利物浦博物馆
Museum of Liverpool

建筑设计 3XN
地址 Mann Island, Liverpool, United Kingdom
客户 National Museums Liverpool
面积 13,000m^2
工程设计 Buro Happold

由丹麦事务所3XN设计的利物浦博物馆于2011年7月19日正式建成开幕。它不仅向我们述说了作为世界上最重要的港口的作用，或者 “披头士现象”的文化影响，而且将成为世界各地参观者的聚焦点。正如建筑师Kim Herforth Nielsen所说，设计本身超越了建筑或是博物馆的功能。

严格的创作过程

利物浦博物馆是英国近百年来准备修建的最大的国家博物馆，坐落在世界遗产名录地区，与利物浦著名的Three Graces相连，建筑师一开始就充分考虑到其巨大的挑战。这也是这家丹麦事务所25年历史上接受到的最大的项目。创作过程非常严格，广泛听取了市民意见并将其作为优先考虑的因素，同时建筑师还认真研习了利物浦的城市历史与博物馆建设基地的历史。

在此基础之上，我们设计了一个动态的低层结构，并与海港长廊周边的高层建筑形成互动，这有利于形成一个现代充满活力的城市空间。建筑意向让人联想起以前停泊于港口的商船，同时立面

浮雕图案对Three Graces历史建筑细部提出了新的注解。巨大的山墙窗口朝向城市和港口，因此象征性地将历史引入博物馆，同时也满足了参观人的好奇心。

连接点

博物馆坐落于利物浦中心区的默西河岸，将是今后重要的地区节点，连接海港长廊与阿尔伯托码头，后者目前包括了餐饮、博物馆和商铺等功能。在利物浦博物馆周围的室外空间布置了供游客休息的座椅，拥有良好的景观，成为动态城市环境的一部分。博物馆中庭充分体现了设计的主题，标志性的旋转楼梯直接将游客带入画廊，增强了社区互动性。综合考量所有这些功能后，建筑师决定

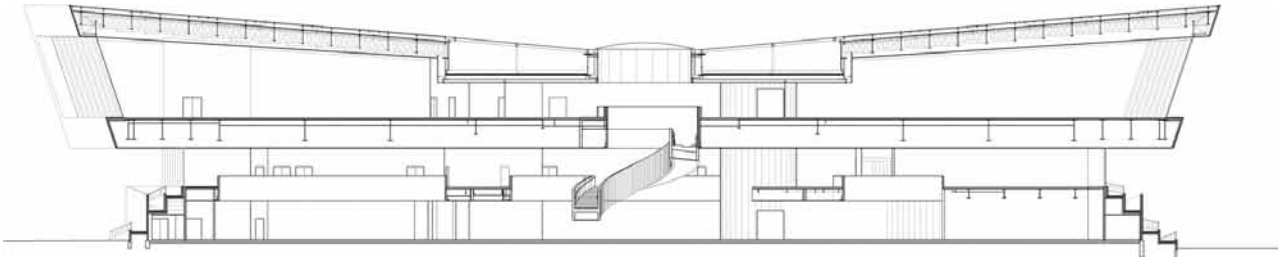
3XN's Museum of Liverpool: More than a Building, More than a Museum

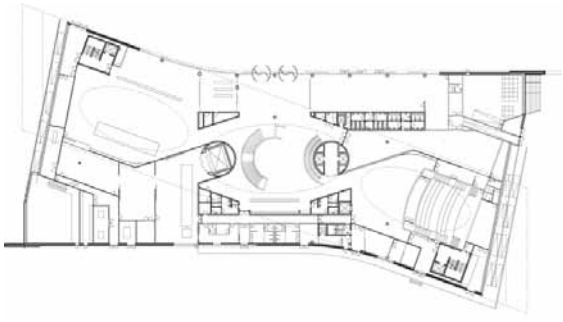
The new Museum of Liverpool, opening on July 19th will not only tell the story of its importance as one of the World's great ports or about its cultural influence, such as with the Beatles phenomenon. It will also serve as a meeting point for History, the People of Liverpool and visitors from around the globe. Therefore, according to the Architect, Kim Herforth Nielsen, the structure functions as much more than just a Building or a Museum.

The Result of a Rigorous Process

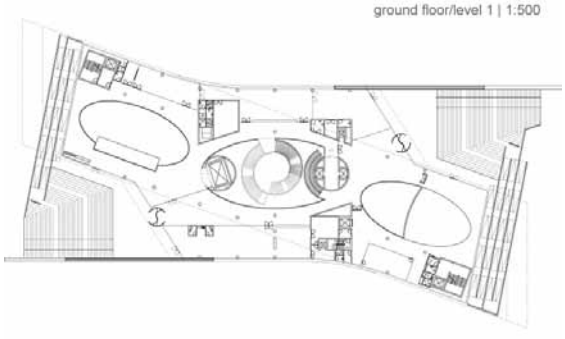
As the largest National Museum to be built in the UK in over 100 years, and situated on a UNESCO World Heritage Site next to Liverpool's famous 'Three Graces,' Principal Architect and Creative Director at 3XN Kim Herforth Nielsen was fully aware of the magnitude of the challenge, when it came to designing the new Museum of Liverpool.

This is one of the largest and most prestigious projects in 3XN's 25 year history.

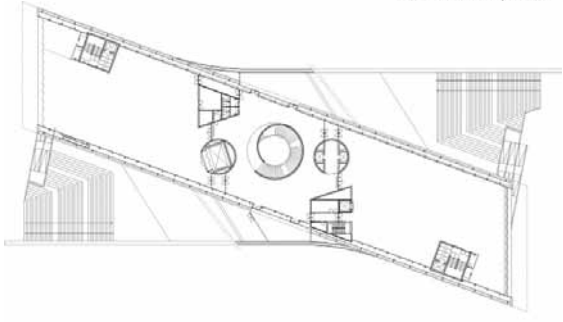




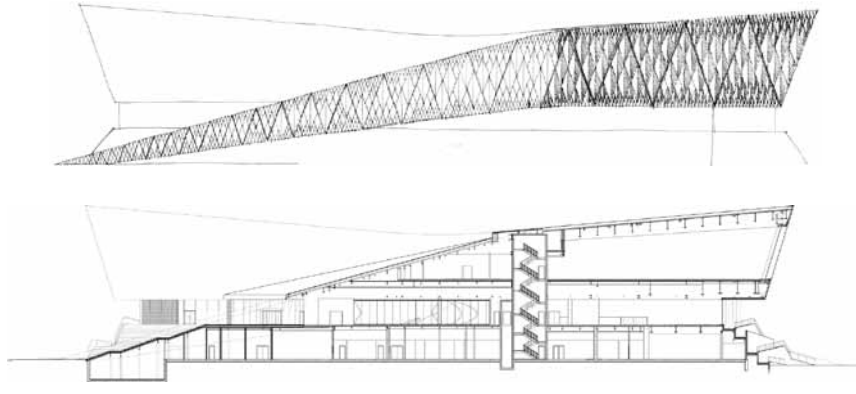
ground floor/level 1 | 1:500



first floor/level 2 | 1:500



second floor/level 4 | 1:500



将设计定义为连结利物浦的结构。

2004年秋季由3XN和Buro Happold联合组成的团队在利物浦博物馆的设计竞赛中胜出，2006年正式动工兴建。中标方案是一个三层建筑，包括一系列的公共画廊、交通空间和私密空间。公共入口位于建筑的一、二层。后勤空间包括员工住宿，装货间、贮存和机房。

10m高的画廊空间、9m的悬挑空间、面积超过8 000m^{2}的展览空间，都使项目面临复杂的结构挑战。设计提供了一体化的工程设计方法，使结构与功能服务结合为一体，在创造节能、低碳的解决方案的同时满足了建筑美学的要求。

螺旋楼梯

建筑中心最具特色的就是只在底部和中层楼板局部支撑的巨大旋转楼梯。它就像H型截面梁，由混凝土现场浇注而成。

混凝土楼梯支承在一些构件上面，楼梯两侧边梁和这些支承构件连接在一起保证楼梯稳定。踏步板在两侧边梁中延伸。筏板基础、核心筒和一、二层楼板也与楼梯连接，提供侧向支撑，进一步保证其稳定性。待混凝土养护28天后再撤除施工支撑。

立面

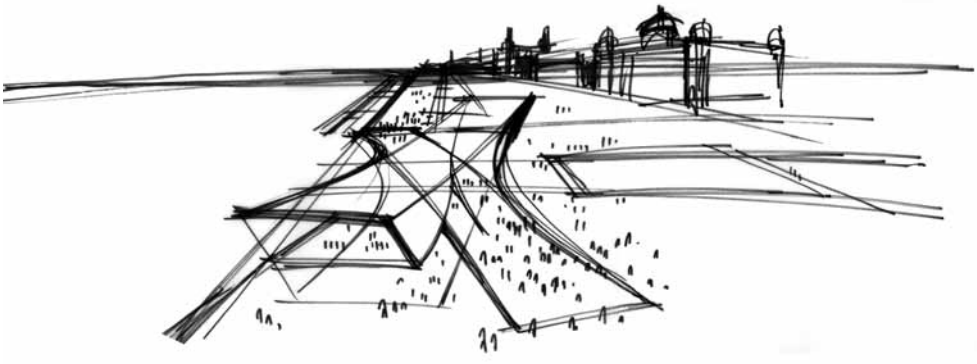
建筑表皮设计采用了玻璃材料，并用朱拉（Jura）石灰石作为外墙雨屏。石灰石被运送到现场安装至镀锌钢框，再用螺栓就能够简便地将其位置固定。立面几何图形意味着不同的立面形式间的转换与典型的楼层隔板或基本的楼板结构不一致，因此，需要第二层钢结构来支撑这些单元。这些单元之间的节点决定了钢结构的设置，第二层钢结构将水平荷载传递至楼板隔层，竖向荷载传递至基础柱。

东西立面均处于三个不同的平面上，第二层钢结构和相关的骨架外墙单元被平移至距柱中心线达1m的距离，因此需要悬臂结构梁间刚性连接，以提供竖向支撑。（译／李昭君）

The Museum’s design is a result of a very rigorous process, where it was of utmost priority to listen to the city inhabitants, learn the city’s history and understand the potential of the historical site that the Museum now sits upon.’
The result is a dynamic low-rise structure which enters into a respectful dialogue with the harbour promenade’s taller historical buildings. This interaction facilitates a modern and lively urban space. The design is reminiscent of the trading ships which at one time dominated the harbour, while the façade’s relief pattern puts forward a new interpretation of the historical architectural detail in the ‘Three Graces.’ The enormous gabled windows open up towards the City and the Harbour, and therefore symbolically draw history into the Museum, while at the same time allow the curious to look in.

A Nexus

The Museum lies along the Mersey River in the center of Liverpool, and will function as a nexus, in that it physically connects the Harbour promenade with the Albert Dock, which today contains restaurants, museums and boutiques. The outdoor areas around the Museum offer seating with views to the water adding to the dynamic urban environment and serving as a meeting point for locals and visitors alike. The theme is carried through into the Museum of Liverpool’s central atrium, with its sculptural sweeping



staircase leading up to the galleries further encouraging social interaction. All of these functions result in Kim Herforth Nielsen choosing to describe the Museum as a structure that unites Liverpool.

The project was won by 3XN Architects and Buro Happold in an architectural design competition in the autumn of 2004, and construction commenced in 2006 on site. The winning design was for a three storey building which is divided into a number of public access galleries and circulation spaces, and private back of house spaces. Public access to the building is available at both ground floor and first floor levels. The back of house spaces contain the staff accommodation, loading bay, storage and plant rooms.

With large 10m high gallery spaces, 9m cantilevers and over 8,000m² of exhibition space, the project has presented complex engineering challenges. The design provides an integrated engineering approach, allowing the structure and the services design solutions to combine and produce an energy efficient, low carbon solution to meet the high aesthetic demands of the architecture.

Spiral Staircase

Internally, the centre of the building features a large spiral staircase that is only supported at its base and the intermediate floors. It functions as an H–section beam and is constructed from in–situ concrete.

The concrete stair relies on the support of several members in the permanent case. The edge parapets of the stair act as beams/struts in combination with these supporting members to make the stair stable. The waist of the stair then spans between these edge beams. Stability is provided through connection to the ground floor raft slab, the stability core, and the first and second floor diaphragm slabs When the staircase was completed, the concrete had to be allowed to cure for a 28 days before the supports could be removed. ed

Facades

The building envelope design adopted a combination of glazing and the use of Jura limestone as an external rainscreen. The limestone is delivered to site fitted into a galvanised steel frame, which is simply bolted on to fixing points. The geometry of the facade means that the transitions between different types of facade do not align with the typical floor diaphragms or primary floor structures. Hence a second layer of steelwork is required to support the units. The setting out of this steelwork is governed by the joints between units. This second layer of steelwork is used to transfer lateral loads back to the floor diaphragms and the vertical load back to the primary columns.

The facade is stepped on three distinct planes on both east and west facades. This second layer of steelwork and associated cladding units are offset by up to a metre from the centreline of the columns and therefore moment connections are required for the beams that cantilever out to provide vertical support.