AJ SPECIFICATION

ROOFING & DRAINAGE

Foster + Partners
Robin Snell and Partners
Hugh Broughton Architects

THE BEATING HEART OF LONDON'S NEW FINANCIAL CENTRE

Project description

The Crossrail Place mixed-use scheme encompasses a public roof garden, retail spaces and the above-ground elements of the new Crossrail station at Canary Wharf. It features a distinctive, timber latticed roof, which cantilevers out over the waters of the North Dock at both ends.

Located adjacent to the HSBC tower and the residential neighbourhood of Poplar, the scheme connects two distinct neighbourhoods, providing retail amenities, shared public facilities and valuable open space.

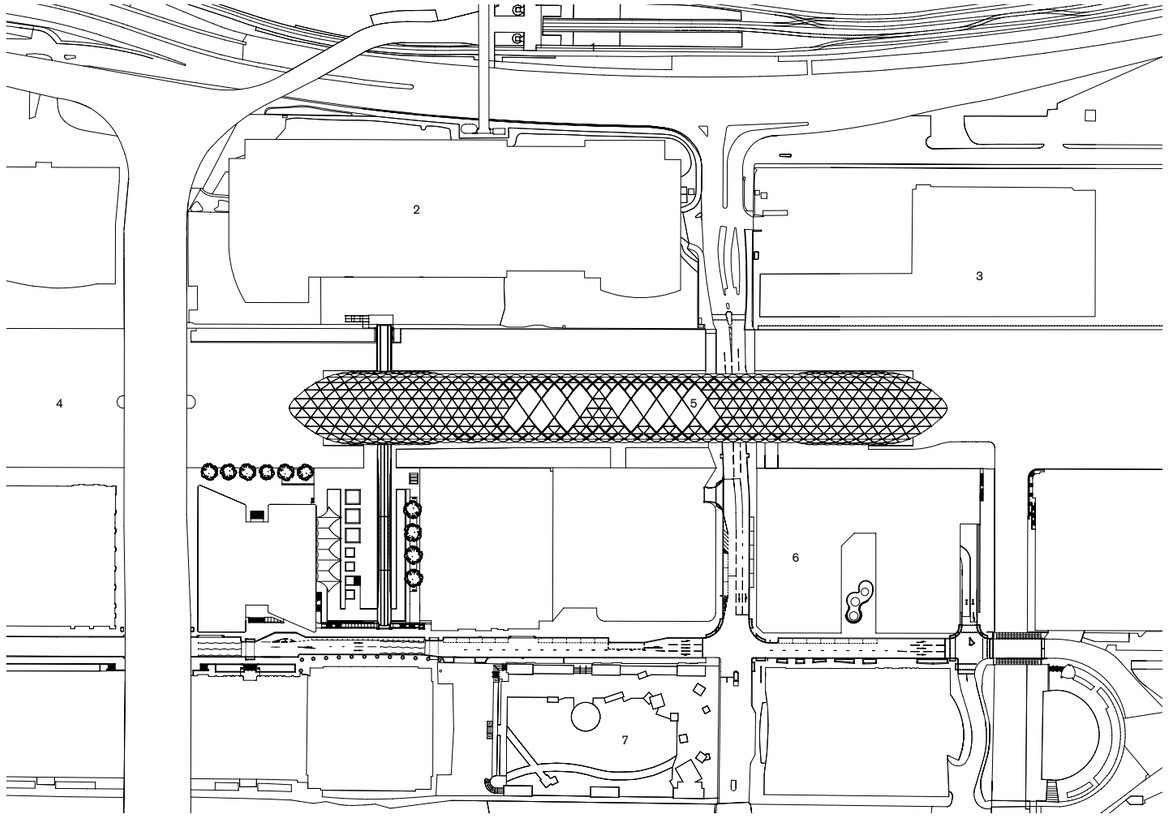
The 310m-long timber grid-shell arches over a large landscaped park, which lies at the heart of the design. The park is open from dawn till dusk and accessible from ground level via connecting bridges. The spruce beams support ETFE cladding with triangular cushions. The roof is partially open for views out and for natural irrigation, while also providing sheltered spaces so workers and residents can enjoy the park all year round. The planting includes some of the species that first entered Britain through the historic docks.

The area around the station is designed to encourage people's enjoyment of the new park and shops, creating a lively community facility. *Ben Scott, partner, and Jonathan Rabagliati, associate, Foster + Partners*

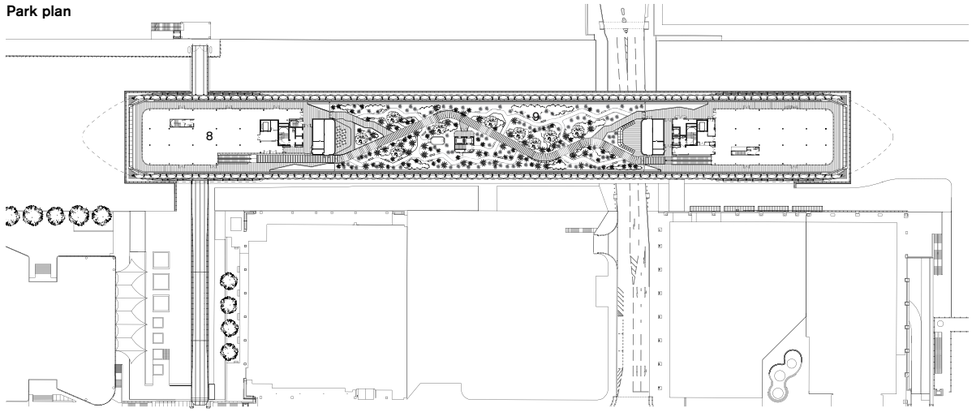
Photography by Nigel Young

Right Aerial view of the 300m-long roof
Previous page Cantilever at west end with fritting on ETFE cushions adjusted to control internal microclimate

Aerial plan

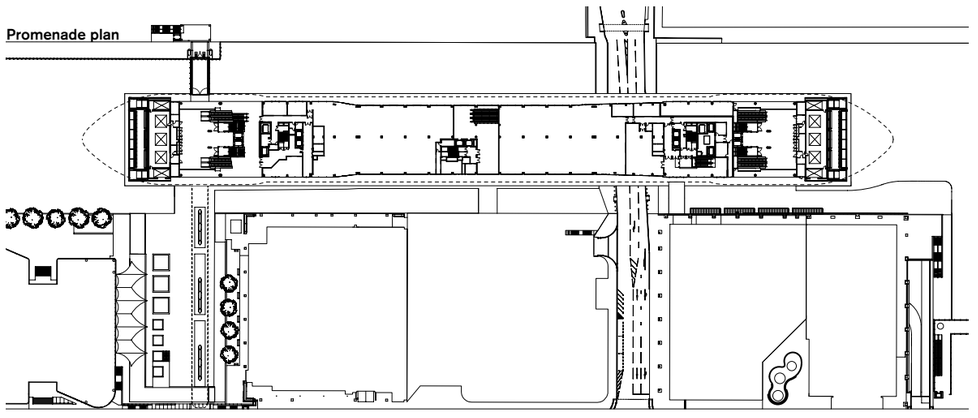


Park plan

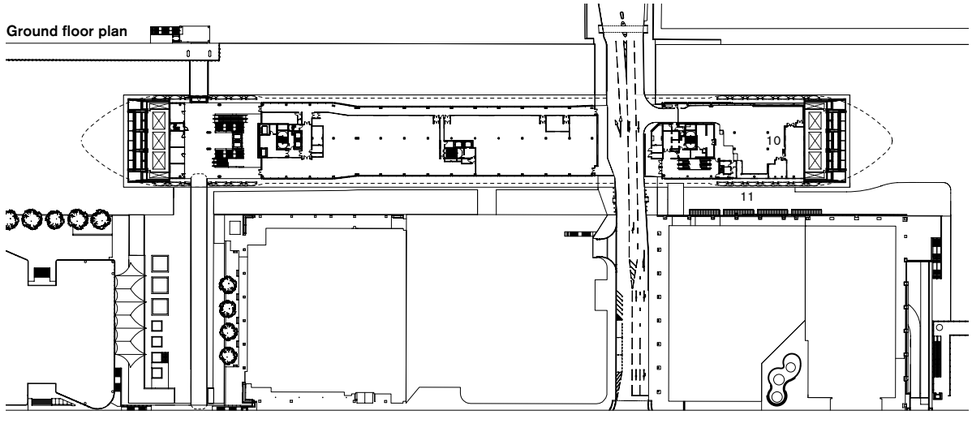


1. Poplar DLR station
2. North Quay
3. Billingsgate Market
4. North Dock
5. Crossrail Place
6. HSBC tower
7. Canada Square Park
8. Restaurant
9. Public roof garden
10. Catering
11. Walkway

Promenade plan



Ground floor plan

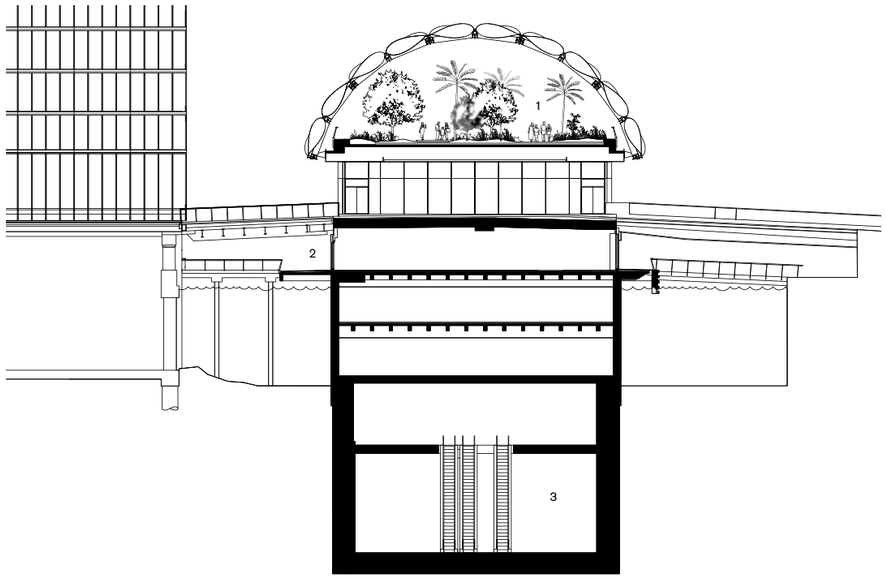


Project data

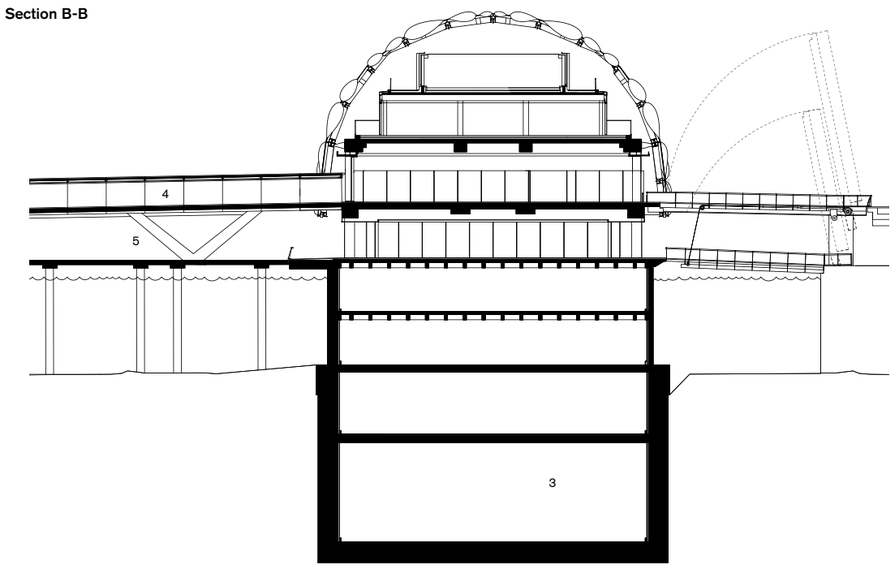
Park and retail opening May 2015
Park area 3,000m²
Architect Foster + Partners
Collaborating architect Adamson Associates Architects
Client Canary Wharf Group
Structural engineer Arup
Roof structural engineer Wiehag/Seele
Timber engineering consultant Haring

Bridge engineer MG Bennett
M&E consultant Arup
Landscape consultant Gillespies
Acoustics consultant Arup
Traffic/movement consultant Steer Davies Gleave
Facade access consultant Reef
Planning consultant DP9
Lighting consultant Maurice Brill Lighting Design
Access consultant Arup
Main contractor Canary Wharf Contractors

Section A-A



Section B-B

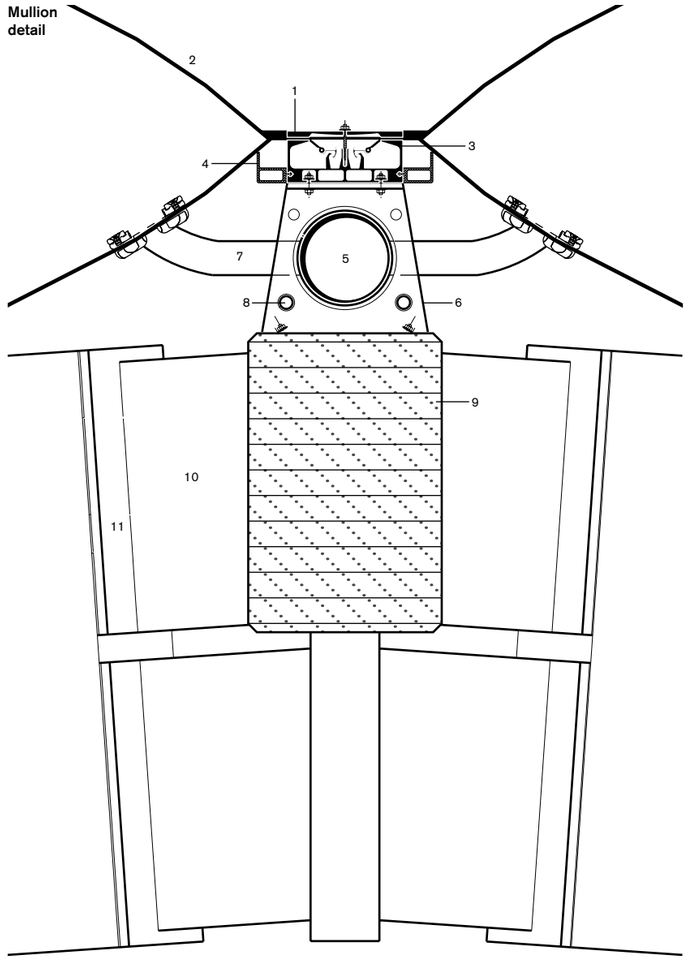


Opposite Aerial view of the 300m-long roof from the north-east, with 236m-high One Canada Square in background

1. Public roof garden
2. Walkway
3. Crossrail station
4. Enclosed footbridge
5. Open deck access

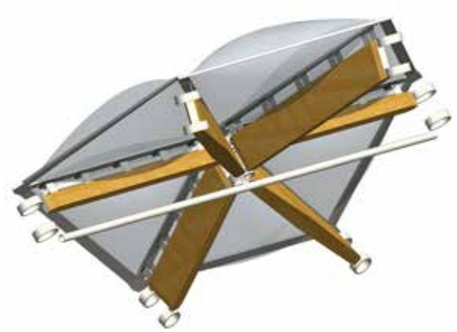
0 10m N

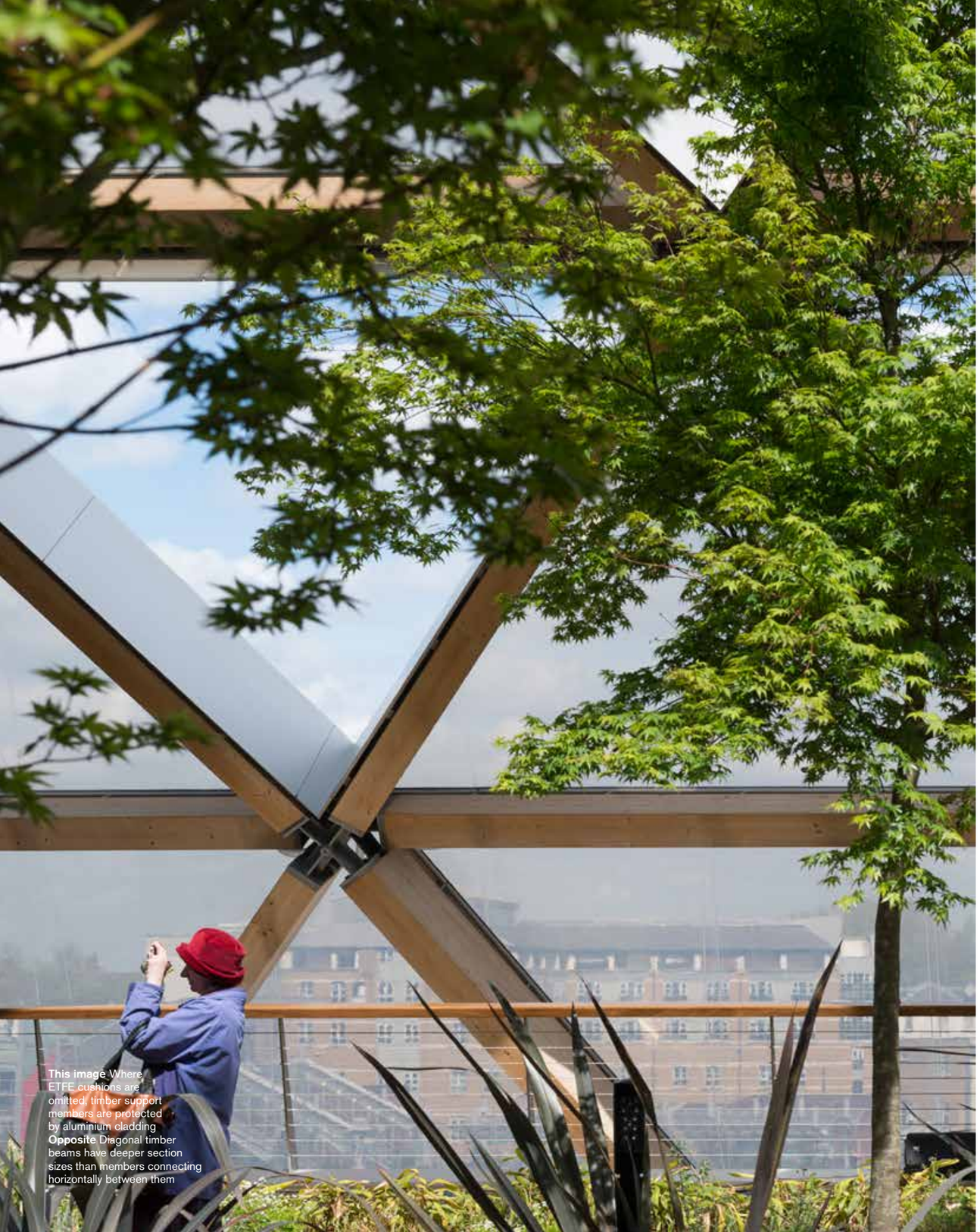
Mullion detail



1. Cover extrusion (aluminium anodised)
2. ETFE pillow
3. Base extrusion (aluminium anodised)
4. Condensation drip catcher (silicone)
5. Primary air pipe
6. Support bracket
7. Individual air pipe feed to ETFE pillow
8. Electrical services for lighting and CCTV cameras
9. Horizontal timber beam
10. Structural node (galvanised)
11. End plate (galvanised)

0 50mm





This image Where ETFE cushions are omitted, timber support members are protected by aluminium cladding
Opposite Diagonal timber beams have deeper section sizes than members connecting horizontally between them

Specification description

The visual simplicity of the roof design incorporates subtle variations in the underlying geometry, which accelerates outwards towards each end, generating dramatic 30m cantilevers. While all but four of the 1,418 glulam beams are straight, they vary in structural grade, depth and length.

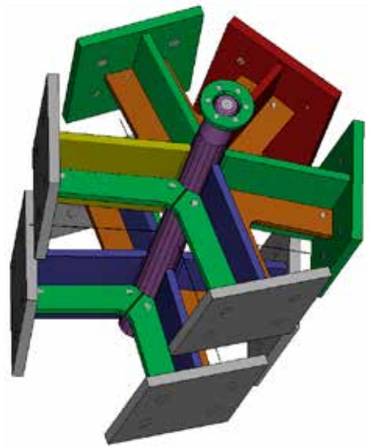
For the steel node connections, the degree of geometric complexity is larger. Of the 564 nodes, more than half are unique in geometry. Similarly, the 777 ETFE cushions occupy 302 different shaped triangles. With ETFE air pipes integrated into the structure, the whole system is a carefully integrated design.

A key feature of the project was that rather than conceptually considering typical or atypical conditions, all the nodes, beams and cushions were designed and fabricated as one parametric family. This approach and the use of scripting was also adopted by specialist ETFE and timber contractors. This permitted the exchange of data sets and geometric rules facilitating the gradual refinement of the design through successive digital and physical prototypes.

This underpinned the project's success and allowed an unprecedented level of precision through design, fabrication and installation. As a result, the completed timber structure was – across its 300m base-span – just 5mm out at each end.

Ben Scott, partner, and Jonathan Rabagliati, associate, Foster + Partners

Single node CAD drawing



View from south-west, with cantilever generated by subtly accelerating the geometry of the underlying roof structure