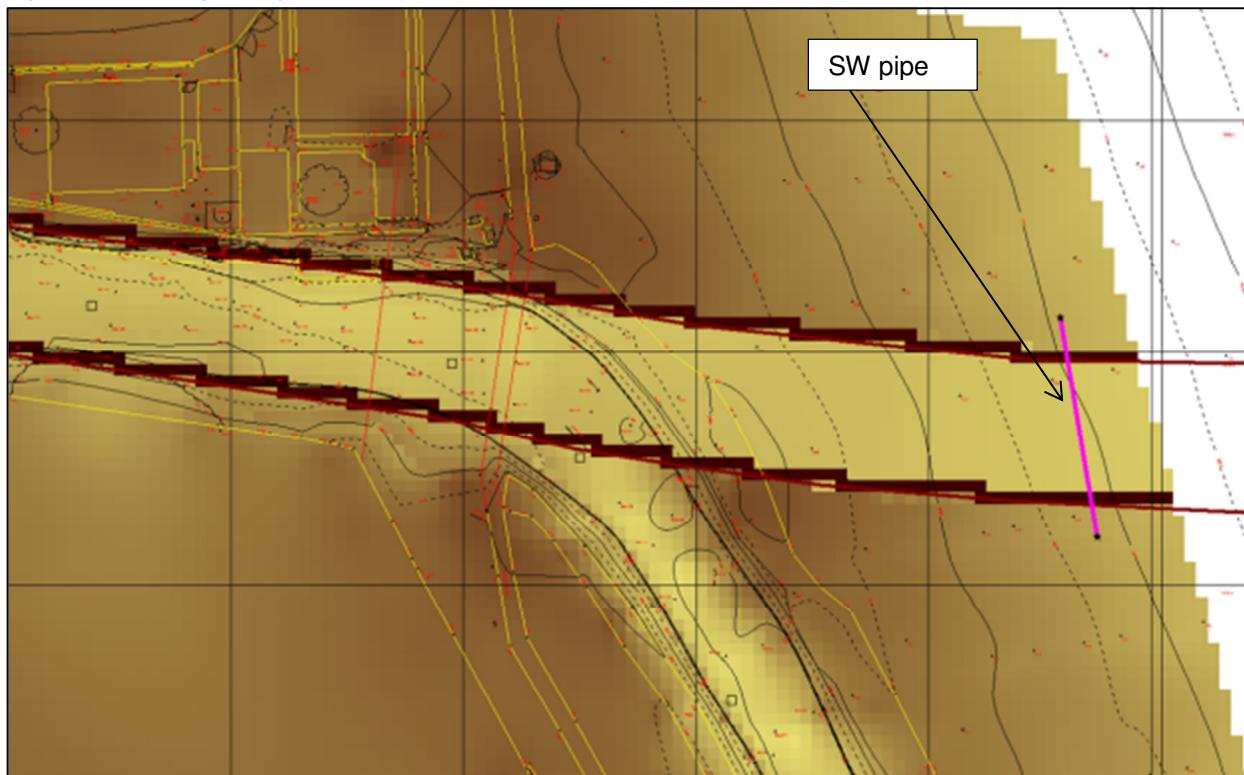
Appendix A. Optioneering

Figure A.1: Lowering the rock armour (Model 100_BB)



Source: The topographical survey from Aberdeenshire Council

Figure A.2: Straighten up of the outlet of Carron Water

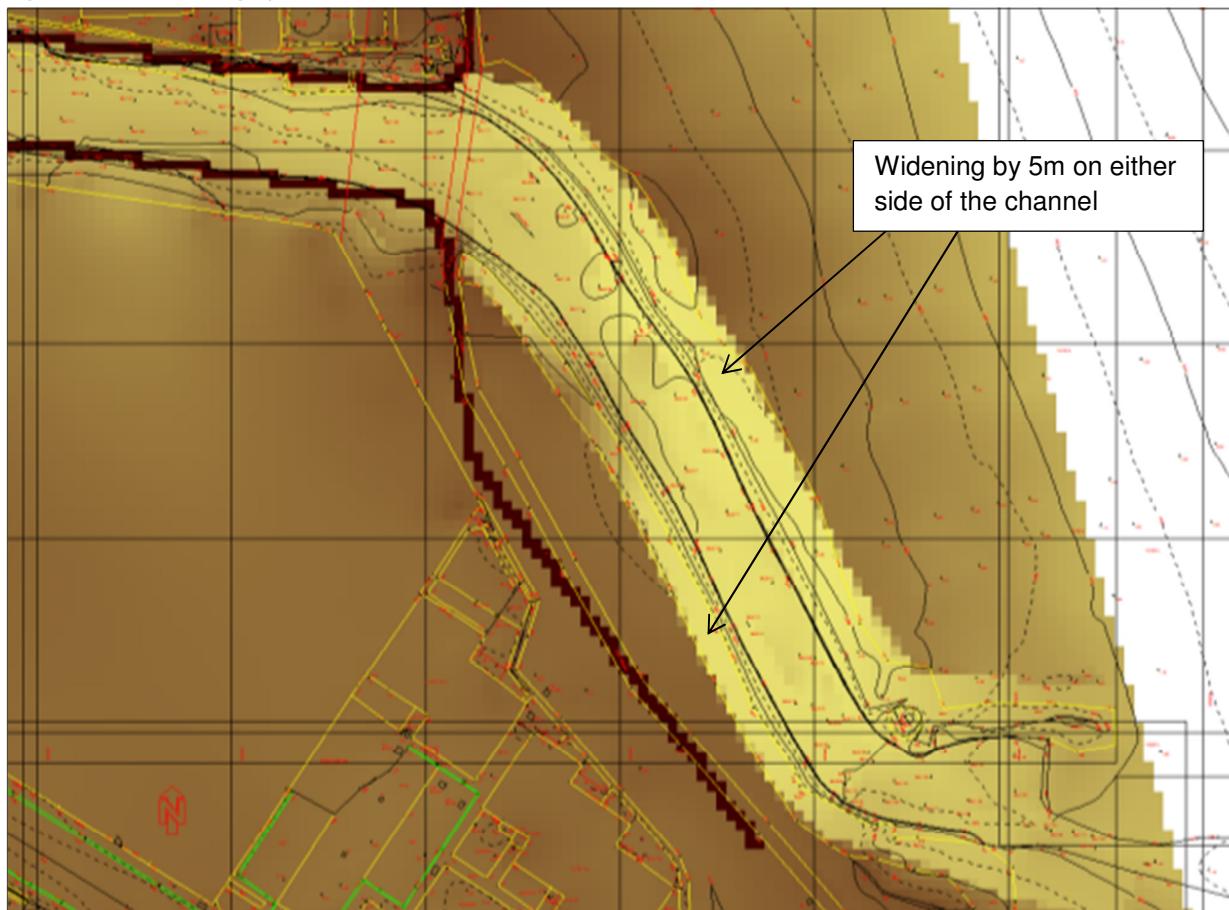


Source: The topographical survey from Aberdeenshire Council

Stonehaven Flood Protection Scheme

Hydrology and Hydraulic Modelling Addendum A to Revision A

Figure A.3: Widening up of the outlet of Carron Water



Source: The topographical survey from Aberdeenshire Council