

# ACEI Design Excellence Awards 2018 Nomination Form

Category (1) Bridges Category (2) Other Civil Projects Category (3) Innovation Project (all disciplines) Category (4) Overseas Project (all disciplines)

### **Company Details**

Contact Name:	Brian Madden/ Daniel O'Keeffe
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Categories/Groups:			
Project Category: Bridges 🛛	Other Civil Projects 🗌	Innovation	Overseas 🗌
<b>Project Group:</b> SMALL Project (under €2.5m)	MEDIUM Project (€2.5m - €2	10m) 🛛 LARGE Pro	o <b>ject</b> (over €10m)

## **Project Information:**

Name of Project:	Leamouth North Footbridge	
Location:	London, United Kingdom	
Commencement date: January 2014 Completion Date: August 2015		
Client:	Ballymore Properties	
Contact:	Peter Halpenny Tel: +44 7876 234 989	

### **Design Team:**

Architect	N/A
Contact	Email: N/A
Contractor	John Sisk and Son Ltd.
Contact	Pat Lucey Email: p.lucey@sisk.ie Tel: 01 4091500

Authorisation to contact above:	Yes	$\square$	No 🗌
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### Project Details:

## (1) Provide a brief outline of the project (Max 200 words):

Leamouth Bridge is a stunning red, long span lifting bridge in London. It was constructed as part of a wider development of the Leamouth Peninsula known as London City Island. It is a pedestrian and cycle bridge spanning the River Lea between the northern part of the peninsula and land adjacent to Canning Town Railway Station on the opposite river bank.

The bridge is a single span steel Pratt style truss which spans approximately 80m. There is a single truss, inclined at approximately 15° off vertical and the deck cantilevers from one side of the bottom chord. The deck is supported by steel frame abutments at both ends which are in turn on piled foundations. The bridge deck is elevated and is accessed at both abutments by a staircase and an elevator.

The elevated deck allows the passage of everyday river traffic, however the bridge also has a lifting facility to raise the deck to provide the clearances required by the Port of London Authority (PLA) for occasional taller vessels.

O'Connor Sutton Cronin (OCSC) were the bridge designer (Civil, Structural, Mechanical and Electrical) for the detailed design stage as part of the successful Design & Build consortium with John Sisk & Son Ltd.

# (2) Provide a statement regarding why this project might be considered award winning: (Max 300 words):

Leamouth Bridge provides a valuable link between London City Island and the transport hub of Canning Town Railway Station. The bridge deck is elevated such that access to the bridge deck is made by stairs and by elevator at both sides of the structure. In order to facilitate the passage of tall river vessels, the structure has a lifting facility. The deck can be lifted vertically by 4m by means of a pair of hydraulic rams at each abutment and a system of vertical guide rails and wheeled bearings ensures rotational stability during lifting operations. The rams are positioned symmetrically about the centre of gravity of the deck such that under normal lifting conditions the deck is in equilibrium under gravity loads and the guide rails are only required to resist effects of unbalancing forces such as wind. However the bridge is also required to be able to operate in the event of one of the pair of rams failing at either one or both ends. In this scenario the vertical guide wheels provide a horizontal force couple to resist the eccentric reaction of the single ram. ACEI Design Excellence Awards 2018



The bridge superstructure and abutments are constructed from steel. All structural steel elements were fabricated by Thompson Project Management in Carlow. The entire 80m bridge superstructure was constructed and painted in the Thompson's workshop. It was then cut into 3 sections and brought across to London by ferry. The structure was then reassembled on site and lifted into place with the use of the UK's largest mobile crane.

Due the fact that the structure moves, it is considered to be a machine under the Machinery Directive. As a result, the structure underwent a thorough review and approvals process to obtain the required CE Marking.

### (3) Provide further details of the project such as: design elements / procedures; complexities involved; innovation aspects; site management and supervision; health & safety issues; project cost controls and any other relevant information (Max 500 words):

Given that the structure was fabricated in Ireland and had to be brought across to the UK and reassembled, dimensional accuracy in the design and fabrication process was of paramount importance. OCSC's Design Engineers worked closely with Thompson Project Management Ltd. to ensure that all fabricated elements were co-ordinated. Co-ordination was also required with the site engineers from John Sisk & Son Ltd. to guarantee that all elements were set-out correctly. This was particularly important in advance of the bridge being lifted into place. There was only 1mm of tolerance between the guide wheels on the bridge superstructure and the guide channels in the bridge abutments.

Prior to the bridge lift, considerable effort went into evaluating how the 200t Bridge should be lifted into place. Lifting points were designed and checked in conjunction with the main contractor, steel fabricator and crane supplier. A trial lift took place the day before the event to ensure that everything was correct. The location of the centre of gravity was very complex and required calculations backed up by site trials.

The design of the structure also required input from Mechanical, Electrical and Hydraulic Design Engineers. The structure required a plantroom on each side of the bridge to house the hydraulic power pack and electrical control system to operate the structure. The bridge also has lighting and there is an elevator at both abutments.

An operating procedure for the structure had to be prepared as part of the design. The Port of London Authority (PLA) who are responsible for the safe navigation of vessels through the River Lea had certain requirements which needed to be catered for. A river traffic signalling system had to be installed and synchronised with the bridge operating system. When the bridge is being raised and lowered, pedestrians and cyclists are not permitted on the structure. To prevent ACEI Design Excellence Awards 2018

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access on to the structure, gates are required at both sides of Leamouth North Footbridge at the bottom of the stairs i.e. at ground level. The bridge deck cannot be raised without the gates being closed. Consideration also had to be made for ambulant and visually disabled residents of London City Island to ensure that they are kept safe at all times during the operation of the bridge.

The safety of the end user of the structure were also incorporated in the design with a series of guards installed to protect people from moving parts of the structure. The guards also act to protect the structure from vandalism,

A Commissioning Plan was written to ensure that all required inputs for this multidisciplinary project were captured prior to commissioning of the bridge in the summer of 2015.

Throughout the project, OCSC carried out Designer's Site Representative duties which included site inspections, response to RFIs and attendance at site meetings.

It is unusual for a bridge to be also a machine! And so the requirements of the Machinery Directive added a complexity to an already difficult project.

Entries should highlight where possible the particular influence or benefit the project engineering design has on society and the wider environment.

### Please confirm by electronic or written signature that:

- (a) The supplied text may be used in any marketing material issued in connection with the awards.
- (b) Agreement has been received from the client and other stakeholders that the project can be inspected by the adjudicator and provide contact details as requested above for the relevant person to be contacted in this regard.

SMadde Daniel O'Keeffe.

Signed:

Firm: O'Connor Sutton Cronin Ltd. Project: Leamouth North Footbridge

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Bridge in elevated position

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Bridge prior to lift



Bridge lift in progress.

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Bridge in place on day of lift



Lifting lug in place (boot for scale) ACEI Design Excellence Awards 2018



### Videos

BBC News report on bridge installation

https://www.dropbox.com/s/elh3ekjg6ptks16/BBC%20News%20report%20on%20bridge%20instal lation.MOV?dl=0

London City Island Website http://www.londoncityisland.com/#