

Cochlea Unwound: A sonic crystal listening aid
Public Art Statement

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Cochlea Unwound: a sonic crystal listening aid

Location:

The site is on the West bank of the River Severn, grid reference, easting 384604 Northing 253529 and the national cycle network route 45 runs between the site and the river bank

Drawings:

Context Plan	033 L01	1:2500	@A3
Existing site plan	033 L01	1:200	@A3
Proposed site plan	033 L02	1:200	@A3
Proposed plan	033 L02	1:50	@A3
Proposed section	033 L03	1:200	@A3
Proposed elevation (NE)	033 L04	1:50	@A3
Proposed elevation (SE)	033 L05	1:50	@A3

Supporting Documents:

Liminal, *Final report on Tranquillity is a State of Mind*, 2010
 Liminal, *Organ of Corti Impact and Evaluation report*, 2011
 Sustrans, *Evaluation Report, Worcester Arts Project*, 2011



Fig 1: Organ of Corti



Fig 2: Listening at Organ of Corti



Fig 3: Organ of Corti and the weir

Approach

Cochlea Unwound will be a permanent artwork sited on the West bank of the River Severn near Diglis Weir, Worcester. It takes the sound of the weir and filters it using the acoustic phenomenon of a sonic crystal, so that visitors to the structure can listen to the noise of the weir filtered into bands of sound, that shift perceptibly as they move around and through the structure. The overall dimensions of the structure will be 4 meters tall, 1.8 meters deep and 6 meters in length. It will consist of an array of cylindrical, sound and light reflecting columns, which will be cantilevered from the ground.

Cochlea Unwound is the permanent realisation of a previous work called *Organ of Corti* that was sited temporarily on the banks of the River Severn in the summer of 2011. The ideas and themes come directly from *Organ of Corti* an experimental instrument that recycled noise from the environment.

Cochlea Unwound does not make any sound of its own, but rather attempts to draw our attention to the sounds already present by framing them in a new way. Like *Organ of Corti* it is also named after the organ of hearing in the inner ear and uses the acoustic technology of sonic crystals to accentuate and attenuate frequencies within the broad range of sound present in the falling water of the weir. By recycling what people might consider surplus sounds from our environment and by adding nothing to the existing soundscape *Cochlea Unwound* offers new ways of listening to what is already there. This instrument is a device that, rematerializes our experience of sound, inviting us to “listen to ourselves listen”

Cochlea Unwound addresses the guidance set out in Worcester’s Public Art Policy and also supports the City’s vision set out in their masterplan to support the establishment of the river as key destination for leisure and recreation. Building on the work that has already been carried out as part of the ‘Worcester Water Front Project’ the installation of *Cochlea Unwound* contributes to the wider aspiration to have public art on the riverside and encourage movement along the riverside paths.



Fig 4: Organ of Corti, Worcester, Summer 2011



Fig 5: Twenty Feet to an Inch



Fig 6: Twenty Feet to an Inch

History and Context

Research and Development

In 2008 Liminal a partnership between architect Frances Crow and sound artist and composer David Prior were commissioned by Sustrans to develop a proposal for an artwork on the National Cycle Network in the Worcester area.

Liminal's work explores the relationship between sound, listening and the environment. With Sustrans they received funding from the Wellcome Trust to research and develop a project called *Tranquillity is a State of Mind: Listening Aids for a Listening Impaired Society*, which explored the relationship between noise in the environment and health and wellbeing. Through a process of dialogue with an acoustician, audiologist and neuroscientist, Liminal developed a proposal for a 'sonic crystal listening aid' for the site next to Diglis Weir in Worcester, called *Cochlea Unwound*.

Feasibility and community engagement

In 2010 Sustrans received funding from the Arts Council to embed the ideas Liminal developed through the *Tranquillity is a State of Mind* project on the site and to engage the communities of Worcester. Through a project called *Twenty Feet to an Inch*, local Artist Rob Colbourne engaged over 20 community groups through a series of walks along the river bank.

In the summer of 2011 for 3 days in August, during the Worcester Music Festival, Liminal installed *Organ of Corti*. This was part of a national tour funded by the PRS for Music Foundation's New Music Award 2010 and over 1000 visitors came to see the structure at that time. The installation of *Organ of Corti* demonstrated that there was significant support for a permanent sonic crystal listening aid on this site and also increased the use of the riverside path significantly of the weekend of its installation (Sustran's, *Evaluation Report, Worcester Arts Project*, 2011).



Fig 7: Looking North towards Organ of Corti and the weir

Organ of Corti, has received national and international recognition within the sound-art, music and acoustic communities. Having won the PRS for music Foundation's New Music Award 2010 it went on to receive the Noise Abatement Society's John Connell innovation award 2011. Organ of Corti has been covered in national and international newspapers and specialist journals and featured in radio and television broadcasts. It continues to receive attention from international media and recently received an Honorary Mention at the international Prix Ars Electronica Digital Music and Sound Art awards in 2011 and was shortlisted for the Phonurgia Nova 2012 Awards, France.

Community Consultation

Since 2008 the local community have been directly involved in the project, as part of this process we a Stakeholder group was set up who provided guidance and advice and continued support for the project.

Worcester City Council have been strong advocates of the project since its inception and have continued to provide guidance in terms of design and installation. The city park rangers, provided help with invigilation and the installation of *Organ of Corti*.

The Public Art Panel have formally expressed their support for a permanent artwork as a development of the *Organ of Corti* project and early negotiations with Nick Kay, from development control have been positive. The Environment Agency has been kept up to date with the progress of the work and the Conservation Advisory Committee have been made aware of the project.

The Worcester city museum service supported the installation of *Organ of Corti* and provided space in their Commandary building for an evenings presentation about the work. The George Marshall Medical Museum and the new Infirmary Museum have both agreed in principle to work with *Cochlea Unwound*, including the artwork in their education programmes. We will continue working with these agencies to integrate the structure within the wider cultural life of Worcester.

Severn Trent Water, provided access to their land for a new tarmacked area for *Organ of Corti*, this was installed as part of the on-going Connect 2 work carried out by Worcestershire County Council. Severn Trent Water also provided access to the river path, through their land so that *Organ of Corti* could be installed over the August weekend. Severn Trent Water are continuing their support for the installation of this artwork by agreeing in principle to move their boundary fence back so the area surrounding *Cochlea Unwound* can become part of the public realm and landscaped accordingly.



Image © Google

Fig 8: Diglis Island on river Severn showing location of site for structure

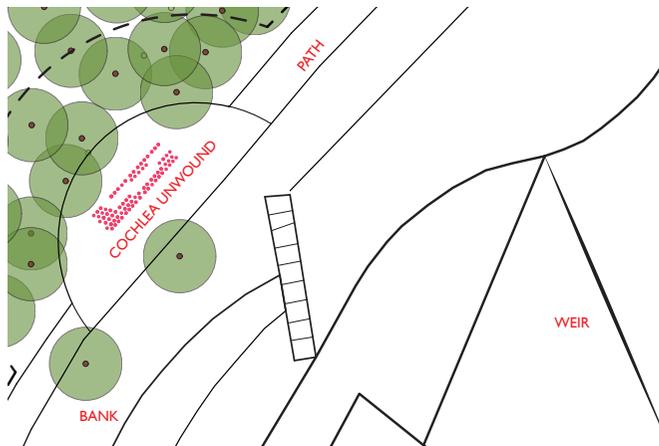


Fig 9: Plan showing location of Cochlea Unwound in relation to weir

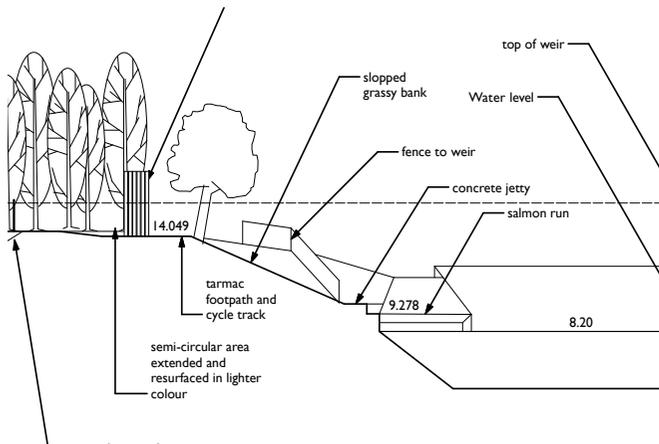


Fig 10: Extract from drawing L03 showing section through site

Site

The site is on the West bank of the River Severn, grid reference, easting 384604 Northing 253529 and the national cycle network route 45 runs between the site and the river bank. Walkers and cyclists use the path on a regular basis.

The path is unlit at night and outside the main city centre area. The site is directly opposite the Diglis Weir and the Diglis Island and is visible from the new Diglis Bridge. The Anglers Club have their hut behind the Severn Trent fence to the South of the site and use the concrete Jetty below the path. The new structure will not interfere with this amenity.

In 2011 Severn Trent Water provided access to their land for a new semi-circular tarmacked area for the temporary prototype *Organ of Corti*. The furthest edge of this tarmacked area was 4 meters behind the existing fence line. The fence to their property was moved so that it aligned with the edge of the new tarmacked area. Worcestershire County Council as part of the on-going Connect 2 work carried out this work.

The permanent structure will sit within the new semi-circular area. Severn Trent are amenable to their fence moving back from the edge of the semi-circular hard-landscaped area to provide an area of soft-landscaping as a back drop to the new artwork.

Site Constraints

8-meter easement

There is an 8-meter easement to allow access for the Environment Agency to maintain the riverbank. We have addressed this requirement for access by siting the permanent sonic crystal listening aid behind the original line of the Severn Trent fence.

Flooding

Cochlea Unwound is sited within the river Severn flood plain and has been designed to address this flood risk. A Flood Risk Assessment is included under a separate cover and shows that the structure does not impede flood flow and that the compensatory excavations will mitigate any loss of flood storage capacity.

Heritage and Archeology

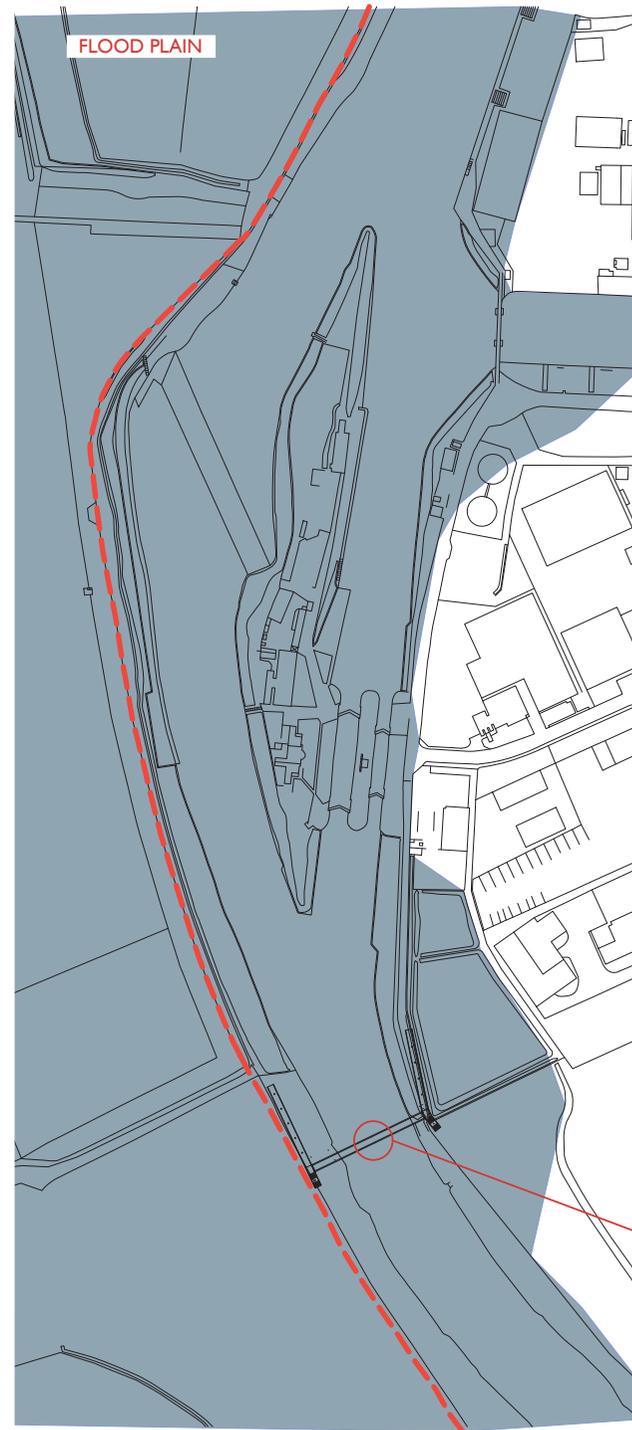
The site is within the Riverside Conservation Area and is located opposite Diglis Island, upon which there is a listed building towards the Southern end. The small scale of *Cochlea Unwound* and its location means that it does not effect the environs of the listed building or the character of the riverside conservation area. It is understood that the site is within an area that may have significant archeological features and the depth of the foundations for the structure will be kept to a minimum.

Environmental Assessment

The riverbank is a rich wildlife habitat, and the small scale of the installation and the precise location will not have a negative impact on any protected species. An environmental survey is included under separate cover.



Diglis Pedestrian and cycling bridge

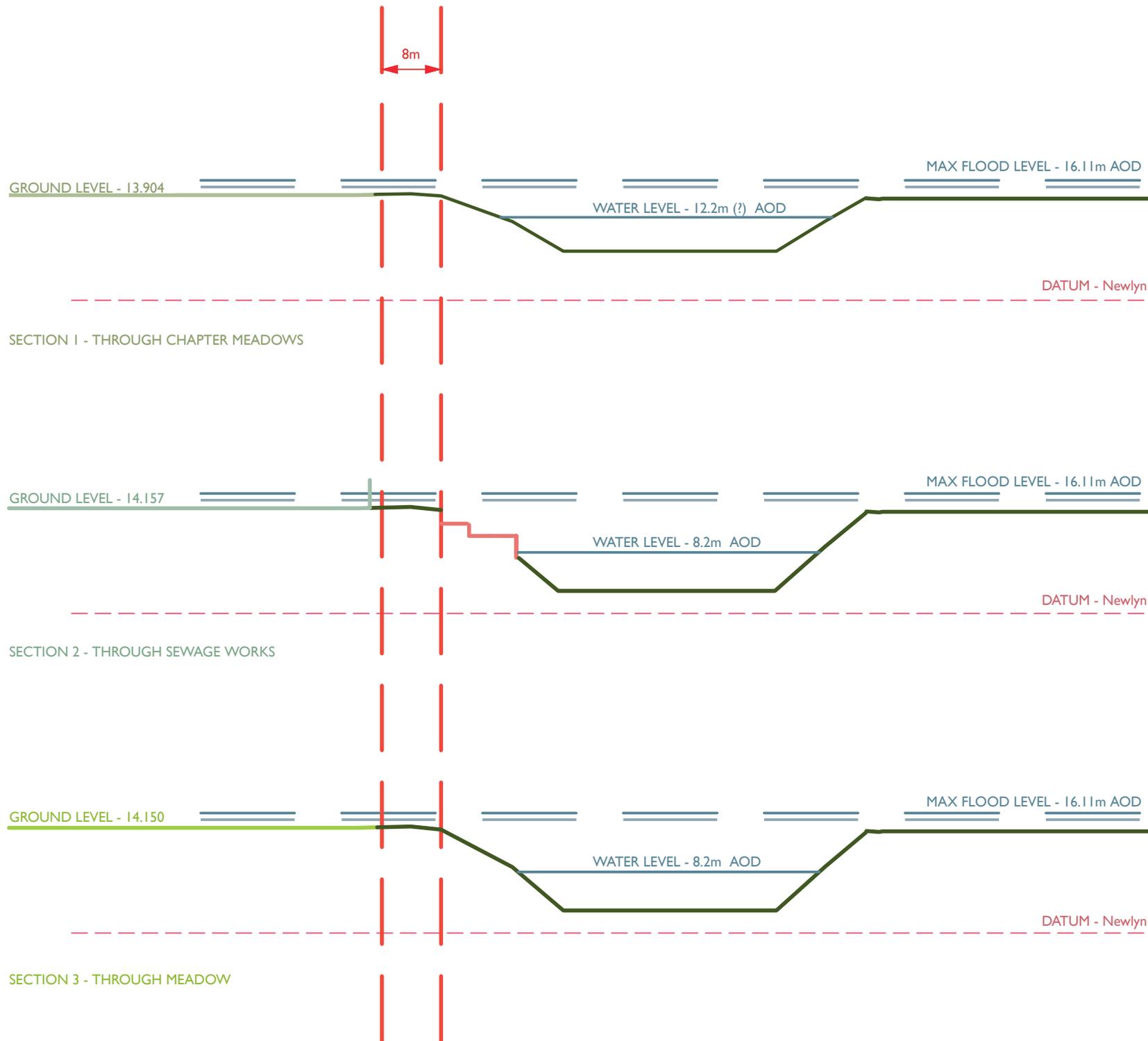


Diglis Pedestrian and cycling bridge

SITE CONSTRAINTS - PLAN

- Anglers Association leased from Severn Trent
- Chapter Meadows Duckworth Trust
- Sewage Works Severn Trent Water
- Meadow Privately Owned
- Flood Plain
- 8 meter easement

SITE CONSTRAINTS - SECTION



- Anglers Association leased from Severn Trent
- Chapter Meadows Duckworth Trust
- Sewage Works Severn Trent Water
- Meadow Privately Owned
- Flood Plain
- 8 meter easement

River Severn hydraulic model at SO 84713 53178:

- 100 year - 15.21m AOD
- 50 year - 15.06m AOD
- 25 year - 14.92m AOD
- 10 year - 14.70m AOD
- 5 year - 14.56m AOD

bridge design level 16.11m AOD

100 year + Climate change 350mm 15.56 AOD

Cross section of river bed in Sections 1 and 2 nominal.

Cross section of river bed in Section 3 taken from WCC cross section of river for bridge design



Fig 12: Artist impression of Cochlea Unwound

Design

Materials and Structure

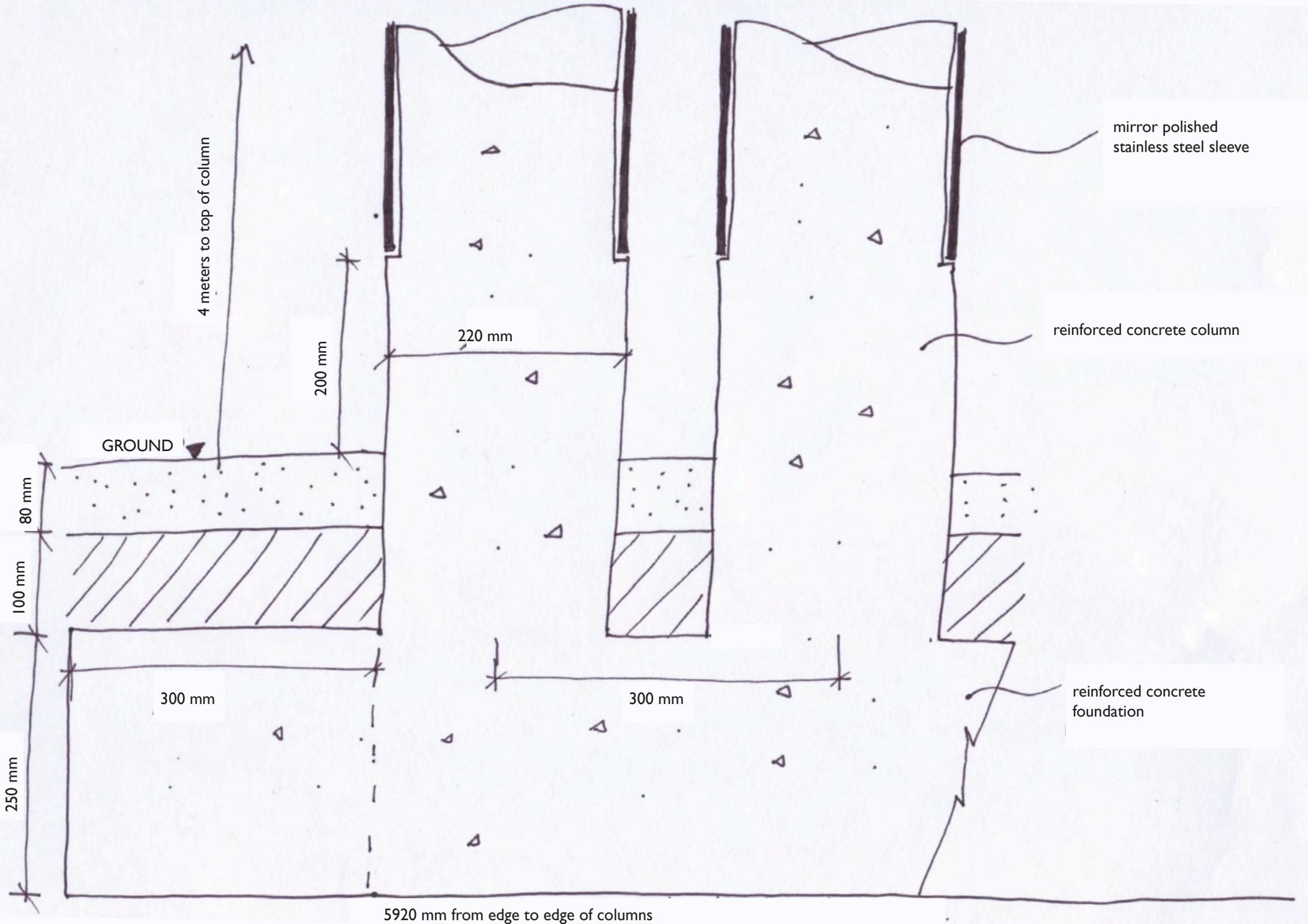
The structure will consist of 79 vertical columns fabricated from bright polish mirrored stainless steel (see sample) that will reflect both the noise of the weir and light from the surrounding landscape. The columns will be cantilevered from the ground providing a level access between, behind and in front of the columns. These steel sleeves will be supported on reinforced concrete cylinders cast into a reinforced concrete foundation, 250mm deep by 6520mm long by 2500mm wide. The concrete cylinders inside the steel sleeves will extend up to shoulder height to prevent vandalism. The steel sleeves will be capped to prevent water ingress and will sit 400mm above ground level so that they are not adversely affected by splash-back from rain-fall. (See sketch on following page)

The Open University Acoustics Research Group has worked with Liminal to develop the design of the sonic crystal array for *Organ of Corti* and will work with the design team on the permanent structure for the Worcester site.

Landscaping

Cochlea Unwound will be located next to the National Cycle Network route 45 and within the semi-circular tarmacked area. We will work with the City Council's Heritage and Planning team to develop a sensitive installation. The semi-circular area will be extended out into the existing pathway and resurfaced with a lighter resin bonded tarmac surface. Two benches will be located under the trees within an area of low level native shrubs and be reached by a bark-mulch pathway which will eventually wear away into a well worn path.

Signage and interpretation will be located at either side and to the edges of the semi-circular area and act as warning bollards to approaching cyclists. There is no power at the site, so the structure will be un-lit. These interventions will create an enjoyable environment for visitors to *Cochlea Unwound* and will support the existing flora and fauna of the area and provide an attractive, robust, flood and vandal proof landscaping scheme.



Disabled Access

Access through and around the structure will be level. The pathway through the structure is not accessible for wheelchair users, but the effect the structure has on the aural landscape can be experienced from behind and to the sides too. The structure is designed to change the aural environment and partially sighted and blind visitors to the Organ of Corti enjoyed the fact that it could be appreciated aurally. Links with New College Worcester have been made during the development of the project and will continue once the project is on site.

Health and Safety

The artwork will be designed so that it meets building regulations where relevant and does not provide a health or safety risk to visitors. There is a risk that people may climb the structure and the design will compensate for this by choosing robust and vandal proof materials.

Design Life

Cochlea Unwound will be designed as a permanent artwork as part of Sustran's successful programme of permanent artworks on their national cycle network. It will be designed so that when it is decommissioned the elements can be disassembled and recycled.