

Report of Director of City Development

Report to Executive Board

Date: 20 September 2017

Subject: Phase 2 Leeds (River Aire) Flood Alleviation Scheme

Are specific electoral Wards affected?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
If relevant, name(s) of Ward(s): City & Hunslet, Kirkstall, Armley, Bramley & Stanningley, Horsforth, Calverley& Farsley		
Are there implications for equality and diversity and cohesion and integration?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Is the decision eligible for Call-In?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Does the report contain confidential or exempt information?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Summary of main issues

1. During the last two months of 2015 northern Britain received some of the highest recorded rainfall on record, culminating with storm Eva which during the Christmas period led to significant urban and rural flooding across Yorkshire, Cumbria and southern Scotland. Evidence gathered from sites in Kirkstall indicate the flood event that began in Leeds on Boxing Day saw flood water levels rise higher than those in 1866 when a number of lives were lost to flooding in the city.
2. The impact caused by flooding was wide reaching, damaging 2,683 residential buildings, and significantly affecting all scales and sectors of commercial operations, from sole traders through to extensive factory and engineering firms together with the first class professional rugby league facility of the Leeds Rhinos adjacent to Kirkstall fields, all of which provide significant employment opportunities to the region.
3. To ensure this doesn't happen again the Council continues to take a comprehensive approach to defending the wider city from flooding from the River Aire. This will build on Phase One of the Leeds Flood Alleviation Scheme and see consideration of the whole Aire catchment by engineers, offering a number of complementary proposals along the reaches of the river that will provide a comprehensive solution to the city.
4. Phase Two of the scheme will be made up of four distinct elements. Beginning with the establishment of a package of Natural Flood Management measures, this will involve working with, restoring or emulating the natural regulating function of the river catchment to reduce flood risk. Land management and extensive tree planting over significant areas of upstream land will be promoted to reduce flood risk, with an

anticipated planting programme of tree saplings into the many hundreds of thousands in number across different stretches of the catchment.

5. Individual areas of land along the river corridor have been identified as suitable for areas of flood water to be actively stored in high river flow events. These will be mechanically controlled and operated by the use of managed gate structures within the adjacent river channel to both fill and subsequently empty in a flood event.
6. Existing obstructions throughout the lower catchment have been investigated to determine if their removal (or a raise in level above the river channel) would have a significant benefit in reducing in water levels in high flow events. There are a number of opportunities for this type of improvement work which forms part of the wider holistic strategy of Phase Two.
7. The residual outcome of the various components outlined above is that some raised defences would need to be constructed in the form of landscaping, terracing, embankments and walls. By advocating a scheme where Natural Flood Management, Flood Water Storage Areas and Removal of Obstructions in the river are promoted, rather than solely a scheme of defence terracing and walls, a reduction in the height of any hard engineered defences needed will be as much as a 700mm.
8. A procurement approach, aimed at reducing timescales and benefiting from early contractor involvement whilst retaining the ability to investigate wide ranging feasibility options, was implemented resulting in a multi-disciplinary project team being established. A comprehensive process of gathering up to date survey information of the River Aire catchment and building a stable hydraulic model has been in motion alongside a heightened series of engagement activities with stakeholders.
9. The £50million multiple award-winning innovative Phase One of the Leeds River Aire Flood Alleviation Scheme (FAS) reduces the risk of devastating physical and economic damage which occurs from flooding whilst supporting the infrastructure for the wider region and encouraging investment. It has a positive impact on over 3,500 properties and key infrastructure including main road routes into the centre, the train station and electricity & telecommunication sub stations.
10. The scheme has advanced at a rapid pace since finalisation of the funding package four years ago this summer, and has created over 150 direct jobs and is on course to safeguard 22,000 more over the next ten years. Analysis of the social value generated in terms of fiscal and economic savings and the social return along with local economic benefit stands at more than £50M alone, whilst the damage of a significant flood event in the centre of Leeds is estimated to cost in the order of £450M.
11. Following events triggered by the extended period of rainfall during November and December 2015, culminating with storm Eva and the 2015 Boxing Day floods, monies were announced by the government to investigate the progression of flood protection measures beyond the Phase One boundary.
12. Ambitious proposals are now emerging for FAS2 beyond the Leeds boundary, a key element of which is Natural Flood Management, the thousands of trees planted as part of the scheme and the strength of partnership working and community engagement.

The scale of NFM will place the River Aire catchment not just on the national map, but the European one too. Other components which make up the emerging proposals include actively controlled flood water storage areas, removal of unnecessary obstructions within and around the river channel, and residual defences in addition to an accelerated package of advanced works.

Recommendations

13. Executive Board is requested to:

- i) Note the emerging proposals for Phase Two in relation to Natural Flood Management, the construction of actively controlled river floodwater storage areas, the removal of existing obstacles effecting the river channel in high flow events, and the residual construction of linear defences and potential terracing;
- ii) Agree for widespread engagement with stakeholders on the emerging proposals to be undertaken;
- iii) To ensure defence works progress as quickly as possible endorse the submission of business cases to ascertain funding in relation to £3.4m of advanced works and subject to the outcome of the business cases, delegate Authority to Spend for the undertaking of these works to the Director of City Development in consultation with the Director of Resources and Housing; and
- iv) Note a further report will be brought to Executive Board in December 2017 for approval of the outline business case submission to the Department of Environment, Food & Rural Affairs and the subsequent planning application submission.

1.0 Purpose of this report

1.1 This report provides an update on the emerging proposals for the Phase Two River Aire Leeds Flood Alleviation Scheme in advance of widespread engagement with stakeholders whilst seeking approval for the submission of funding applications and subsequent undertaking of an accelerated package of advanced works.

2.0 Background information

2.1 When the comprehensive FAS led by the Environment Agency (EA) was unable to secure funding from the Government in 2011, the City Council's Executive Board gave approval for a revised strategy and phased approach in 2012. The three phases reported were: (1) initial city centre works at 1 in 75 year (1.3%) Standard of Protection (SoP); (2) an extension to include remaining areas identified as part of the abandoned scheme; and (3) increasing the SoP of phase one and two to a 1 in 200 year (0.5%) SoP. Standard of Protection means the likelihood or probability of a flood occurring in any one year.

- 2.2 The Phase 1 River Aire Flood Alleviation Scheme is a crucial project for Leeds, which had the original aim of defending the City Centre against a 1 in 75 year (1.3%) river flood event, and the significant physical and economic damage that results from such an incident. Since becoming the Lead Local Flood Authority in Autumn 2010, the Council has continued to work with partners to develop proposals, secure external funding, drive down costs and improve the standard of protection offered.
- 2.3 The FAS1 works spans over 4.5km plus Woodlesford and includes innovative moveable weirs, merging the river and canal and linear defences in the form of embankments, terracing, landscaping and much lower walls than those proposed as part of the initial scheme. The scheme is set to be completed in September this year within the agreed timescale and budget at an enhanced 1 in 100yr (1%) SoP for the city centre and Hol beck areas whilst works were completed at Woodlesford in 2014 at a 1 in 200yr (0.5%) SoP which proved effective in providing 74 homes with protection from the 2015 storm Eva flooding event. Additionally through optimisation of the scheme design the allowance for climate change has increased to the year 2069 from 2039 and surface water enhancements have been added alongside the river defences.
- 2.4 A key component has been the replacement of Victorian weirs at two locations with innovative mechanical weirs which has placed Leeds at the forefront of national flood defence schemes. As well as being able to control river levels during flood events, both new weirs incorporate fish, otter and elver passes whilst diverse flow conditions and fish spawning habitats have been introduced. Other natural wildlife improvements include the planting of 700 new trees as part of the diverted Trans Pennine Trail and otter and bat habitats. Otters have been seen on a number of occasions in the vicinity of the works which indicates an improving water quality and there have also been reports from angling enthusiasts of salmon swimming through the centre of Leeds for the first time in over 200 years.
- 2.5 The works in the city centre have been implemented to enhance the surrounding areas through the use of high quality materials and intelligent designs to reduce defence heights above ground level whilst a new iconic footbridge creating a future gateway into Leeds is also included. The scheme has already achieved a number of awards in a variety of categories ahead of national and international competition with more anticipated next year. The most notable of these was the New Engineering Contract Project of the Year Award that recognised the working relationship between organisations with the project team.
- 2.6 In terms of additional phases, there is a clear emphasis from central government on integrated planning and scheme development. This can be seen by the formation of the National Infrastructure Commission and the National Infrastructure Assessment which is currently in progress, the findings from the National Flood Resilience Review, and the continued promotion of a Catchment Based Approach to engineer solutions for flood defence within cities and their localised communities.
- 2.7 The Minister for the Northern Powerhouse has a focus on transport and connectivity, viewing them as a key enabler to achieving a step change in economic growth across the north. There is a growing recognition and awareness that this needs to be complemented by targeted investments in key places.

- 2.8 The Leeds City Region Local Enterprise Partnership (LEP) Strategic Economic Plan has ten Headline Initiatives, the third of which is to “develop an integrated flood prevention programme incorporating flood defences; green infrastructure and sustainable drainage measures; resilient development and preventive measures in existing businesses”.
- 2.9 Within the City Region, the West Yorkshire Combined Authority is aligned to the ambitions of the Northern Powerhouse with a focus on connectivity, and political commitment to ensuring the economic benefit of investments are maximised through integrated schemes. Leeds City Council is similarly ambitious to become the Best City in the United Kingdom and is keen to be HS2 ready as soon as possible.
- 2.10 As contained in the Storm Eva Flood Investigation S19 report, the impact of flooding on businesses and residential properties in the city amounted to 672 commercial properties and 2,683 residential buildings suffering damage. In addition highway and rail infrastructure assets and properties including a museum, nature reserve and a professional sports training facility also experienced substantial loss.
- 2.11 As a response to the broad extent and impacts of the storm Eva flood and because the greater frequency and severity of future floods are likely inevitable due to climate change, the Combined Authority Leaders requested that a Leeds City Region Flood Review be undertaken. This found that the direct economic impact to the City Region was over half a billion pounds. In Leeds district, the direct cost for the business and residential properties flooded (not impacted) was an estimated £36.8M.
- 2.12 Currently there are no formal flood defences along the River Aire upstream of those constructed as part of FAS1 where in Kirkstall alone businesses employing around 2,000 people were significantly affected. Should the event have occurred outside the festive holiday period it is estimated that approximately 27,000 people would have been isolated in the city centre without road or rail exit to the west.
- 2.13 Following storm Eva, an initial Scoping Report was developed by the EA and approved by the Defra Secretary of State. This formed the basis of the report approved by the Executive Board in April 2016 which set out the following key areas to be investigated as part of the feasibility study and business case stage:
- A review of all relevant prior studies and information relating to the former study area and its extents - providing the project with the ability to utilise previous work and information to offer both efficiencies and to highlight where additional studies and any fundamental broadening of catchment extent investigations are needed.
 - A review and update the development of hydraulic/hydrological models alongside data collected since Boxing Day to inform an options appraisal, and fully assess the extent of a proposed scheme area.
 - Investigate opportunities for the utilisation of informal and formal flood storage within the city boundaries, linking in to the master planning of HS2, south bank regeneration, A65 corridor development sites and existing flood plain, and further tie

this to integrating planned and potential interventions in the built environment (including both green and blue infrastructure).

- Investigation of storage options and natural flood risk measures (run-off reduction, sediment control and landscape management) in the upper reaches of the catchment outside of the Leeds boundary.
- Ensure any future work to reduce flood risk upstream is compatible with the ongoing scheme and downstream communities, and any other related water infrastructure, such as highway drainage, canal system and sewer networks.
- Taking into account an integrated catchment approach, develop and implement a funding strategy for both the capital investment and long term maintenance of new assets. This will include levy based funding and engagement of the third sector.
- Develop the initial strategy for operation and maintenance of the scheme and integration with warning and informing options for the area affected.
- Develop a catchment partnership approach to reducing flood risk in Leeds and the River Aire Catchment. Early engagement with communities and stakeholders shall be essential.
- Investigate any potential “quick win” mitigation measures in advance of the main programme of project deliverables.
- Consider where possible suitable community and public/youth engagement work can assist in providing part solutions and initiatives within communities.
- Investigate with particular regard to upper Aire catchment the viability and benefit of land management and natural upstream water storage attenuation initiatives.

2.14 Contract documentation was then produced and tendered last summer for Feasibility & Business Case appraisal, Specimen Design, and Technical Advisory services. The procurement approach taken reduces the overall number of tenders required from typically five down to three (or possibly two subject to future outcomes) and aimed to maximise early contractor involvement and reduce timescales whilst retaining the ability to investigate wide ranging feasibility options.

2.15 Much of the same team from FAS1 is working on FAS2 and again strong project governance mechanisms have been established and are operating efficiently. Since the contract commenced in October 2016, a comprehensive process of gathering up to date survey information of the River Aire catchment and building a stable hydraulic model has been in motion alongside a heightened series of engagement activities with stakeholders. The ambitious programme for FAS2 aims for a business case to be submitted to the Government this coming Christmas, for design work to continue whilst a decision is made, and then tendering during summer 2018 for a detailed Design and Build construction contract. In addition, advanced works are being pursued ahead of the main proposals currently estimated to commence on site early in 2019.

3 Main Issues Overview

3.1 Exciting proposals are now emerging for FAS2 which has looked beyond the Leeds boundary. This includes Natural Flood Management (NFM), floodwater storage areas, removal of existing obstructions to high flow levels within the river channel and the residual defence heights required and advanced works.

3.2 Natural Flood Management

3.2.1 Natural Flood Management (NFM) involves working with, restoring or emulating the natural regulating function of river catchments to reduce flood risk. This approach is also referred to as Working with Natural Processes (WwNP). Ostensibly they are the same thing, and are terms used to describe to land management, planting and using natural materials to offer reductions in flood risk.

3.2.2 Information has been gathered from over forty specialists including representatives of fisheries, biodiversity & geomorphology, national environmental assessment service (NEAS), catchment coordinators, ecologists, geomorphologists, hydrologists, environmental scientists, Leeds University, NSRI, West Yorkshire Joint Services Ecology, North & East Yorkshire Ecological Data Centre and Natural England.

Although additional workshops are required to further assist with the options for delivery, a clear direction is emerging that this component of the scheme will be ambitious and can be of a scale unlike any other previous scheme.

3.2.3 As well as bringing a range of multi-disciplinary benefits, the flood risk reduction to Leeds most likely to be achieved is for a reduction in defence heights along with an enhanced level of climate change allowance and future proofing of works. Fundamental to this will be the delivery of three elements of NFM: Woodland Creation (increasing canopy coverage in the catchment from 7% to 15%, above the national average of 12%); Land Management (run off reduction via various means); and River Channel and Floodplain Restoration (river bank, morphology, and floodplain restoration, large woody debris, and storage ponds).

3.3 Active Floodwater Storage Areas

3.3.1 A catchment wide study into storage has been undertaken, with over 40 sites through and upstream of Leeds being assessed as part of this investigation.

This has identified that the largest opportunities are generally located higher up in the catchment such as Connonley Washlands (near Skipton) or Holden Park (Keighley). However, the efficiency of a floodwater storage scheme diminishes with distance away from the site for which mitigation is required. Furthermore, the further upstream the storage area is situated, the greater the potential for a storm producing the flood event to Leeds to 'miss' the storage area, with the most significant flows arriving in the system between the storage location and the receptor site. Decisively the area of benefit in Leeds has a high threshold of flooding when compared to other existing development along the River Aire between Leeds and other potential storage sites. This means that should remote

upstream storage areas be upgraded and optimised, with a view to maximising benefit to Leeds, then it is likely that intervening areas of development would be given over to flooding more frequently as a result of this process, which is very unlikely to be acceptable.

- 3.3.2 Consequently from the list of potential storage sites at an appropriate distance from Leeds centre and of the scale required, Rodley Nature Reserve has the largest capacity for an area to provide flood water storage, estimated at some 2.2million m³. A second area, situated at Apperley Bridge, is capable of storing approximately 1million m³. Both these large flood water storage areas would be most effective through the use of an active control or river gate system.

Moving closer to the city centre opportunity becomes somewhat constrained in terms of topography, and subsequently there are only a small number of storage opportunities along this length. The ones identified are at Kirkstall Meadows and Kirkstall Valley Nature Reserve. Storage at Kirkstall Meadows (the rugby practice pitches on the opposite bank to Kirkstall Abbey) and similarly at Kirkstall Valley Nature Reserve are estimated to each provide 0.2million m³ of temporary storage.

Similar to Rodley & Apperley Bridge these sites would be most effective through the use of an active control river gate system. Potentially these storage areas used in times of flood would achieve reductions in downstream defence heights of between 300 – 600mm as well as providing residual benefits to the Phase One scheme.

3.4 Removal of obstructions within the river channel.

- 3.4.1 The existing obstructions throughout the lower catchment have been investigated to determine if their removal (or a raise in level) would have a significant beneficial reduction in water levels, and as a consequence the structure which may yield the greatest benefit is the raising of a footbridge at Milford Place.
- 3.4.2 The potential to reduce flood defences by the use of additional flood corridors to the main river has been investigated along with lowering a 10 - 30metre strip of the north bank of the river channel adjacent to the A65 corridor between Viaduct Road and Wellington Bridge.

The analysis has shown that allowing flow through Kirkstall Goit (running between Kirkstall Abbey Weir and Kirkstall Valley Nature Reserve) does lower flood levels by typically 0.2m although flood levels along the Goit would be raised by up to 1.7m and would therefore require flood defences.

The extent of lowering has been assessed for a range of widths of 10m, 20m, and 30m respectively. Modelling indicates that a 20m set back (intermittent to take account of existing river side buildings and bridges) would lower water levels upstream of Viaduct Road by approximately 0.3m; an effect which reduces to 0.15m by the Home Office Buildings upstream. Future development change could create opportunities to make this modification into a continuous feature which would facilitate a further 0.1m reduction in water levels. The intention is that such a set-back would increase the capacity of the river channel, as well as providing the potential for amenity access along the river corridor.

3.5 Defence Heights

- 3.5.1 The residual outcome of the various components outlined above is that some raised defences would need to be constructed in the form of landscaping, terracing, embankments and walls.
- 3.5.2 By advocating a scheme where Natural Flood Management, Flood Water Storage Areas and Removal of Obstructions in the river are promoted, rather than solely a scheme of defence terracing and walls, a reduction in the height of any hard engineered defences needed will be as much as a 700mm.
- 3.5.3 The extent of these interventions is subject to the chosen standard of protection and allowance for climate change, but results indicate proposed heights similar to those brought forward as part of the Phase One scheme will be needed (circa 1200 – 1400mm).

3.6 Advanced Works

- 3.6.1 Completed activities include: Vodaphone resilience works; NPG substation works; business resilience studies and works; and enhanced messaging. Activities in progress include the installation of a Yorkshire Water flap valve at Kirkstall bridge.
- 3.6.2 Works which have been modelled and shown to be effective at reducing flood risk include the removal of a redundant bridge at Milford Place and the removal of platform under Gotts Bridge.
- 3.6.3 It is also recommended to progress with a programme of vegetation and channel clearance between Rodley and the train station at the earliest opportunity.
- 3.6.4 A number of NFM measures have also been identified as being able to be progressed as advanced works. These include:
 - Deep Cliff Hole (tree planting programme on City of Bradford owned land in areas supporting targeted woodland planting zones);
 - Kirkstall Woodland Creation (tree planting on LCC owned land in areas supporting targeted woodland planting zones).

 - Flasby and Eshton Beck (Flasby Estate – existing partners EA, Craven District Council, Yorkshire Wildlife Trust, Yorkshire Farming and Wildlife Partnership) - large stretches owned by Flasby Estate who are keen to work further with Yorkshire Wildlife Trust as part of this project to put in bank protection measures for water quality and NFM provision;

 - Otterburn Beck and tributaries (existing partners EA, Craven District Council, Yorkshire Wildlife Trust, Yorkshire Farming and Wildlife Partnership) – build upon NFM interventions installed in partnership over last three years. Existing relationships with landowners provide opportunity for catchment woodland, debris dams, and bank protection measures on main Otterburn beck channel;

- Earby Beck and tributaries (existing partners EA, Pendle Borough Council) – develop a range of NFM interventions in line with main scheme works which are under development in this catchment. Existing relationships with landowners provide opportunity for catchment woodland, debris dams, distributed storage and bank protection measures.

- 3.6.5 And finally works at Stourton to form a 700 metre length flood defence using a mixture of new walls and refurbished/strengthened existing ones alongside surface water interventions to provide a 1 in 200 yr (0.5%) (plus climate change) standard of protection (comparable with mitigation works completed earlier at Woodlesford).
- 3.7 A budget costing exercise has been undertaken by a team of quantity surveyors and estimated the emerging proposals at approximately £101M of which £3.4M is estimated for the identified advanced works.
- 3.8 As with Phase One of the Leeds Flood Alleviation Scheme opportunities for enhancements to the overall project will be measured in detail. Preliminary consideration is looking at potential enhancement to non-motorised user corridors along the river edge which could include significant improvements for cyclists and walkers along these routes.

4 Corporate Considerations

4.1 Consultation and Engagement

- 4.1.1 As part of the progression of the feasibility and business case appraisal, briefings have been provided to Members of Wards directly affected by the current corridor of interest in Leeds on the 14th March 2016, 29th November 2016 and 2nd August 2017.
- 4.1.2 Between December 2016 and June 2017, the FAS project team worked from an information centre twice a week in Kirkstall providing updates on the scheme and encouraging engagement along with offering advice about flooding. Over 700 residential and commercial stakeholders were provided with a briefing about the scheme on 1 December 2016. The project team have also provided consultancy services to businesses which led to an increased uptake on available flood grants.
- 4.1.3 Quarterly newsletters regarding FAS2 are issued in addition to the ones circulated every two months regarding FAS1 and a scheme twitter account is well established and issues weekly tweets alongside the schemes website which is updated at least every two months. The project team also held a large exhibition about FAS1 and FAS2 at the Leeds Waterfront Festival on the 24th and 25th June 2017.
- 4.1.4 Recognising the scale of the challenge of developing a catchment approach to reducing flood risk to Leeds, not least the need to bring together a wide range of pre-existing partnerships, their different aspirations and capabilities the EA has worked with the existing partnerships to create an “Upper Aire Catchment Network”. The Upper Aire Catchment Network was launched at an event on the 3rd November 2016 bringing together over 60 stakeholders, including Councillors, local authorities, consultancies, local businesses, scholars, charities and the EA.

- 4.1.5 The Network creates a positive ambitious environment, which complements existing governance arrangements. The concept of all parties becoming a network of people with a common purpose in relation to flood risk across the catchment has given confidence to key partners to build new and important relationships. This is being reflected in a range of initiatives from sharing learning and best practise to improve community engagement and resilience, and developing river stewardship across the catchment focussed in flood affected communities. The first bi-annual newsletter aimed at keeping members informed of the different projects, schemes and work streams within the Upper Aire Catchment was shared widely in June 2017. Crucially, the concept of working as a Network has also enabled the Leeds FAS project team to traverse partnership politics to gather evidence, at pace, to support the development of the integrated catchment approach.
- 4.1.6 As the optimum locations for works are now becoming clearer, engagement is now to commence with landowners followed by a widespread consultation process upon approval of this report.

4.2 Equality and Diversity / Cohesion and Integration

- 4.2.1 Future proposals to mitigate the risk and effects of flooding across the city will be subject to detailed Equality Impact Assessments to ensure that the most disadvantaged are not adversely impacted and that individual needs and the requirement to make reasonable adjustments where necessary are recognised.

4.3 Council policies and Best Council Plan

- 4.3.1 This scheme embodies many of the priorities and outcomes sought in the Best Council Plan (BCP) as outlined below:
- (i) Good Growth – the scheme will seek to support the sustainable growth of the Leeds economy through safeguarding jobs in the area protected by flood defences. The investigation of measures to reduce flood risk with regard to opportunities presented by the South Bank Master Plan (Europe’s largest regeneration area with the potential to create 35,000 new jobs and 4000 new homes), HS2, the A65 Kirkstall corridor and its interface with wider existing Network Rail infrastructure. This will directly support the BCP ambition for a strong economy.
 - (ii) Resilient Communities – adopting a Catchment Based approach to flood defence would offer a high level of community confidence against future flood events, enhance public citizen and stewardship involvement, moving toward a more holistic solution to a flood defence initiative and to vanguard community ownership and their association to local flood protection measures. This will support the BCP outcome for people to be safe and feel safe. It will also directly support the BCP ambition for a more engaged public.
 - (iii) Transport and Infrastructure: Low Carbon – the scheme will seek to enable the growth of the city whilst protecting its distinctive green character; it will investigate the enhancement of the waterfront areas through new or improved and accessible public spaces to support leisure and amenity uses, in keeping with the urban context, sense of place and identity. This will support the BCP outcome for people

to live in clean and well cared for places and for people to enjoy greater access to green spaces, leisure and the arts.

- (iv) The scheme would protect road, rail and ped/cycle accessibility to the city centre from the west, safeguarding local multi-modal commuting routes and city regional transport links and through the protection afforded to the South Bank and Leeds Station area, helping the city become ready for HS2, Northern Powerhouse Rail and the interchange facilities to be provided at the remodelled 'Yorkshire Hub'. This will support the BCP outcome of moving around a well-planned city easily.

4.4 Resources and value for money

4.4.1 Funding - The government initially made £3M available through the Environment Agency Flood Defence Grant in Aid for initial scoping development, business case, feasibility design and planning application of a potential scheme. A funding application to the European Structural and Investment Fund (ESIF) for £750,000 which amounts to 50% of the estimated cost of the advanced works at Stourton has been submitted. An application for the remaining amount at Stourton and to cover any difference if the ESIF application is unsuccessful has been submitted to the Defra Booster Fund. A separate application for all of the other remaining identified advanced works has also been submitted to the Defra Booster Fund. Funding applications for the main works will be the subject of the next report to the Executive Board.

4.4.3 Revenue Implications – None at this stage.

4.5 Legal Implications, Access to Information and Call In

4.5.1 Under Section 165 of the Water Resources Act 1991, powers have been devolved from the Environment Agency to enter private land for the purpose of undertaking flood defence and drainage works as part of the scheme.

4.6 Risk Management

4.6.1 Until flood risk is reduced, the risk to life, property and businesses remains. If progression of the study is delayed, difficulties may be encountered in achieving the deadlines set and funding could be withdrawn.

5 Conclusions

5.1 Members will be aware that historically Leeds has had no flood defence from the River Aire. Through the success of Phase One and the use of innovative movable weir technology for the first time in the United Kingdom, the city is now protected from the area around the railway station downstream to Knostrop for a 1:100 year storm event, with an additional and considerable allowance for climate change to 2069.

5.2 Building on this success, feasibility for phase two of the scheme is taking a whole catchment approach, and will again promote an exciting and innovative range of both civil engineering and land use and management measures, to provide a comprehensive flood defence scheme.

- 5.3 Subject to the outcomes of engagement and success of the subsequent outline business case, the emerging scheme proposals will deliver an exemplar of good practice in flood defence initiatives on a European scale.
- 5.4 The City Council has demonstrated its capability to attract sponsorship-support and lead the delivery of major flood defence work in the city. Since 2010 and the decision to not progress with the original 1 in 200 year (0.5%) proposals, there has been rapid and successful advancement of the alternate scheme which will shortly see the city centre, downstream to Knostrop, protected from a 1 in 100 year (1%) flood event with Woodlesford afforded defences against 1 in 200 years (0.5%).
- 5.5 Moving forward on progress to define and deliver a second flood alleviation scheme to protect areas further west and south of the city centre is crucial to underpin the aspiration of a Northern Powerhouse, its foundation of secure and rapid transport and the ambitions of a Best City together with the objectives of the Local Enterprise Partnership Strategic Economic Plan.
- 5.6 Protecting communities, the well-being of people and sustaining inclusive economic growth is the basis of the BCP. Recent weather and flood events have visibly demonstrated the necessity to develop a scheme or programme of works to safeguard the local population from flooding.
- 5.7 The existing project delivery team has developed a strong multi-organisational 'one team' approach, and has considerable specific skills and expertise. The progress made to date on the accelerated programme of work to develop FAS2 alongside delivery of FAS1 has meant the city has already capitalised on this, and it is of significant value to continue at pace.

6. Recommendations

- 6.1 Executive Board is recommended to:
- i) Note the emerging proposals for Phase Two in relation to Natural Flood Management, the construction of actively controlled river floodwater storage areas, the removal of existing obstacles effecting the river channel in high flow events, and the residual construction of linear defences and potential terracing;
 - ii) Agree for widespread engagement with stakeholders on the emerging proposals to be undertaken;
 - iii) To ensure defence works progress as quickly as possible endorse the submission of business cases to ascertain funding in relation to £3.4m of advanced works and subject to the outcome of the business cases, delegate Authority to Spend for the undertaking of these works to the Director of City Development in consultation with the Director of Resources and Housing; and
 - iv) Note a further report will be brought to Executive Board in December 2017 for approval of the outline business case submission to the Department of

Environment, Food & Rural Affairs and the subsequent planning application submission.

7.0 Background documents¹

7.1 None

8.0 Appendices

8.1 Woodland planting plan.

8.2 Floodwater storage areas plan.

8.3 Existing obstructions removal plan.

¹ The background documents listed in this section are available to download from the Council's website, unless they contain confidential or exempt information. The list of background documents does not include published works.