Lustrum Beck Progress Update January 2014

The feasibility/appraisal stage of the project is in progress and the modelling work is still on-going. Significant progress has been made in understanding the nature of the complex flood risk along Lustrum Beck and identifying mitigation options.

The project has an indicative allocation of Flood Defence Grant-in-Aid (FDGiA) funding of 600k for 14/15 and 600k for 15/16 along with 415k of Local Levy funding.

We are nearing the stage of having a solution for the Browns Bridge area which will comprise of a number of features:

- Opening up the first 10m of Primrose Hill Culvert (to create a large increase in inlet capacity).
- Preventing blockage/blinding on the screen of Primrose Hill Culvert (see below for details).
- Increasing the capacity of Durham Road Bridge.
- Increasing the height of the existing flood wall between Browns Bridge and Durham road bridge.
- Alterations to the flood embankments upstream of Browns Bridge – raising the embankment and wall immediately upstream of the bridge and setting back and raising the embankments further upstream.

There are still some issues which need to be resolved with these solutions:

- We are still unclear if it is structurally possible to re-open the Durham Road bridge arch, investigation works are on-going. If this is not feasible within reasonable costs then we will not be able to deliver the 1 in 75yr SoP through local measures.
- Blinding of the security screen on Primrose Hill Culvert significantly increases risk upstream. It is not physically possible for the EA workforce to keep the screen clear during high flows. When the screen is blinded, with the proposed solutions in place (listed above), the resulting SoP is reduced to 1 in 20 (It is not possible achieve a 1 in 75yr standard of protection using local options when the screen is blinded, if the 1 in 75 SoP cannot be reached, the amount of FDGiA available falls significantly).
    - The screen needs to stay for security reasons. We are therefore investigating the option to use a self-cleaning or lifting screen. This would require a new screen to be installed – both are affordable for the scheme.
    - Key issues with the self-cleaning screen are the security of the mechanised cleaner (from theft and damage and resulting increase in flood risk if this occurs) and the risk to public safety (of remotely controlled machinery operating in an area which is known for being difficult to keep the public out). In addition to these risks, the lifting screen would also result in the culvert inlet being open during high flows.
    - By introducing a mechanised screen cleaner, we are introducing another risk to public safety. These risks must be considered carefully. There are three options:
        - No screen- risk to public safety – public accessing culvert.
        - Screen as is – increased flood risk – no viable flood alleviation scheme.
        - Screen with mechanised cleaner/lifting screen – Risk to public safety remotely controlled machinery, from which it will not be entirely possible to prevent access and risk from theft/vandalism – which would result in a increase in flood risk if the system was not functioning and in the case of the lifting screen open access during high flows.

- The flood risk downstream is currently uncertain due to changes in topography at two key sites, resulting from re-development. The key sites are the Queens Park North site which is a future residential development, located immediately downstream of Primrose Hill Culvert and includes plans to extend the culvert, and the adjacent North Shore Academy. New topographic survey needs to be obtained and input in the model. The model will then be re-run with the current and proposed scenario to assess any change in downstream risk and determine whether any action is necessary as a result.

Surface water flooding

Surface water flooding has been known to be an issue in the Browns Bridge area. The proposed options listed above would not address surface water risk and properties would still be at risk from surface water flooding. We have obtained NWL's model to investigate the surface water risk. The model has been run previously assuming a free discharge and therefore giving a "no risk" result. We have therefore run the model with the boundary conditions from the fluvial model. The initial results have shown NWLs system to discharge in the 1 in 20yr event. We are now in the process of determining the risk to properties from the surcharge volumes.

The proposed solution to deal with the surface water issue is to use the adjacent Wrensfield Road Adult Training Centre site as a storage area during high flows. During normal flows the site can be used as parkland/recreation area.

There are a number of outstanding issues which need to be resolved before we can finalise the modelling for the surface water system and approach NWL to contribute or make amendments to their system. The outfall of the culverted water-course (which we understand has its source in the scrap yard) is reportedly located under Browns Bridge but has still not been located. The source and catchment area of the watercourse also need to be determined to understanding the flow and therefore design the storage feature. An initial survey has been carried out on the culverted watercourse to further inform the modelling work and inform the CCTV survey which is being commissioned. Survey work on Lustrum Beck will also be taking place to measure silt depths at the next low flow opportunity.

Next steps: Oxbridge/Browns Bridge issue

We are nearing the stage where we have a solution for the Browns Bridge area. There are still some key issues which need to be confirmed however the currently proposed combination of options can deliver the 1 in 75yr standard of protection and is affordable for the funds which the project can draw down.

The solution for Oxbridge is much less advanced. The Oxbridge solution will need to involve up-stream storage. As a large scale dam as originally proposed is not economically feasible for the project, we have begun to look at a number or smaller scale storage areas and improved land management in the upper catchment. This approach however will require time. It will involve working with and negotiating with a large number of land owners and getting a number of agreements in place. This process could realistically take over a year.

The table below shows a breakdown of the funding that can be drawn down by risk area and benefit type. The first column shows the funding that can be drawn down by a combined scheme. In the following columns, the funding which is available when the areas are split is given.

	Oxbridge and	Browns Bridge	Oxbridge only	Oxbridge only

		Browns Bridge	only		– no blinding
OM 1 general economic benefit		£429k	£200k	£130k	£70k
OM2 residential properties	a	£840k	£840k		
	b				
	c	£67k		£67k	£22k
OM4 environmental benefits		£225k (creation of habitat through upstream storage)	£68k	£225k (creation of habitat through upstream storage)	£225k (creation of habitat through upstream storage)
Total		£1561k	£1108k	£422k	£317k

As can be seen, the majority of the funding is derived from benefits from the Browns Bridge area. Over half of the funding that Oxbridge would draw down comes from OM4 environmental benefits, which would be delivered through the flood storage areas. On purely property benefits Oxbridge would draw down only £67k.

The local levy funding was allocated to the Browns Bridge area.

In the short term, Oxbridge will benefit from the works proposed for Browns Bridge. The works proposed in the Browns Bridge project would reduce the risk category of every property at risk in the Oxbridge area.

	Present situation	After proposed works at Browns Bridge
Moderate	2	9
Significant	11	10
V significant	7	

On-going work/outstanding issues:

- Up stream storage: Modelling work is currently on-going to determine if storing water in a number of features within the upper catchment will have a big enough impact on flood risk downstream. The existing model has been extended to allow this analysis to take place. JBA are currently in the process of analysing the impact of 14 potential storage sites for which we have provided the storage feature characteristics (dam level, dam height and storage volume).

- A significant amount of the airports drainage is being drained into the Lustrum Beck Catchment – we need to look at ways to influence any future development of the site and any opportunities to reduce the existing amount/rate at which this water enters Lustrum Beck. At present the airport pumps part of its drainage uphill to discharge it into the Lustrum Beck catchment, instead of allowing it to drain towards the Tees.

- 10km of the A66 drains into the Lustrum Beck catchment. This is a large amount of rapid run-off entering Lustrum Beck. AONE (managers of the road) say they do not have any data on this and finding out this information would be costly. We have requested a site visit to try and establish some basic information to allow us do some basic analysis of the impact of the road.