

University of Leicester – Percy Gee East Wing Project

Considerate Constructors - Innovative Idea

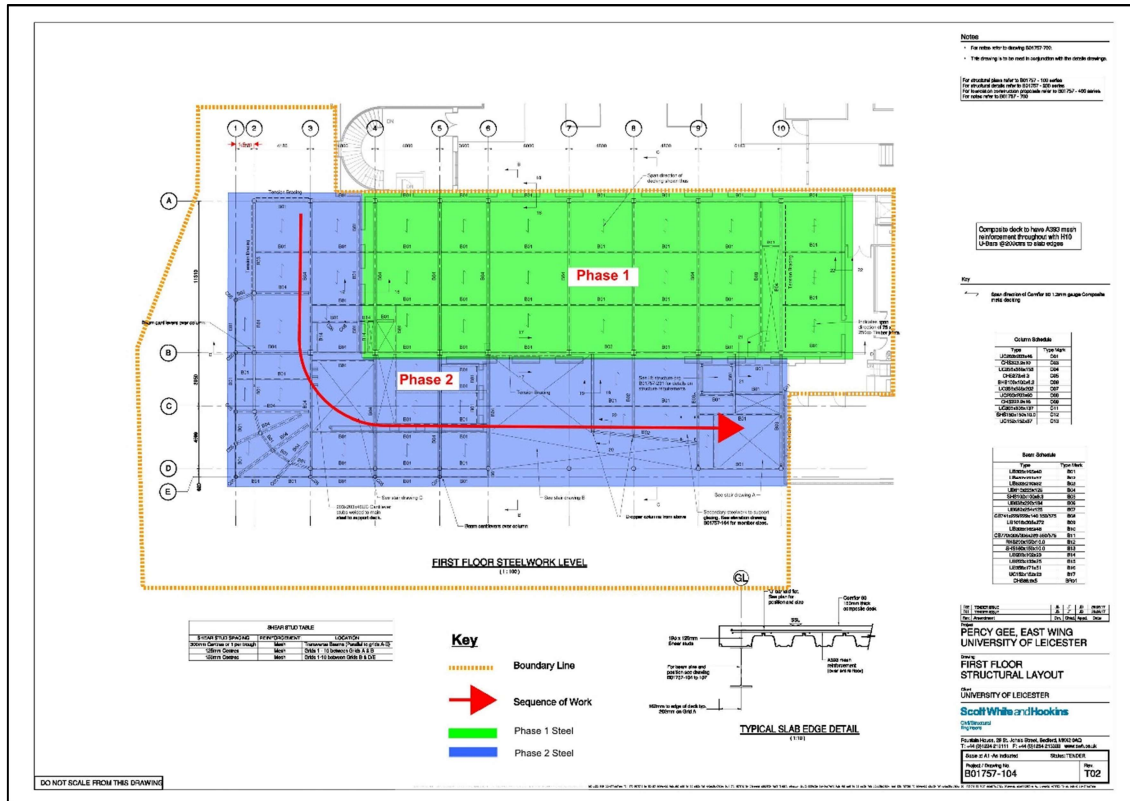
Manhole rings for safe steel installation

As part of the works undertaken on the £13m Percy Gee new build/refurbishment project at the University of Leicester, there was a requirement to install the steel columns on to foundation pads which were located circa 4 metres below ground level, within 7 metres of the site boundary (circles red below). With a confined site, which required the installation of a tower crane base (located on the left of the photograph below) along with the storage of all material required for the build adjacent to a live university square; a solution to reduce the excavation and movement of material was required.



As shown on the diagram below, the foundation pads lie close to the site boundary line

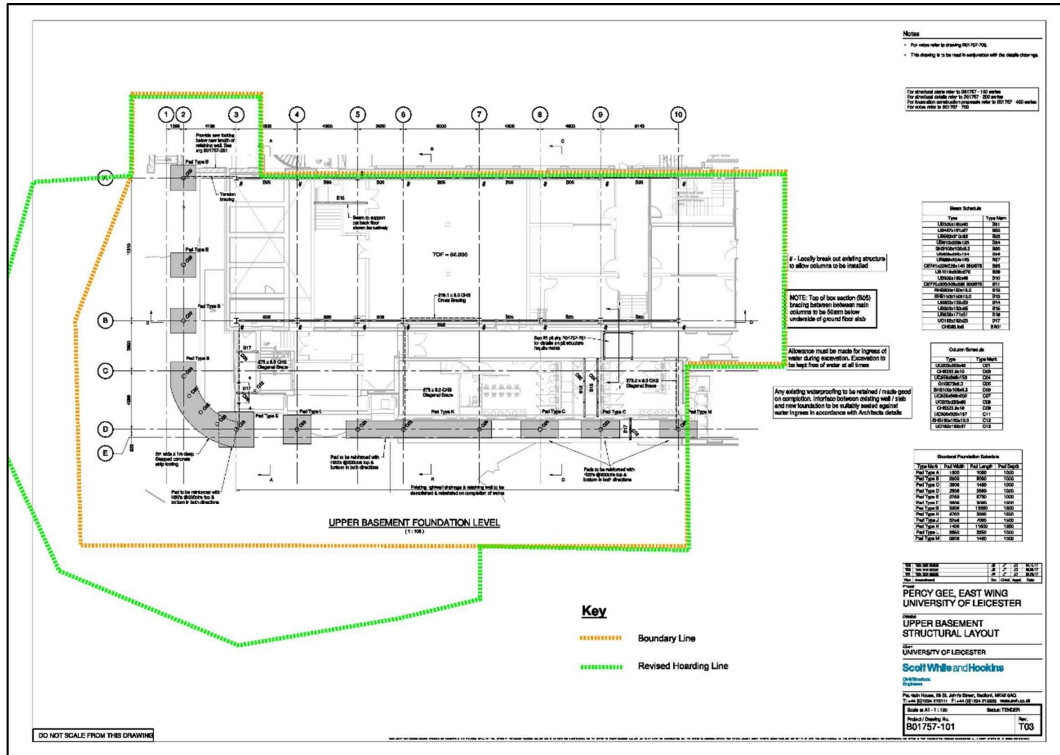
The steel work installation was split into two phases. The first phase of steel was installed within the Queen's hall (highlighted green) to support the existing structure and allow the removal of the existing roof supports.



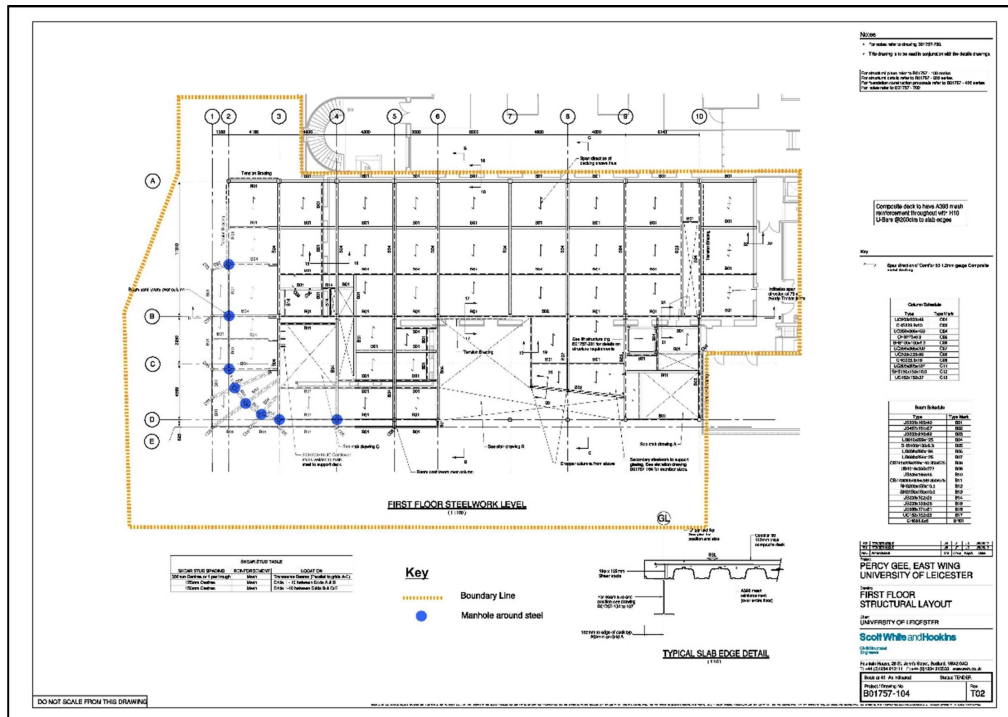
Following phase one and the completion of the support of the existing structure, the installation of the phase 2 (highlighted blue above) steel could commence. Ahead of the steel installation the ground was required to be made up to allow the support of MEWPS to aid the installation by the steel erectors. This created an issue externally due to the constraints of the site area, it was not possible to install the steels adjacent to the queens hall without infilling the excavations required to install the steel on to the pads highlighted below.

Should the innovative idea not have been sought or utilised, the duration and size of the exposed excavation would have increased. This would lead to the site boundary line being moved to the green line on the drawing below and reducing accessibility for members of the public and students to adjacent buildings; this would also restrict emergency services access to adjacent buildings.

The drawing below shows where the potential excavation would have had to be extended to in order to allow access for MEWPS's for the installation. This material would have to have been removed from site pending the steel installation and brought back on to site on completion. Therefore this innovative idea removed the need to unnecessary muck shift through the university campus and the city, thus reducing the environmental impact both in terms of emissions, congestion and material removed from the project site and improving the safety of the workforce and public in the vicinity of the project.



To overcome the issues highlighted above the team sought an alternative method utilising manhole rings with integrated ladder access as a form of shoring. Using this method, prior to the ground being prepared for MEWP access, manhole rings were placed to expose the holding down bolts in several locations (shown in blue below). This allowed for the rest of the area to be built up to the required ground level and remain structurally sound.





To complete the construction of the works in line with the structural design, the manhole ring will be filled with concrete. This will replace the requirement for operatives working within an excavation and on ladders/podiums to install timber formwork.





In summary using this method has given the team the following benefits:

- Reduces CO2 emissions by limiting the transport of material off site.
- Reduced programme due to made up ground being finalised ahead of steel installation and the omission of timber formwork for concrete encasement in line with design.
- A safer environment for our workforce with the pre-fixed ladders built into the manhole rings.
- Eliminating the risk of deep excavations and reducing the risk of falls from height with the smaller opening size.
- Reducing the amount of plant on site and the running time.
- Eliminating the need to extend hoarding lines in to live, occupied university areas.