



Timber Tectonic Case Study

BISHOP EDWARD KING CHAPEL

Niall Mclaughlin Architect

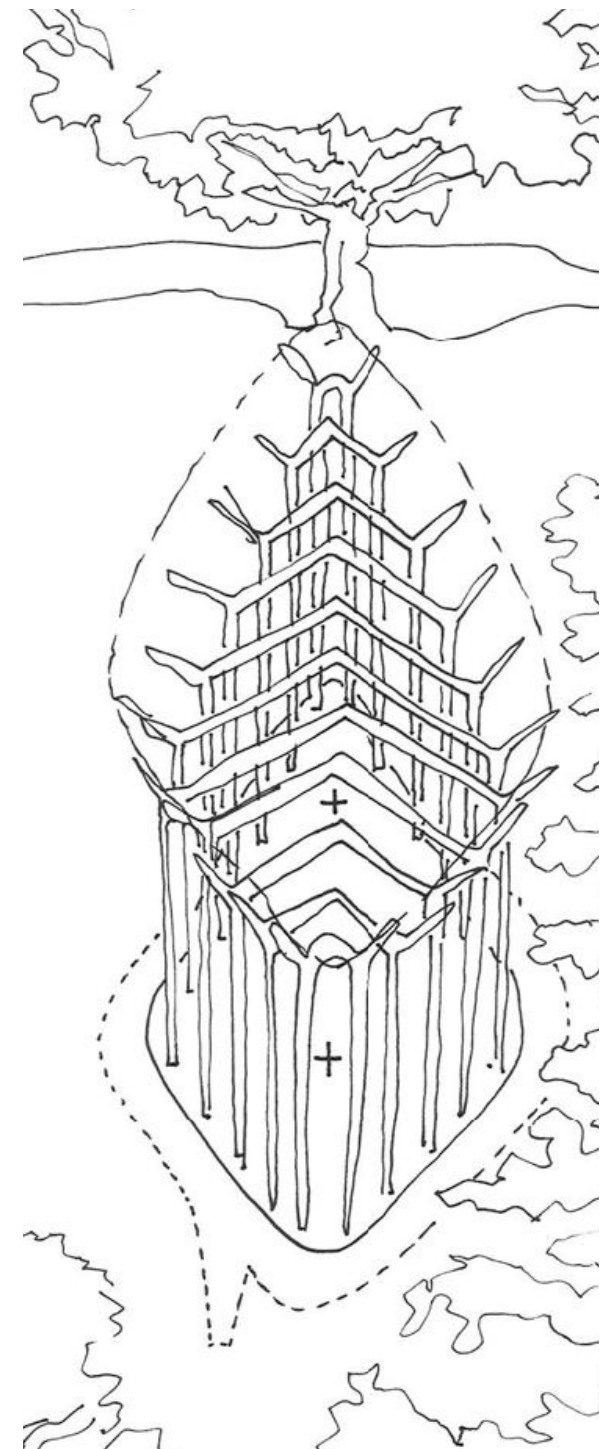
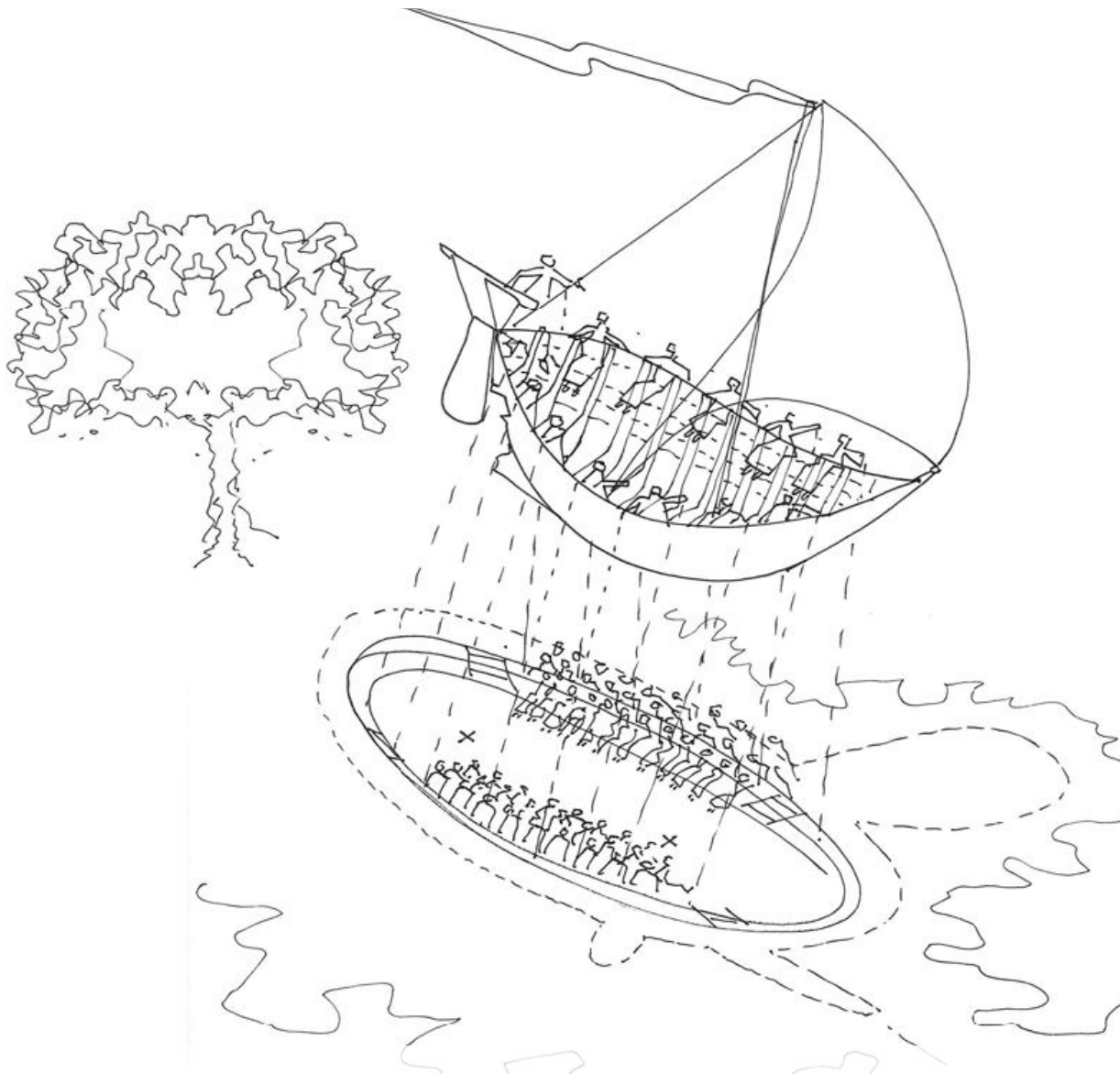
Zhengxian Jin



Building Contractor: Price and Myers
Structural Engineer: Harrison Goldman
Stone Consultant: Jane Toplis Associates
Access Consultant: Nathaniel Lichfield and Partners
Planning Consultant: Construction Consultant: Richard Bayfield
Cost: 2,034,000

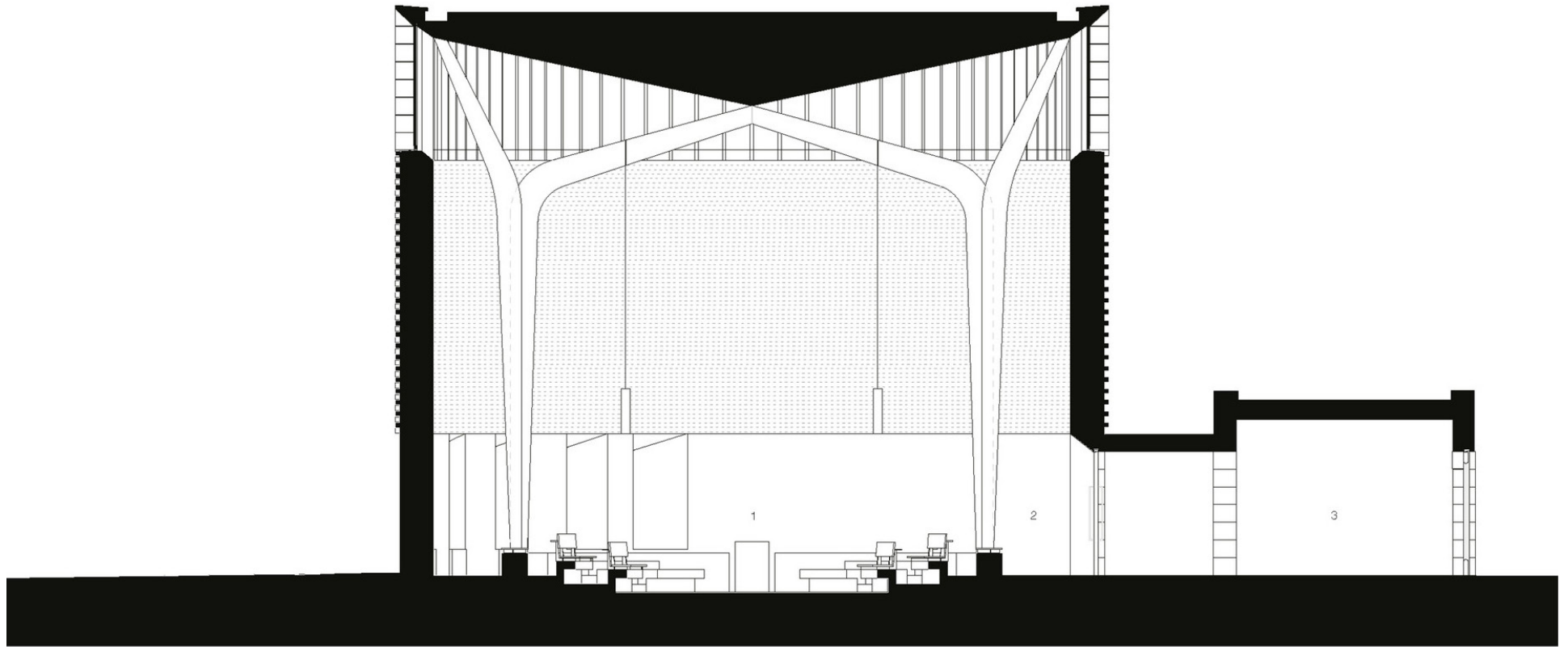
The Bishop Edward King Chapel designed by Niall McLaughlin Architects was completed in 2013, replaced the existing one on the site built in nineteenth century. I found this project from the list of case studies posted on the canvas for Grids, Shells and Gridshells structure. Simple but innovative timber structure create a bright and comfortable space un the roof, and proper use of material and structural components is the biggest reason why I pick this project as the case study to dig in further.



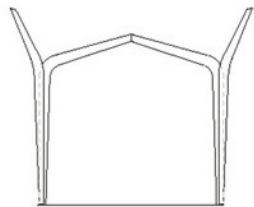
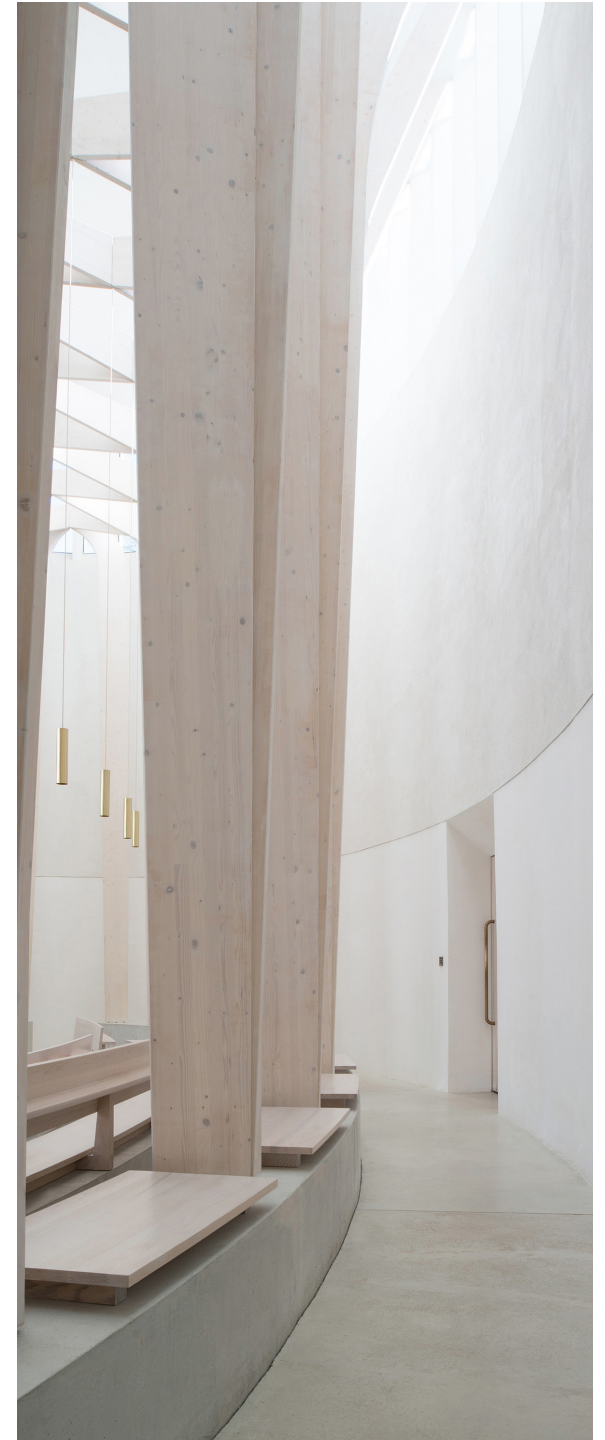


The main concept for the space is, based on the article on the ArchDaily, “the hollow in the ground as the meeting place of the community” and “the delicate ship-like timber structure that floats above in the tree canopy”. Main component of the building is an ellipse shaped floor enclosed by a stone round wall. The “ship-like” roof is held by a timber grid structure lifted by 26 timber lightweight plywood columns that stands on masonry rim of the central clearing. The tilted ceiling and a gap between roof and exterior stone wall allow to reflect sunlight back to the interior wall and diffuse the daylight to the room.

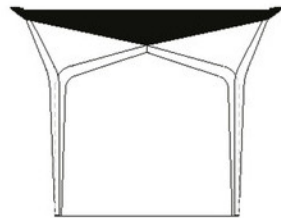




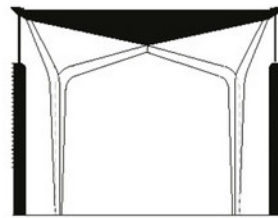
The ceiling is held by a diagonal shaped grid with angle. The internal timber structure is prefabricated glulam connected with steel fixings and these steel plate connections are completely concealed with timbers to keep a sense of a wood structure. Each column is contained with two pieces of half arches extend inward to create the grid and have another column is extended out to top of the clearstory. This three dimensional timber structure is also have branched out from the grid and reaches to the highest point of the ceiling which is the outside boundary of the ellipse. These branches have an essential role to the special quality of the chapel. Space between columns and stone wall allows people to walk around the chapel and looking into the brighter and open space in the center.



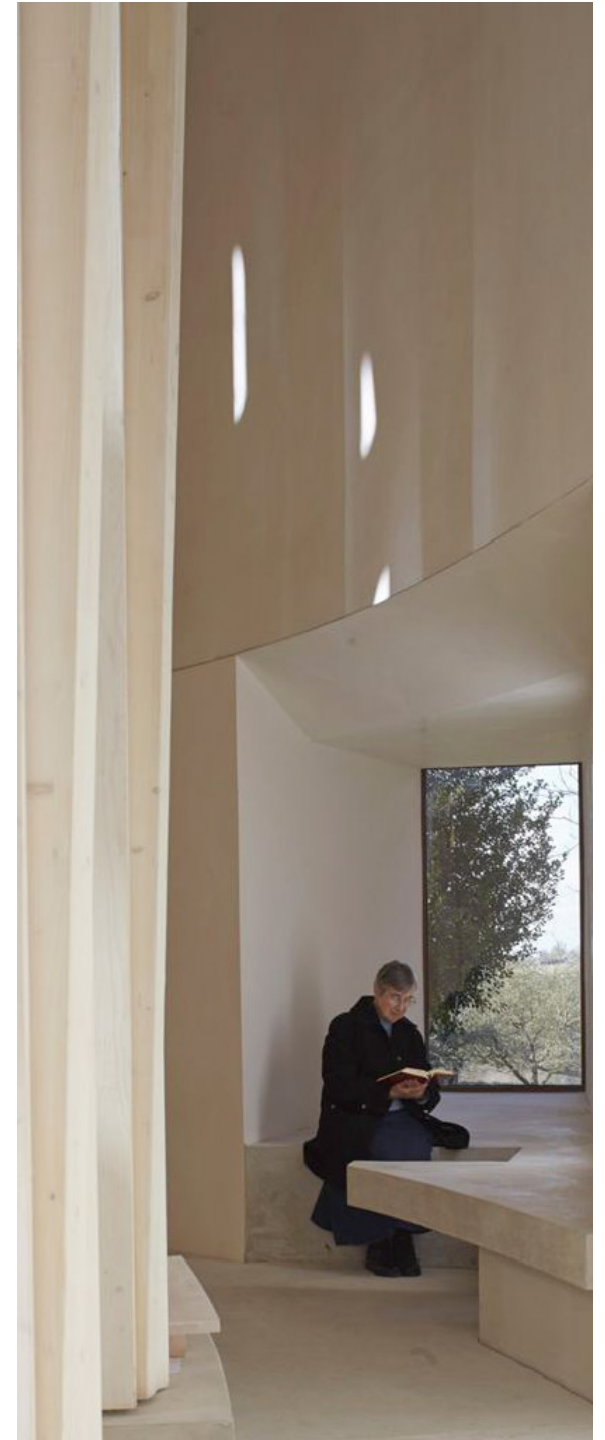
1. Timber Frame

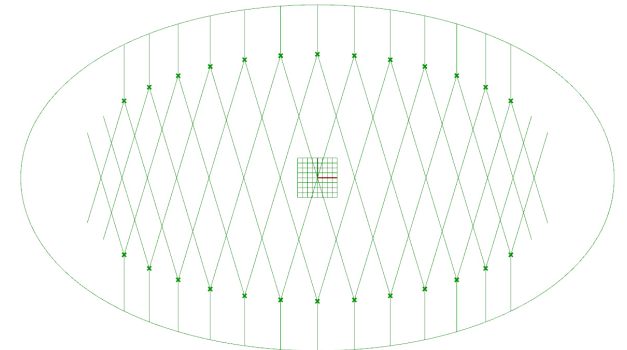
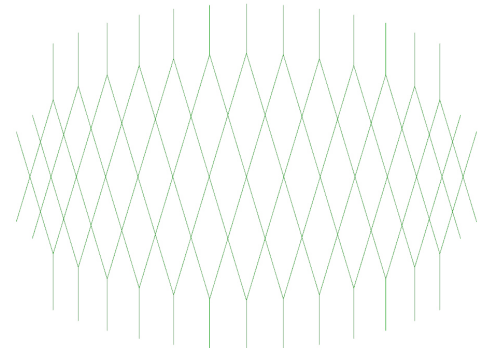
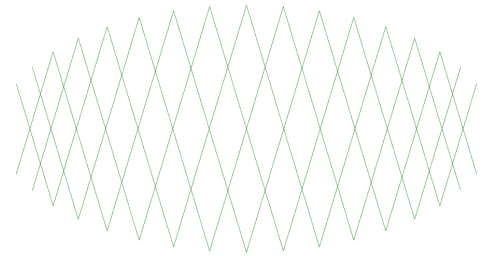
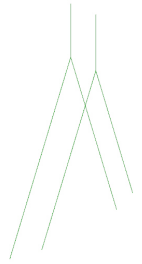


2. Frame Supports Timber Roof



3. Walls Encircle Frame Erect

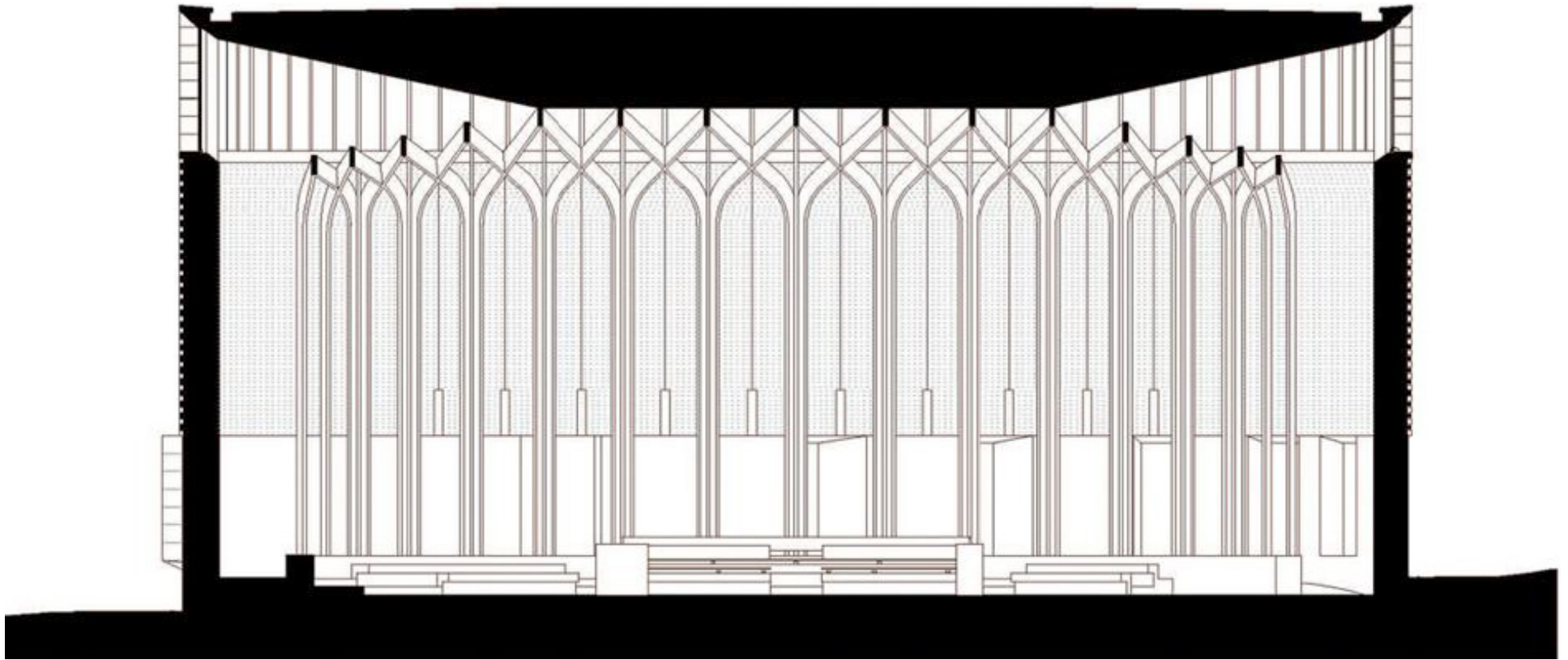






The chapel is enclosed with a ellipse stone masonry wall, and the decision of using Clipsham stone is based on context to the campus, both in terms of texture and coloration with limestone on the surrounding buildings. The base of the chapel is clad in ashlar stone laid in regular courses, and a cropped walling stone laid in a dog-tooth is stepping on the regular coursed base. On top of the façade, a halo of natural stone fins is surrounding the chapel, allows natural daylight and ventilation to the chapel.





The best part of in the design is the smart use of different materials in appropriate place and location, can dramatically reduce the cost in maintaining the building and extend the lifecycle of the building. The glulam timber grid structure is creating a dynamic interior space at the same time supporting a ship-like ceiling and roof structure. The exterior stone wall is offset out from the timber structure, protecting the structure from natural environment, at the same time maintaining the context to the site. In addition, because the roof is supported by the inner columns, the solid stone wall don't need direct contact with the roof, give a chance to make a continuous glazing on top of the façade allow air and light coming in to the space.



REFERENCE

“Bishop Edward King Chapel / Niall McLaughlin Architects” 23 Mar 2015. ArchDaily. Accessed 26 Feb 2017. <<http://www.archdaily.com/611186/bishop-edward-king-chapel-niall-mclaughlin-architects/>>

“Unit G_Structure2014_15” 2014.unit g at Oxford Brookes School of Architecture. Accessed 26 Feb 2017. <<https://unitgblog.wordpress.com/tragic/workshops/structures-workshop/>>