

## Victoria Bridge, Bath

# Outline Works Method Statement

## Including Construction & Environmental Management Approach

Title	Outline Method Statement
Project Name	Victoria Bridge, Bath
Reference No	CEGD0016/WPP/001/001
Revision No	A

WORK PACKAGE DETAILS				
Project Name:	Victoria Bridge			
Project Number:	CEGD0016			
Principal Contractor:	Balfour Beatty Civil Engineering			
Responsible Contractor:	Balfour Beatty Civil Engineering			
Programme Dates:	Start:	December 2013	Finish:	October 2014

DOCUMENT APPROVAL		
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	Date:	

REVISION STATUS DETAILS		
Revision No	Date	Description
A	12/11/13	First Issue



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## A INTRODUCTION

### A.1 Original Structure and Historic Repairs

Victoria Bridge was designed and constructed in 1836 by local entrepreneur James Dredge to link the lower and upper Bristol Roads over the River Avon. This is thought to be the first of some 50 bridges of this type designed by Dredge constructed in the United Kingdom, Ireland and further worldwide including examples in India and Jamaica. Only a small number of these bridges survive; a number have collapsed and other been demolished. Victoria Bridge has been altered various times during its life, however, the most significant reconstruction was carried out for the City of Bath in 1946/7. Originally constructed as a toll bridge, open to vehicular traffic, but following the reconstruction the use of the bridge is now restricted to pedestrians and cyclists. It has a clear span of 42.52m and overall width of 6.00m. The bridge is Grade II\* listed.

Dredge's design features a number of distinct elements including the tapering of the chain system and the splayed hanger arrangement between the chains and the bridge deck. The bridge was also very economical in line with Dredge's belief that his much lighter structure would still provide sufficient capacity as much heavier, more traditional structure types.

A significant amount of work has already been completed on understanding both the Dredge bridge design and the history of Victoria Bridge. The Design and Access Report by AECOM in March 2013 provides further detail.

### A.2 Recent Temporary Works

In 2010, the bridge was closed to the public amid concerns about the Bridge's condition and consequent strength and stability. In 2011 the Council formalised a project and appointed a project team, including a team of engineers and specialists in their field, to develop a permanent solution to enable the bridge to be reopened. Monitoring undertaken in Autumn 2011 revealed the condition of the bridge to be rapidly and unpredictably deteriorating and a decision was taken to close the River and towpath beneath before bringing forward the installation of a temporary truss, as an emergency solution to stabilise the bridge.

The installation was completed in December 2012 and the River and towpath reopened to the public shortly afterwards. Ramps were added at either end of the truss and the route across the Bridge reopened to the public on a temporary basis.

### A.3 Proposed Solution

Recognising both the heritage value, and the use of the bridge by the public a solution has been developed that incorporates elements of the original bridge and design, whilst ensuring the long term future of the structure.

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The existing Victoria Bridge metalwork will be removed from site by our specialist subcontractor in sections and where required to form part of the finished structure, original elements will be refurbished. Additional new sections of metalwork will be fabricated and introduced to improve the capacity of the structure. The metalwork sections will then be delivered to site and installed. The decision to remove the original bridge allows for the works to be completed in controlled environmental conditions and reduces the health and safety implications of working at height above a navigable watercourse. All elements of the metalwork will be tracked through the process.

The masonry towers and approach walls will be refurbished in situ, including cleaning and replacement of degraded elements. New foundations will be constructed at each end of the bridge, making use of the original foundations, on either approach. The approaches will then be finished to a high quality to link the enhanced public realm works adjacent to the Bath Western Riverside development. Once the bridge is complete the temporary works truss bridge will be removed.

Balfour Beatty was appointed in August 2013 to complete pre-construction services to the project. These include the production of this method statement, assisting with the discharge of listed building consent conditions, stakeholder engagement, on site trials and material sampling.

Prior to works commencing we will complete our detailed Project Management Plan which outlines in further detail our approach to the works, delegated responsibilities, and refers back to our own Business Management System which provides the forms, guidance, and processes that assist in the management of all site operations. Further documents including the Site Waste Management Plan, Environmental Management Plan, Traffic Management Plan, Plant & Pedestrian Interface Plan will also be developed and in place in readiness for the works to commence on site. We will create a bespoke set of Activity Control Plans which control each site process, including the requisite quality hold points and checks.

Section B of this document covers our approach to completing the key elements of the works to the bridge, including our proposals for temporary works where appropriate and an overview of the planned construction phase programme. Whilst these processes will undergo further planning up to the point that they are implemented on site, the details included are intended to provide an overview of approach to key works elements, and the approaches we have taken to mitigate some of the key risks associated with a job as technically challenging as Victoria Bridge. Section C gives further details on how we propose to interact with the general public and key stakeholder. This follows on from early meetings and discussions with many of the key stakeholders to ensure that their thoughts and concerns regarding the scheme are understood and incorporated into our methodology.

Within the appendix are a number of sketches and drawings providing further detail on the narrative and photographs of some of the site trial work, along with the works programme and proposed closure schedule.

## B CONSTRUCTION PHASE METHODOLOGY

### B.1 Site Setup

Our site setup, including office and welfare cabins will be within the existing Bath Western Riverside development site. To reduce the impact on the recently inhabited sections of the development the setup will not be directly adjacent to the bridge. Parking will be limited to a small number of cars and visitor spaces with the site workforce encouraged to car share, make use of the local park and ride facilities or use the site mini bus. For local staff and workforce the use of public transport will be promoted by the site team.

We will make use of the existing Bath Western Riverside site area in the south west quadrant of the bridge, including the river walk area. We will install a security gate to pass from this compound out into the public area initially to gain access to the bridge. A small site area will be fenced off around the eastern southern backspan until it is removed. Once removed and the access ramp adjusted the site boundary will then follow the western edge of the access ramp and the site areas will be joined together. Further details of the access ramp is included in section C.1.

Sketch CEGD0016/SK/N/10 in the appendix shows the proposed initial site layout. Sketch CEGD0010/SK/N/08 shows the new ramp location following removal of the backspan, and CEGD0010/SK/N/09 shows the proposed site boundary during construction of the southern foundations.

On the northern approach we will maintain access to Victoria Bridge Court at all times, with a site boundary directly south of this junction. Heras fencing will be used to segregate site activities from public areas. The northern work area will change a number of times during the works due to the limited space and the desire to maintain access over the bridge.

Sketch CEGD0010/SK/N/01 in the appendix shows the proposed initial site setup on the northern approach. Sketches CEGD0010/SK/N/05 and 06 show the adjusted northern site setup to allow construction of the northern foundations.

An extensive site survey will be completed prior to the works commencing. Small survey targets will be placed on existing structures including the Omega Centre, the Victoria Bridge Court garden wall, and the short walls adjacent to the southern approach to allow the structures to be monitored during the works. The monitoring will be completed on a weekly basis.

#### Access Overview

It is our intention to maintain access over the bridge for as much of the works duration as it is safe to do so, and attempt to limit closures to 30 minute mini-closures for removing and reinstalling main span sections. There will be some day long closures of the bridge during key lifting operations for safety reasons. All pending closures will be shown on the site notice boards at either end of the bridge to allow members of the public sufficient time to

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make alternative travel plans. Diversion route plans will also be shown on the notice boards, and each diversion route will be clearly signed.

We intend to use the southern end of the bridge as much as possible for material deliveries and access to the main bridge span. We will need to create a small working area on the northern approach, and this is shown on sketches CEGD0016/SK/N/01, 05 and 06.

For northern deliveries, we intend to setup a “lay-by” arrangement on the A4 where any deliveries will halt and call the site team. A trained vehicle marshal will then assist the vehicle to reverse toward the site area. We will leave sufficient access throughout into Victoria Bridge Court, and ensure that in instances that the road may be blocked for a duration that all residents are made aware of the works at least 2 weeks in advance to allow them to make sufficient plans.

For southern deliveries, we intend to use the Bath Western Riverside access route via Midland Road as much as is possible. Only in a small minority of circumstances will we utilise the southern section of Victoria Bridge road for access. The site will be setup in advance of these deliveries to ensure that there is no risk to the public using the route or crossing the bridge. A trained vehicle marshal will be attendance at all times.

A site safety boat will be in attendance during all works over or immediately adjacent to the water. The boat will be moored on the south bank of the river on a section of the river walk inside our site boundary. The safety boat will be manned throughout by a qualified pilot. Prior to works commencing over the water, an Emergency Plan will be developed for the works, including all water based emergencies. This will be briefed to all involved in working over water with practice drills completed during the works.

## B.2 Removal of the Bridge (including Temporary Works)

### Current Structure and Temporary Works

Presently, it is believed that around 70% of the weight of the original bridge is held by the temporary Mabey truss bridge. We have completed calculations that show that the truss is capable of taking the full weight of the original bridge, with pedestrian loading and moderate construction loading also in place. The pedestrian loading equates to over 100 people on the bridge at any given time, so bridge use will be monitored to ensure that this is not exceeded.

We intend to make use of the Mabey truss as much as is possible to reduce the amount of crane visits required to complete the works. Crane works as noted in other sections will likely result in bridge closures which we are attempting to minimise where possible.

It will be important to make sure that the loading is evenly distributed between the temporary hangars as the works progress, and that the remaining 30% of the original deck load is transferred to the temporary structure. Prior to adjusting the temporary hangars to suit our own temporary works, we will install additional hangars which will have load cells attached to them. These will take the place of some of the existing hangars and will provide

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us with a definitive load. We will complete this replacement at 5 locations on each side of the bridge, adjacent to each tower, at midspan, and at quarter span. As various activities are undertaken the pattern of loading will change and the load in the hangers will need to be monitored. We also anticipate a temperature difference of 1°C will result in a 1mm deflection of the bridge at midspan.

The main bridge deck elements will therefore be removed using a runway beam system installed onto the sides of the Mabey truss. This will provide a lifting mechanism across the whole bridge. Details of the runway beams are shown on the temporary works drawings in the appendix. The runway beam is constructed of similar components to the Mabey system, and will be easy to manoeuvre onto and around the original bridge deck.

The first operation will then be to remove the existing parapet system which is insufficient as edge protection for our site team. Additional Heras fencing panels will be attached to the Mabey deck to provide additional protection to the public and to further segregate the site works. During works on the deck, debris netting will be attached to the Heras panels to provide further segregation and reduce the risk of dust or debris leaving the works areas. The netting will be moved along the deck as the works progress to keep the route across the bridge from becoming completely enclosed and potentially discouraging use. It is proposed that some of the parapet elements will be reused on the refurbished structure. Prior to reuse they will be tested to ensure that they can be incorporated back onto the structure and withstand the design loading.

As the existing parapet is removed a new temporary system will be introduced. During these works, all access to the original bridge deck will be restricted and all operatives on the deck involved with these works will wear harnesses attached back to the Mabey truss.

### Chains

The bridge chains will be removed in a number of steps. Whilst the backspan chains and hangers are supporting only their self weight, there will be some loading within the central span and hangers, so the following process has again been designed by our in house Temporary Works designer.

The load cells in the hangers will be carefully monitored during the controlled release of the hangers as detailed below to ensure that the full weight of the existing bridge is taken by the temporary bridge.

The first part of the process will be to remove the majority of the hangers, maintaining two per chain about the mid span point and one on either backspan to prevent uplift. The hangers will be removed in matching pairs on both sides of the bridge to prevent rotation of the deck, and we will start at each abutment and work toward the centre of the bridge. This will continually reduce the overall span of the existing bridge supporting itself and ensuring all loading is passed onto the temporary works.

Due to the way the hangers are held by the chain and the deck and that they are to all be replaced we will remove the hangers on site. The hangers will be carefully released, in a controlled manner to avoid any potential shock loading, using flame cutting equipment.

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This will allow the bar to yield as the cutting proceeds through the section. A tirfor hand winch laid on its side will be attached to the chains adjacent to the backspan foundation block and at midspan using wire ropes. We will then tension the tirfor and wire rope arrangements and jack out the existing chain pins inside (i.e. toward the tower) of these points. We will then slowly release the tirfor at each end of the chain allowing the chains to "relax" onto the deck or backspan foundations. We will also remove the last remaining hangers at this point. The same process will then be repeated, but this time with the tirsors installed at the foundation blocks and adjacent to the tops of the towers, splitting the chain into another 2 section. The mobile crane can then be connected to the backspan chain section, lowering it to deck level before being trolleyed from the bridge and this can then be removed from site. The half of the central span chain can then be removed in a similar way. This process is shown stage by stage on the Temporary Works drawings appendix.

This will be repeated for all 4 quadrants of the bridge, with the chain elements clearly tagged before being removed from site.

### Central Span – Deck Sections

As above the deck will be removed in sections that match the splice intervals on the longitudinal beams that support the deck. These are to be retained during the works and as a result we plan to avoid needlessly cutting through them. Starting from the southern end of the bridge deck our site team will identify the section length and mark this across the deck. We will remove the areas of timber decking adjacent to the cut lines, allowing the original deck to be attached to four manual hoists working off the runway beams.

We will then install our trough system which is detailed further in section C.7, and as shown in the photograph section in the appendix. This will allow the site team to first blast the existing paint system from the cut location before completing the actual cut without allowing any material to fall to the river below. The trough has been trialled in our workshop off site successfully.

The final operation will be to release the bridge support beams underneath the deck from the Mabey truss, allowing the beams to be removed via the runway beams to the southern side of the bridge. Once the section has been disconnected from the main deck it will be lowered directly down, using the 4No. Hand operated chain blocks suspended from the temporary runway beams onto a receiving point adjacent to the south tower on the river walk. From there it will be lifted by a rubber tracked telehandler and loaded onto a wagon for removal from site. Before leaving site the section will be thoroughly photographed, and elements clearly tagged.

For subsequent deck sections the length to be removed will be suspended from the repositioned chain blocks. Once released from the deck and the Mabey truss they will be trolleyed to the south end of the bridge before being lowered to the receiving point, as above. The trolleys will be moved along the runway beams using Tirfor hand winches, ensuring that the trolleys on each beam stay in line with each other. This is repeated until all of the deck has been removed.

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We anticipate the bridge will be cut into 14 sections during this process. During the works to finally release each section and subsequently allow them to travel across to the southern embankment we will use 30 minute bridge closures and river restrictions. Whilst we are confident in our approach the need to protect the public is paramount in our processes so we will adopt this approach.

There are two hangers that connect the deck directly into the masonry towers. These will also be removed as the standard hangers, and the works to the tower end of these hangers completed from the scaffolding that is to be used for the masonry works.

### Crane Lifting

We will require a small mobile crane for the following works on the northern and southern approaches:

- Removal of the existing backspan chains;
- Removal of the central span chains;
- Reinstallation of the refurbished backspan chains;
- Reinstallation of the refurbished central span chains;
- Removal and reinstallation of the top of tower chain saddles;
- Movement of the approach access ramps.

During all crane works on the northern approach, Victoria Bridge will be closed to the public. For crane works on the southern approach there will be some full closures and some 30 minute closures depending on the works involved and likely durations.

Current planning suggests a 35T size crane will be adequate for the works. Due to the size of crane and the loads to be lifted, it is unlikely that additional crane foundations will need to be installed, instead a simple system of timber crane mats will be used. Prior to the works commencing a temporary works design will be completed to ensure that the foundation is suitable for the crane.

During each of the lifts, the lifted materials will be travelling between the bridge structure and a delivery vehicle parked on Victoria Bridge road or our site compound area. On the northern approach, due to the size of the Victoria Bridge road, it will not be possible to complete these lifts without partial oversailing. We propose to oversail the Victoria Bridge Court side rather than the Omega Centre side. This provides a safer, more manageable solution as it will be clear to those in control of the lifting operations that the area to be oversailed is clear of people and materials. During these lifts we will setup a small segregated area within the Victoria Bridge Court area and provide one Lift Marshal to ensure that no persons approach the segregated area during lifting. On the completion of each lift, the area will be left clear of site materials and in the same condition as found before the lift commenced.

The proposed crane layout, slew restrictions and exclusion zone is shown in sketch CEGD0016/SK/N/02 in the appendix.

## B.3 Off Site Refurbishment and Fabrication

The removed bridge sections will be transported by road to our specialist metalwork subcontractor works in Cardiff. On arrival, the material components will be logged as per section B7 as they are removed from the large single section into each part.

As per section B7, the elements will be reviewed and tested in line with the works specification to determine if they are to be reused. All testing will be completed as soon as possible to provide time for the fabrication of replacement elements if required.

For all parts that are to be reused, the existing paint system will be removed within a specialist blasting chamber. New bridge elements will also be fabricated in the same workshop against the fabrication drawings. As each section of new and reused materials are completed they will be painted by a specialist painting team. Prior to returning to site, the components will be reassembled into 3-4m sections and returned to site.

By completing the works off site, and in one location, the management of the elements is improved. The only items that may be completed away from Cardiff will be the casting of replacement hanger bosses. This will be coordinated through the team in Cardiff with examples provided in advance of the final installation. The majority of the timber decking will also be installed in Cardiff, providing "bridge ready" sections to return to Bath.

All of the off site works will be subject to rigorous quality assurance procedures and audits by our Heritage specialists to ensure that the requirements of the specification and heritage management plan are both met.

The bridge will be painted Fir Green (RAL 6009). A metalwork sample painted in this colour was submitted to John Davey of B&NES Planning Services on 5<sup>th</sup> November 2013.

## B.4 Reconstruction of the Bridge (including Temporary Works)

### Foundation Construction

The permanent works design for the new foundations is shown on AECOM drawing 013 in the appendix. The works consist of two elements – the first is the replacement of the concrete ground beam that holds the lower part of the hangers in place; the second is the construction of the larger anchor blocks that provide reaction for the whole chain system. To keep the bridge open, it is intended to complete the east side foundation first, and then the west.

### *North Approach*

During the eastern foundation works, the existing access ramp will be moved across to the western side of the site, and in line with the western footway. The western works will be completed second with the opposite arrangement in place.

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Once the backspan elements have been removed on both sides, and the ramp location addressed as above, the concrete ground beam will be broken out using a machine mounted breaker. The excavation depth is anticipated to be approximately 600mm below existing carriageway level and so excavation support is not anticipated.

The new reinforced concrete anchor block is larger and will require excavation support. The majority of the block requires an excavation of 1.700m. The final section of the excavation is 2.6m deep. On the western foundation, the block is directly adjacent to the eastern wall of the Omega Centre. On the eastern foundation, the block is directly adjacent to western boundary wall of the Victoria Bridge Court.

For both foundations a temporary works design will be fully developed to allow the excavation works to progress safely. The temporary works will be designed with two key outcomes:

- Providing a safe working environment for our site team;
- Safeguard the foundations of the adjacent structures.

It is currently anticipated that the temporary works will take the form of a shallow cofferdam constructed with short trench sheets, with either a frame or waler beam support. We do not intend to excavate underneath the adjacent structures, nor form any type of underpinning as part of our works.

Due to the proximity of the above structures we do not intend to drive the sheets using a vibrating hammer. Instead we propose to excavate a short length of the perimeter of the cofferdam, approximately 1m at a time, using a narrow bucket mounted on a tracked excavator to the required excavation level. We will then lift the trench sheets into position and backfill on either side of the sheets. This process will be completed around the full perimeter of the cofferdam. The main excavation of the cofferdam will then commence, with the frames or walers installed as per the design to provide support to the sheets.

A series of trial holes will be completed well in advance of installing the sheets to ensure that no underground services are located within the excavation.

The excavations will be monitored on a daily basis and following inclement weather conditions. Survey targets, and if necessary tell-tails will be placed on all adjacent structures during the excavation works and monitored.

The new reinforced concrete foundations will be constructed after the initial Temporary Works Coordinator sign off of the cofferdam support. We will need to remove the excavated material and broken out concrete from site. This will be loaded into 20T wagons by the tracked excavator and taken off site for reuse. Reinforcement and temporary works materials will be brought to site on a hi-ab lorry and offloaded. Concrete will be brought to site in read-mix lorries and discharged into the excavations. All vehicles will be marshalled in and out of the site.

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On completion of the foundations the sheets will be cut off below ground level and left in situ. Due to the proximity of the structures we will cast the foundations against the sheet piles, using a damp proof membrane to separate the two elements. With the horizontal load against the sheets and the limited working space, we believe that attempting to remove the sheets may cause damage to the new foundation or the adjacent structures.

The proposed western foundation temporary works outline is shown on sketch CEGD0016/SK/N/05. The proposed eastern foundation temporary works outline is shown on sketch CEGD0016/SK/N/06. A cross section of the proposed temporary excavation support is shown on sketch CEGD0016/SK/N/07.

### *South Approach*

Due to the level difference across the bridge, the current southern access ramp is twice the length of the one section on the northern side. If we were to reinstall both lengths of ramp in one single, straight ramp, we would cut off the emergency access routes into the Bath Western Riverside area. We considered the use of steps but this would be a barrier to pedestrians with push chairs or prams. We will rotate the first ramp to run directly east from the existing landing platform, with a second mid landing used to change the ramp direction through 90 degrees, turning south. This arrangement once in place can be maintained until the works have been completed.

As per the northern approach, once the backspan elements have been removed on both sides, and the ramp location addressed as above, the concrete ground beam will be broken out using a machine mounted breaker. The excavation depth is anticipated to be approximately 600mm below existing carriageway level and so excavation support is not anticipated.

Again, as per the northern approach, the new anchor block is larger and will require excavation support. The majority of the block requires an excavation of 1.700m. The final section of the excavation is 2.6m deep. On both sides of the bridge, the foundations are adjacent to the short masonry walls that run in parallel with the Victoria Bridge chains. There are no details of the foundations of these walls, so trial holes will be completed in advance of finalising the temporary works design to confirm the construction type. For both foundations a temporary works design will be fully developed to allow the excavation works to progress safely. It is currently anticipated that the temporary works will take the form of a sheet piled cofferdam, with either a frame or waler beam support. The sheets and support will be installed by a tracked excavator working from the main site compound. The sheets will be installed prior to any excavation works commencing. A series of trial holes will be completed well in advance of driving the sheets to ensure that no underground services are located within the excavation.

The excavations will be monitored on a daily basis and following inclement weather conditions. The foundations will be constructed after the initial Temporary Works Coordinator sign off of the cofferdam support. We will need to remove the excavated material and broken out concrete from site. This will be loaded into 20T wagons by the tracked excavator and taken off site for reuse. Reinforcement and temporary works materials will be brought to site on a hi-ab lorry and offloaded. Concrete will be brought to

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site in read-mix lorries and discharged into the excavations. All vehicles will be marshalled in and out of the site.

All concrete washout will be completed either off site, or on site in designated locations away from the river and drainage routes.

The proposed southern approach foundation layouts are shown on sketches CEGD0016/SK/N/09 in the appendix.

### Deck Support

The existing corbel supports on the towers directly below the deck will be strengthened to provide a better support to the bridge. The works involve the drilling and fixing of new reinforcement, and the casting of small concrete elements. Each of these areas will already be part of the works area and will be segregated from the public. Care will be taken during these operations due to their proximity to the River Avon, including the use of debris netting.

### Bridge Reconstruction

The refurbished deck sections will be reinstalled making another use of the runway beam system mounted on the Mabey truss. As opposite to removal, the most northerly section will be installed first and held in place on the new corbels and fixed to the truss. The second section will then follow on the runway beam system and will be bolted together with the first section, and set to level. The bolts will be accessed through small openings left in the timber decking. Each section will feature edge protection on all four edges to remove the risk of personnel falling from height. As the bridge will be incomplete for a number of weeks, an end of shift inspection will be completed daily to ensure that the bridge is left safe and does not feature any open edges that may present a risk to trespassers.

The level of the bridge will be carefully monitored during reinstallation to ensure that the desired finished levels are achieved when the hangers and chains are reintroduced and the temporary works removed.

As with the removal, we propose the use of 30 minute closures on the bridge, coupled with 30 minute river restrictions during the lifting works.

When all deck sections have been replaced and attached to the Mabey truss it will be necessary to survey the sections and then adjust the temporary hangers to give the new deck the correct vertical alignment before the chain hangers can be re-attached. Once this has been completed the bolted connections between the deck deck sections can be finally tightened.

The chains will be installed in reverse of how they were removed. They will be returned to site with the new hangers already attached and strapped up. This will reduced the installation time by avoiding opening up each chain link to insert the hangers. Using additional suspension points on the Mabey truss the suspension chain will have to be lifted locally to allow the hangers to be threaded each side of the deck edge beams. Once the

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through bolts have been installed locating the hanger trunnion blocks to the deck edge beams the temporary suspension of the chain can be removed.

We will use surveying equipment to ensure that as the hangers and chains are reattached we produce the same catenary shape as the design, with local modifications made on site if required. The finished soffit level of the refurbished structure will be no lower than the existing soffit of the existing bridge

When all section have been installed we will install the remaining timber decking elements and apply locally as required the surfacing. The parapet sections will then be installed, with the operatives harnessed on to the bridge truss and short lanyards at all times.

The parapet details to the bridge as shown on AECOM drawing 60274494/C/010 in the Appendix. The fabrication drawings that will be prepared for the parapets will be provided to the Client for approval prior to fabrication commencing.

All elements that are to be reinstalled on the structure will have a paint inspection completed before they are lifted onto the bridge in the site compound. Any touch up work required as a result of minor damage during transportation and lifting will be addressed prior to the sections being installed. A further inspection will be completed once the elements are back in place. Only minor touch up work is anticipated in this way to the bolted connections. All paints and associated materials and tools will be carefully stored and managed on the structure to remove the risk of any materials falling from the structure.

## B.5 Masonry Towers

A full survey of the towers has been completed and this is recorded in section 5.9 of the Design and Access Report prepared by AECOM. A full copy of the report is included in the appendix.

The masonry towers at either end of the bridge are original and will also be refurbished as part of the scheme. They are both constructed from Bath stone blocks, and feature internal voids in the upper section. The outer faces of the towers are accurately finished with cut stones and thin mortar beds to give a flat profile.

The work scope for the towers includes;

- Each tower will be cleaned to remove biological growth and deposits, graffiti, and carbon deposits. Both DOFF (water) and JOS-TORC (stone abrasion) cleaning methods will be used as necessary. Trial panels of each have already been completed on the western face of the southern tower successfully.
- The removal of the vegetation that is currently growing from the towers, with removal of as much of the root structure as possible without further damaging the masonry. Any remaining roots will be treated to prevent regrowth.

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- Cracked stones will be inspected after cleaning and an assessment made to determine replacement, repair or retain depending on the position of the stone. This decision will be based on the flowchart included in the appendix.
- For minor damage to the stone, lime putty repairs will be completed. The lime putty will be mixed on site with careful attention to ensure a good colour match with the stone under repair. If required to provide additional security to the repair small stainless steel pins will be used.
- Originally 4 of the deck hangers were connected directly to the towers. These will be reinstalled to replicate the original design.
- The top of tower cradles will be removed by our metalwork subcontractor for refurbishment. The support to the cradles will be improved by the introduction of a small reinforced concrete section cast within the upper section of the tower. The existing copings will be surveyed as per the other section of masonry to determine if any repairs are required, or if the blocks are to be replaced.
- Following the cleaning the mortar joints will be reviewed using the flowchart in the appendix. Where necessary damaged or failed mortar will be carefully raked out of the joint, with new lime mortar used.
- All repaired joints will be recessed so that the edges of the stonework are clearly visible and well defined.
- The proposed mortar mix will be made up of 2.5 parts of stone dust to 1 part Natural Hydraulic Lime (NHL) 3.5. The current programme shows the masonry works being completed in Spring 2014 so freezing temperatures are not anticipated. However, if the weather is unseasonably cold, we will use the same ratio as above but with NHL 5 and a 10% addition of a cement based additive. The lime mortar will be carefully matched to the colour of the existing mortar. Combe Down quarry dust will be used to ensure that the replacement mortar matches the existing mortar colour.

Prior to all cleaning works commencing, a thorough, recorded, inspection of all masonry elements will be completed by our specialist masonry subcontractor and the project team.

To access the majority of the works to the towers we will construct a scaffold system around each. We anticipate using a standard tube and fitting scaffold system that will be designed and checked by scaffold design specialists. An overall width of system from the face of the tower to the outer face of the scaffold of 1.2m is anticipated, although this may increase marginally on completion of the design. This will be sheeted to prevent stone dust and water vapour leaving the working area. The scaffold on the northern tower will require the use of some of the land at the front of Victoria Bridge court as shown on sketch CEGD0016/SK/N/04 in the appendix. Care will be taken when erecting the scaffolding on the southern tower to minimise our impact on the finished work area. The inside of the tower portal will be completed once the temporary works truss has been removed towards the end of the works programme.

During the installation and removal of the scaffolding to the north tower, the scaffold wagon will be parked on Victoria Bridge road with scaffold materials moved from the wagon to the work face by hand. We will develop the working method to minimise the requirement to access Victoria Bridge Court during the scaffold installation, although this will be required to provide a footing for the scaffold. As with the lifting operations, we would propose to fence off a small area within Victoria Bridge Court to provide a safe

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working area for the scaffolding. Once the scaffolding is completed, this fencing will be moved to 0.5m from the scaffold and secured as a site boundary. A joint survey will be completed prior to any of these works progressing with the land owner to ensure that the area required for access and the scaffold is accurately recorded, and returned in an equal condition.

The majority of the cleaning and repointing works will require only hand tools to be used which will be lifted onto the scaffold using hand operated pulleys. For any stone replacement and the construction of new cradle foundation, a mobile crane will be utilised.

Care will be taken whilst completing the masonry works to ensure that all materials are kept within the site boundary. Bunds will be installed at the foot of the towers as each face is cleaned to ensure that any excess water run off is intercepted and recycled, and not permitted to soak into the ground or drain toward the river. All lime mortar batching operations will also be completed in the site compound well away from the river and drainage routes.

The small walls that run parallel with the southern backspan chains also form part of the listed structure. During the works, these walls will also be cleaned using the above methods, with local repairs completed as necessary. Care will be taken during the construction of the new southern foundation blocks as per section B.4 to ensure that the walls are not damaged as a result of our works.

Our proposed masonry subcontractor has extensive knowledge of working on Bath stone, and has a portfolio of work already completed within the city and local area. They also have excellent experience of working adjacent to waterways.

On completion of the works, and prior to the removal of the scaffolding, a final thorough, recorded, inspection of all masonry elements will be completed by our specialist masonry subcontractor and the project team. A final written report will be compiled on completion of the works and provided as part of the overall scheme Archaeological Report.

Photographs of the completed cleaning trials are shown in the Appendix.

## B.6 Removal of the Temporary Bridge

On completion of the bridge reinstatement, the temporary works bridge can be removed. During these works it will be necessary to close the bridge for a number of days due to the amount of lifting operations and vehicles movements on Victoria Bridge road.

The approach ramps will be removed first. The ramp surface will be removed along with the parapets using hand tools and either a small crane or telehandler. The support sections will then be broken down back to smaller elements that can be safely lifted onto transport for removal from site. The timber block supports will be also be removed. The area beneath each ramp will be cleared of any debris and swept.

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The main truss will then be lowered onto the new deck, which has sufficient capacity to carry the loading. The truss will be lowered onto a set of rollers that will allow the truss to be rolled out on the new deck to the north end of the bridge. The rollers will be positioned accurately on the new deck to ensure that the loading placed through them by the truss is evenly distributed over the new bridge deck and avoid load concentrations during removal. The rollers will be installed “wheels up” with timber packers below the roller to ensure it is accurately levelled, and to reduce the risk of damage to the new surface.

As each section of the truss passes clear of the north tower portal the process will halt and the section will be disconnected from the main element and lifted by the crane onto transport for removal from site. It is our intention to remove the bridge in large sections to reduce the amount of time that the operation takes. This will continue for each section of the truss.

The truss is currently supported on mini piles adjacent to the towers. It is not possible to remove the whole foundation due to their depth. Instead the foundation will be removed from finished ground level to 500mm below finished ground level. This will permit the replacement of the footway.

With the truss removed, the anti-slip surfacing will be applied. Monarflex sheeting will be secured to both parapets to prevent any of the material leaving the bridge deck. The timber decking sections will also be checked to ensure that there is no risk of material passing through the deck to the river below.

Once all of the truss elements and ramps have been removed, and the foundation area safe for access the bridge will be reopened for use. There will be the final elements of the masonry works to complete as per the previous section, along with the finishes in section B.8 as detailed below.

Outline lift plans for the works are included in the Appendix.

## **B.7 Heritage Works – Recording the Work**

It is the intention of the project to build and archive a comprehensive record which covers the history of Victoria Bridge from its conception and construction right through to the completion of the works to which this document relates. This record will comprise a number of elements which are listed in Appendix 4. The proposals to record the dismantling and reconstruction process, (items 4a to 4l inclusive) form a key part of the record.

The recording of the structure during disassembly and subsequent works is essential both to comply with the Listed Building Consent Conditions and to ensure that a complete record exists on the condition of individual elements, their suitability for re-use and where necessary their replacement with replica items in the re-assembled structure.

Ironwork Dismantling

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An initial dismantling methodology has been developed by the specialist contractor undertaking the refurbishment works this allows for the bridge to be partly dismantled on site into large components and taken to separate workshop for further dismantling into its component form. It is essential during all stages of this process and the subsequent treatment and re-assembly stages that a thorough record of the components and their condition is maintained as a historic record.

All survey works to follow the English Heritage guidelines noted in their publication *Understanding Historic Buildings – A guide to good recording practice* (published 2006).

### Strategy

The ironwork will be recorded in-situ prior to the commencement of works on site. The form of this recording will be agreed with the project team but as a minimum will comprise of a photographic record of the structure, an accurate measured survey and a 3D laser scan of the structure. Copies of these surveys together with historic record photographs will be reviewed by the project team to ensure that a sufficient pre-commencement record exists of the bridge structure.

As the structure is dismantled each removed component will be uniquely identified and an electronic record held noting both key information about the component and a series of photographic records at agreed stages.

For ease of identification a hierarchy reference system will be utilised to note the original position and type of component together with its unique identification code.

A suggested format may be:

Element	Unique ID Number	Orientation	Grid No
Hangers (H)	1	North	1
Hanger Boss (HB)	2	South	2
Chains (C)	3		
Chain Pin (CP)	4		
Plate (P)	5		

This would provide each element with an individual part number such as HB 0125 N (3)

### Data Recording off-site

The majority of the component disassembly works will be undertaken by the contractor in Cardiff. It is important therefore that the off-site recording is maintained to ensure that the full information can be collated together as the final Conservation Record. Off-site data recording will be undertaken in a similar manner using the hand held iPads to record each item as it is stripped from its component assembly.

### Identification of Components

Each component will be identified using stamped tags (either square cut or penny washer) which will be tied securely in two locations to each component with malleable steel tie

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wire. The tags will remain with the components throughout the treatment process and only removed once the component returns to its original or otherwise agreed position in the re-assembled bridge structure.

### Component Reuse

The contract specification provides an outline summary of the planned retention of elements for reuse on the refurbished structure. Due to the inherent design issues with the structure, many components will have reached the end of their design life and will not be refurbished. A number of tests will be carried out on each element to ensure that those that are to be reincorporated into the structure are acceptable. All elements that will not be reused will be retained by the Project Team, with some being tested to destruction. A plan is currently being developed by the Project Team to distribute original elements to local museums and interested parties where possible. Any remaining material will be recycled.

All metalwork, old and new, will be recorded as part of our Quality Assurance scheme which will include material tests, mill certificates, weld test certificates and painting certificates.

## B.8 Finishes

On completion of the removal of the temporary bridge structure, the new approaches will be constructed using hard landscaping materials. During these works the refurbished bridge will be in use by the public. As such we will ensure that our works are clearly signed and demarcated from the public routes and ensure that each section is thoroughly checked before being opened to the public. Small operated plant will be used to place the paving and kerbs to reduce the exposure to manual handling for our site team.

New bollards will be installed on the approaches to the bridge as shown on AECOM drawing 60274494/C/001 in the Appendix. The bollards will be in line with the Bath Western Riverside specification.

New gates will be installed on the approaches to the bridge as shown on AECOM drawing 60274494/C/015 in the Appendix.

The footpath between the towpath and Victoria Bridge Road will be formally closed through the B&NES Highways department prior to the works commencing. Unfortunately there is no way of keeping this section of path open during the works.

The initial stair and landing earthworks will be completed once the northern backspan has been removed and the scaffold works completed, using a small tracked excavator. All aggregate, soil, and concrete movements will be as per section B.4. These steps will be finished in parallel with the main finishing works and opened to the public at the earliest opportunity.

We also anticipate that minor ecological enhancements will be introduced on the new structure. These are likely to be a small number of bat boxes which will be used by the bats

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who use the river as a corridor through the area. Holes will also be drilled into the masonry towers to provide a route to the internal void for bats. These measures are shown on AECOM drawing 60274494/ECO/001 in the Appendix.

### B.9 Programme

Our current programme for the main construction phase states that the works will be completed in 43 weeks.

Following receipt of the necessary approvals we anticipate mobilising the site setup and welfare facilities prior to Christmas. In the New Year we will commence with the installation of the northern towpath scaffolding, Onega Centre scaffolding, and providing the site boundary and notice boards, with the bridge works starting in mid January.

We believe that the existing bridge metalwork will be removed in around 8 weeks through to mid March. Whilst the metalwork is off site and being refurbished and new elements fabricated, we will construct the new foundations, corbel supports and complete the majority of the masonry works to the towers. This is currently programmed for 7 weeks.

The bridge reinstallation will then commence as outlined in the previous section and take around 16 weeks. We will then remove the temporary bridge structure, and complete the finishing works during a period of 8 weeks, with construction therefore due to be completed by late September 2014.

The draft phase 2 programme is included in the appendix. A schedule of planned closures has been developed by the project team and this is also included in the appendix. This schedule will be maintained in line with the programme and circulated to key stakeholders as works progress.

### B.10 Communications

Bath and North East Somerset Council have produced a detailed Communications Strategy for the works which identifies the key stakeholders and communications objectives for the works. As the Principal Contractor, we will be taking a lead role for the day to day communications in relation to operational matters, access arrangements, bridge, road and towpath closures, and alerting local residents to any forthcoming noisy works or potential disruption.

Two notice boards will be positioned locally at either end of the works. These will provide the above information and will be kept up to date by the site team. The project will also feature on the B&NES website. A Twitter feed will also be setup and used to provide real time information and updates as the works progress whilst allowing easy access to the site team for the general public.

Further details with regard to Bath Western Riverside and Crest Nicholson are included in section C.

## C STAKEHOLDERS

### C.1 The Travelling Public – Victoria Bridge and Victoria Bridge Road

We appreciate that Victoria Bridge provides a well used route across the River Avon. As such we will endeavour to maintain access over the bridge for as much time as is safe and practicable for us to achieve. The method that we intend to utilise as outlined in section B allows this to be achieved.

We intend to utilise approximately 40 number 30 minute long closures during the removal of the deck sections, releasing the chains, and installation and removal of the scaffold towers at either end of the main span.

There will be however a need to also close the bridge during some operations. These include the removal and reinstallation of the northern and southern backspan chains, movement of the approach ramps as detailed below, works to the bearing saddles at the top of each tower, releasing and reinstalling the main span chain system, and the removal of the temporary works bridge at the completion of the job. Based on our current schedule of closures, the above amount to approximately 20 days of full bridge closures.

The temporary bridge system currently has access ramps at either end to allow members of the public to access the temporary bridge deck without the need for stairs. However, to maintain access for as much as possible we will need to reposition these ramps following the initial back span removals.

On the northern side, we will move the ramp from its central alignment over to the eastern footway of Victoria Bridge road. This will permit us to construct the new below ground foundations blocks on the western side. This arrangement will then be swapped to permit construction of the eastern side. The ramp will run in both instances from the existing landing platform directly north of the tower and down to ground level at the same gradient as present.

On the southern side due to the requirement for two lengths of ramp, we propose to take the first ramp directly east of the landing platform, with a second mid landing used to change the ramp direction through 90 degrees, turning south. This arrangement once in place can be maintained until the works have been completed.

Both of these types of closure will be formally agreed through the B&NES Highway department in advance. The dates and times of closures will also be advertised 2 weeks in advance on the site notice boards, the site page on the B&NES website, and through social media.

Access into Victoria Bridge Court on the northern approach to the bridge will be maintained throughout the works. We intend to use the southern end of the bridge as much as possible for material deliveries and access to the main bridge span. We will need to create a small working area on the northern approach, and this is shown on sketches CEGD0016/SK/N/01, 05 and 06 in the appendix.

For northern approach deliveries, we intend to setup a “lay-by” arrangement on the A4 where any deliveries will halt and call the site team. A trained vehicle marshal will then assist the vehicle to reverse toward the site area. We will leave sufficient access throughout into Victoria Bridge Court, and ensure that in instances that the road may be blocked for a duration that all residents are made aware of the works at least 2 weeks in advance to allow them to make sufficient plans.

The proposed layouts showing the approach ramp configurations are shown on sketches CEGD0016/SK/05, 06, 08 and 09 in the appendix.

## C.2 The Travelling Public – North Towpath

We recognise that the northern towpath provides a well used route in and out of the city for both commuters and for leisure. As such we will endeavour to maintain the use of the route for pedestrians and cyclists as far as is safe and practical.

We will provide additional edge protection on the bridge to ensure that there is no risk of materials or plant leaving the work area and falling to the towpath below.

Some of the planned works to the tower including the scaffolding and low level masonry work will require our site team to access the towpath. These works will be clearly segregated from the public area of the towpath by Heras fencing.

Presently a set of permanent pedestrians barriers act as a chicane to direct cyclists in particular under the area of the bridge with the highest level of headroom. These will be retained throughout with the works. Particular care will be taken to ensure that the headroom is not reduced through this area during the works, other than during one of the towpath closures.

The existing stairs between the towpath and Victoria Bridge Road will be closed throughout the works. We have reviewed providing and maintaining an access at this point but due to the congested interface at the top of the stairs between the bridge, temporary bridge, foundations, tower, and existing buildings this is not achievable.

A scaffold is proposed to provide emergency egress from the Omega Centre which has fire escapes situated on the southern elevation. This scaffold will provide a stair access to towpath level, and a one direction door to provide access onto the towpath, and prevent access via the towpath.

Additional signage will be placed along the towpath approaches to ensure that all towpath users are aware of the works.

During the removal and reinstatement of the deck sections directly above the towpath, we intend to close the towpath for 2 days. During this time, lifting works will be happening directly overhead and as such it is unacceptable to allow access directly underneath.

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There will also be a need to close the towpath for some of the planned works. These include the installation and removal of the scaffolding to the masonry tower. We anticipate presently that this will take 2 days for the installation, and 2 days for the removal.

These closures will be formally agreed through the B&NES Highway department in advance. The dates and times of closures will also be advertised 2 weeks in advance on the site notice boards, the site page on the B&NES website, and through social media.

This proposed layout is shown on sketches CEGD0016/SK/N/03 and 10 in the appendix.

### C.3 The Travelling Public – Southern Riverwalk

The southern river walk works to lower the towpath and river wall and provide a new area of public realm have already been completed as part of the Bath Western Riverside works. The area is not yet fully open to the public, with the route from the City ending at the bridge, with a route to the Bath Western Riverside area already in place via new stairs.

We propose to only make a minor to change to this arrangement during the works, and this will be to move the eastern barrier slightly further east to provide a small additional area of working space, and access to the river for the site safety boat.

A survey of the already completed works will be completed prior to our own works commencing. Protection measures will be installed during our works to protect these finished works.

This proposed layout is shown on sketch CEGD0016/SK/N/10 in the appendix.

### C.4 River Users, and the Canal and River Trust

As with Victoria Bridge, we plan to keep the River Avon open to river traffic for as much of the works duration as is safe and practicable for us to do so. As with the bridge, we propose to use 30 minute restrictions on river traffic during key lifting operations.

We do not propose to completely close the river at any point during the works. All works, including the removal of the temporary bridge truss at the end of the scheme will be completed using the 30 minute restrictions as above.

These restrictions will be formally agreed through the Canals & Rivers Trust in advance. The dates and times of restrictions will also be advertised 2 weeks in advance on the site notice boards, the site page on the B&NES website, the CRT website and through social media.

As noted in section B.4, we will endeavour to complete all painting works prior to the bridge elements being reinstalled, or by accessing from the new deck for touching up works. However we may need to complete minor painting works from the river once the bridge has been reinstalled around the bolted connection locations in particular to ensure that the entire structure is coated in line with the specification.

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If the need to work from the river arises, we will meet with the Canals and River Trust prior to commencing and finalise our approach and programme. Works will only be completed during low or typical river flows. Working during flood conditions will not be permitted. For works from the river we would utilise 4No. 5.3m by 2.4m uni-flotes with handrailed edge protection, and a small access scaffold on them.

During 30 minute restrictions, the uni-flotes would be lifted onto the river using a small crane from the southern compound area and moved into position by the site safety boat. The uni-flotes would be tied back to the southern side of the river initially with kentledge provided on the river walk, with the touch up painting moving from south to north. Access to the uni-flotes will be via the safety boat. When away from the southern river wall, the uni-flotes would use a small anchor to secure them in position with a secondary chain tying back to the nearest bank. The safety boat will remain in attendance throughout the work, and all vessels entering our section of the river would be forewarned of the works ahead. If required, 30 minute restrictions would be used to reposition the uni-flotes. The uni-flotes would be returned to the south side of the river at the end of each shift and secured. They will not be left unattended at any point mid river.

As per section B.4 all paints and materials will be carefully controlled to ensure there is no risk of them leaving our works area.

During all of the restrictions noted for in the preceding sections, we will need to ensure that all vessels are aware of the restriction. Due to the relatively high freeboard underneath Victoria Bridge we are not expecting river users to moor and access the northern towpath directly adjacent to the bridge. There is also limited access to the towpath on the approaches to the bridge. The new mooring points introduced on the southern embankment are privately owned and therefore will not be used.

We propose to hold boats at the Weston Lock cut and Broad Quays mooring where existing suitable mooring facilities are already in place. We will install suitable signage at these locations giving details of the works and the forthcoming closures, as well as contact details for the project team. Prior to the planned restrictions works commencing, we will check that the restriction area of the river is clear of traffic and lifting works can safely commence. All river traffic signage will be in line with the current AINA standards. The site safety boat will act as a lookout during all restrictions. Should a vessel be missed at the above sites, or move off from a mooring within the restriction, the site safety boat will notify the site team to pause operations prior to the vessel approaching and passing under Victoria Bridge.

As is standard practice when working above water, we will have on site our own safety boat. During the restrictions this boat will be used to pick up any boats that pass into the restriction area prior to the works being completed.

## C.5 Local Residents

The bridge is located adjacent to Victoria Bridge Court on the north side of the river, and the Bath Western Riverside development on the south. As such there is a need to ensure

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that all local residents are kept informed about the works to ensure that they have routes of contacting the project team if required, and an understanding of the works programme.

Prior to any site works commencing, we will hold a number of evening meetings that will permit local residents to attend, meet some of the project team, be provided with outline details of the scheme, and provide an opportunity to put questions or concerns across.

As the works progress, we will keep at least 2 site notice boards up to date with site progress, forthcoming closures or restrictions and outline details of the coming weeks work. We will also provide contact details for the project team. We will complete letter drops where appropriate to provide further detail to local residents.

Noise and working hour restrictions are clearly identified in the Works Specification. These will be strictly adhered to by the site team, with noise monitoring carried out during the works to ensure that sufficient mitigation measures have been employed to reduce the impact of the works on local residents.

We recognise that unit 3 of the Omega centre has a fire escape located on the southern boundary of the building. At present, the occupants of the building may exit through this door in the event of a fire and pass around the building to the muster point.

It is our intention to maintain this route as much as is practicable during the works. However, during all northern foundation works and some lifting activities it will not be possible to safely maintain this route. It is understood that there is no route around to the other side of the Omega centre from the fire escape. As such, we will provide a safe route from the fire escape down to the river tow path. This route will be used for emergency access only, and will feature a push bar secure gate at towpath level to discourage casual use of the access by members of the public.

The proposed emergency access route from the Omega Centre is shown on sketch CEGD0016/SK/N/03 in the appendix.

The site will sign up to the Considerate Contractors scheme and will be audited at least twice during the duration of the works.

B&NES have produced a detailed communications plan which provides further details of the above approach.

## C.6 Environment Agency

As part of the preconstruction works we will submit an electronic application to the Environment Agency for Flood Defence Consent as the works are directly above the River Avon. This will include this methodology and supporting documents.

The 100 year flood level for the site is given is 18.36m AOD. The current temporary bridge soffit is set at 19.02m AOD. The normal retention level for the river through this section is controlled by the Environment Agency's Operations Team and Twerton Sluice and is

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15.50m AOD. This level is only changed via the radial gate at Twerton if high flows are expected or due gate failure. As such the risk of flooding during the site works is low.

We will also ensure that our works do not have a negative impact on the River Avon; both in terms of ecology and water quality. As outlined in section B, we have attempted to minimise the amount of cutting and paint removal completed directly above the channel. There will need to be a small amount of these works completed in situ to release the bridge sections. We have completed initial trials in our workshop of an under slung trough unit that will be attached directly below the area to be blasted and then cut. The blasting will be completed by a hand held vacuum blasting unit, which removes the existing paint system using an inert aggregate medium. The majority of this medium during the trials is removed by the vacuum. The small percentage which is not removed will be caught by the trough rather than fall to the river below. This process has been trialled in our workshops and the safety boat will be used to monitor the first instances to ensure that the success in the trials is fully translated to site.

Following the blasting of each section, the vacuum will be used to remove the material from the trough before moving on. The trough system is approximately 300mm in depth, and so will reduce the clearance beneath the bridge by the same amount. However, the trough will only be in position during blasting works, and in discreet areas so the impact on clearances is negligible.

We will provide the Environment Agency with 24 hour contact details to pass on to their Flood Incident Duty Office (FIDO) to have available if the need to notify a flood event is required. Our details will also be included on the Environment Agency's operational constraints log.

Some photographs of the trough trial are included in appendix 5.

## C.7 Bath Western Riverside

The Bath Western Riverside development, underway with Crest Nicholson represents a significant investment in this area of Bath. We recognise that as our works progress, so will the construction works.

We will hold regular coordination meetings with our counterparts at Crest Nicholson to ensure that our site activities are well planned to avoid disrupting one another. We will ensure that all of our site access routes are well signed, and the demarcation between the two sites is clear.

As the development progresses, the construction site becomes a residential area. As each area is opened for occupancy we will ensure that all Bath Western Riverside residents are aware of our works and how to contact the project team.

## APPENDICES

Appendix 1 – Site Layout Plan and sketches

Appendix 2 – AECOM Permanent Works Drawings

Appendix 3 – Balfour Beatty Temporary Works Drawings

Appendix 4 – Archaeology Scope

Appendix 5 – Photographs

Appendix 6 – Phase 2 Outline Programme

Appendix 7 – Closure Schedule

Appendix 8 – Design and Access Report