

Baffle Structure - Outline Maintenance Requirements

Project Bridgewater Place
Subject Baffle Structures Outline Maintenance Requirements
Project no 032543
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Revision	Description	Issued by	Date	Approved (signature)
01	Tender Issue	SEF	11/12/14	SC
02	Updated to address council comments	SEF	20/02/15	SC
03	Baffle lighting removed	KL	29/01/16	SC

1.0 Design and Drawings

1.1 Overview of Design

The baffles are portal structures over Water Lane, Leeds, with a framework that supports perforate metal cladding on one side. The function of the baffles, together with the proposed sails and canopy, is to withstand the effects of the design wind load in the vicinity of the Bridgewater Place building.

The design life of the structures is 120 years.

Sustainable and low embodied energy materials will be used where possible. All steel components of the superstructure shall be manufactured from recyclable materials. In particular, the main component, steel is 100% recyclable after use.

The specification for painting exposed steel surfaces will require the use of paint systems selected for optimum durability, appearance, cost and environmental suitability.

The baffle structure will comprise steel grade S355J2G3 to BS EN 10025 or S355J2H to BS EN 10210. Mild Steel may be used for certain secondary components. All outer steel surfaces to be painted in accordance with the MCHW. The structures will be classed as "difficult access" and hence protection system type II will be specified. No additional treatment will be provided within closed sections, which will be continuously sealed by welding.

Baffle cladding is anticipated to comprise stainless steel or marine grade aluminium with no additional protective treatment. Continuous openings will be provided along the bottom of baffle to prevent debris accumulation and allow for drainage

Connections in the primary structure will be generally made using high strength friction grip bolts or by welding. The steelwork for the bridge superstructure will be prefabricated off-site as far as possible, in factory conditions. The structure will be proportioned to allow it to be delivered to site in large pieces with little or no requirement for site welding.

Bird roosting will be discouraged by avoiding flat surfaces or recesses within the baffles. The possible benefits of additional anti-bird measures (mesh, "pigeon glide", spikes, electric track, spring wire, netting, gel, sonic systems) will be evaluated.

All foundations shall be constructed from reinforced concrete and be inherently durable.

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The structures are fully integral and do not incorporate any bearings or movement joints that would require maintenance.

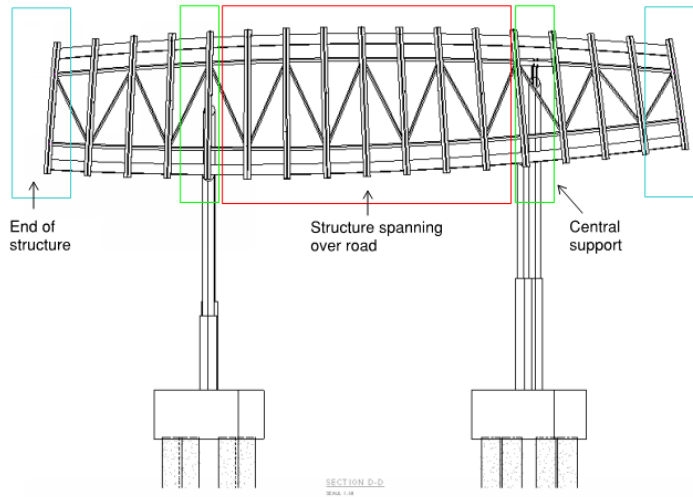
Refer to baffle drawings for further details.

2.0 Operation & Maintenance

2.1 Inspection, Test, Cleaning & Maintenance Plan

2.1.1 Access

Proposed Access Routes to Baffles Site:



<i>Location</i>	<i>Proposed Access Route</i>
Ends of Structure	On foot via footways
Central Support	On foot in conjunction with partial lane closure of road, if required
Structure spanning over road	Mobile elevated work platform located in Water Lane in conjunction with partial lane closure of road

Access Equipment:

The following table summarises the proposed method of access for inspection and minor maintenance activities of the various baffle elements. Access requirements for major maintenance activities are described in the relevant sections later in this report.

<i>Location</i>	<i>Proposed Access Methods</i>
Ends of Structure	Temporary tower scaffold
Central Support	Mobile elevated work platform located in Water Lane in conjunction with

	partial lane closure of road
Structure spanning over road	Mobile elevated work platform located in Water Lane in conjunction with partial lane closure of road

Road Closures:

Certain inspection and maintenance operations will require partial road closure of Water Lane for safety reasons. It is not envisaged that full closure will be required, except during initial erection and future demolition of the baffle structures.

2.1.2 Inspection Requirements

The frequency of routine structural inspections required for the Baffles is as follows:

<i>Inspection Type</i>	<i>Frequency</i>
Visual (Superficial) Examination	Annual plus pre-high windspeed events.
General inspection (covering representative parts of the structure)	Every 2 years
Principal inspection (close examination of all elements)	Every 6 years

Reference should be made to Highway documents BD 63/94 and BA 63/94 for a detailed description of these activities.

2.1.3 Procedure for Visual (Superficial) Examination

The purpose of the annual superficial inspection is to identify any obvious deficiencies that might lead to accidents or high maintenance costs. It is sufficient to examine the structures from ground level and no special access equipment will be required.

The visual examination will be restricted to areas where access can safely be gained without a full or partial road closure. It would be carried out during the day without the need for artificial lighting provided there is sufficient daylight.

2.1.4 Procedure for General Inspection of Baffle Structures

The objective of the general inspection is to examine representative elements of the structure for signs of damage and deterioration.

In the case of the baffle structures, this would be expected to cover each of the supports as well as typical areas of the baffle superstructure.

It is not necessary to use special access equipment to get up close to all parts of the bridge soffit. As the underside can be viewed from the footways, no road closures are anticipated.

2.1.5 Procedure for Principal Inspection of Baffle Structures

The principal inspection necessitates a close examination of all accessible parts of the structures and therefore special access equipment will be required.

The areas of structure to be inspected above Water Lane would comprise the soffit and sides of the superstructure together with its associated cladding.

Partial road closures will be required and it may be necessary for work to be undertaken at night. In this event, an important consideration is the provision of adequate temporary floodlighting and lanterns.

It is envisaged that minor maintenance works to the bridge undersides may be undertaken at the same time as principal inspections in order to make optimal use of the access equipment and road closures.

3 Description of Basic Maintenance Operations

Generally the baffle structures have been designed and detailed with the objective of minimising future maintenance requirements. However, although the design life of the structure itself is 120 years, some components have a shorter life span and will require replacement.

3.1 Cladding [TO BE CONFIRMED BY CLADDING SUPPLIER]

3.1.1 Cleaning

The cladding will require routine cleaning during its life. Interior and exterior cleaning and removal of any accumulated debris will take place on a biannual basis (each spring and autumn, say).

3.1.2 Inspection

The cladding will be subject to close examination during the principal inspection of the top and underside of the structure every six years.

3.1.3 Replacement of Isolated Unit

The cladding shall be of a robust design, and isolated units will only require replacement as a result of an extraordinary event. This will be facilitated by detailing that permits removal and installation of discrete units.

As such replacement would be a rare and reactive item of maintenance; it is not included in the planned maintenance regime.

3.1.4 Replacement of Synthetic Materials

Synthetic materials such as silicone sealants and EPDM gaskets would have a typical design life of 25 years. The cladding system has been designed in such a way that replacement of these items can be undertaken without major disassembly.

3.1.5 Replacement

The cladding components will have a design life of not less than 60 years. When life-expired, the cladding could be replaced on a rolling programme of works along the length of the structure. The cladding units will be detailed so that they can be removed and replaced as single panels using lightweight plant i.e. a MEWP located in Water Lane. Partial lane closure of the road may be required.

3.2 Steelwork and Associated Protective Treatment

The baffle steelwork is protected by a paint system with a life to minor maintenance of 12 years and a life to major maintenance of 25 years.

3.2.1 Inspection and Minor Maintenance

Visual inspection of the baffle steelwork should be carried out by suitably experienced inspectors at least every two years. The baffle steelwork will be subject to close examination during the principal inspection of the top and underside of the structure every six years.

3.2.2 Cleaning

Steel surfaces contaminated with dirt or debris should, where practicable, be periodically cleaned with low pressure water washing. This can be included with the biannual cleaning of cladding.

The baffles have been detailed so that water run-off is controlled by means of drips and deflectors. Opportunities for roosting have been minimised.

The possibility of graffiti and vandalism exists and there may be a need to clean the steelwork.

3.2.3 Major Maintenance

Major maintenance will occur when the protective treatment is renewed. This will require removal of the cladding to allow access to all parts of the steelwork. Enclosure will be required and it is anticipated that scaffold access will be provided to facilitate the works.

3.2.4 Mechanical Damage

The baffle support columns have been designed to resist vehicle collision loading in accordance with relevant standards. In the event of mechanical damage, local treatment of the protective treatment may be required in order to preserve the structural durability. Any significant deformation of the steelwork will need to be structurally assessed by a competent engineer and remedial works determined on a case by case basis.

3.3 Concrete Elements

All concrete foundation elements are below ground and no maintenance requirements are anticipated during the design life of the structures.

4 Summary Schedule of Anticipated Inspection and Maintenance Requirements

<i>Ref</i>	<i>Activity</i>	<i>Frequency</i>	<i>Partial Road Closure</i>
Overall Structure	Visual Examination	Annual	No
	General Inspection	Every two years	No
	Principal Inspection	Every six years	Yes
Cladding	External cleaning and debris removal	Biannual	Yes
	Inspection and minor maintenance	Every six years	Yes
	Replacement	Every 50 years	Yes
Steelwork and Associated Protective Treatment	Inspection and minor maintenance	Every six years	Yes
	External cleaning and debris removal	Biannual	Yes
	Major maintenance	Every 25 years	Yes

5 Specialist Wind Inspection Requirements

Since the baffles work in conjunction with a number of other canopies and screens adjoining Bridgewater Place to reduce wind speeds within Water Lane, individual cladding panels are able to be removed on a rolling programme without significant effect on the efficiency of the baffles.

In the event of a major incident causing damage to more than one porous cladding panel on a baffle, or damage to a combination of baffles, or damage to a combination of baffles/canopy/screens on Bridgewater Place, advice should be sought from a suitably qualified wind engineer to ensure that the wind mitigation is maintained.

Should works be required to a number of baffles at the same time, or to a combination of the baffles/screens/canopies, advice should be sought from a suitably qualified wind engineer to ensure that the wind mitigation is maintained.