

BIM in Principle and in Practice, Third edition

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Figure 5.2 Model walkthrough view (courtesy of DLA Architecture Ltd)

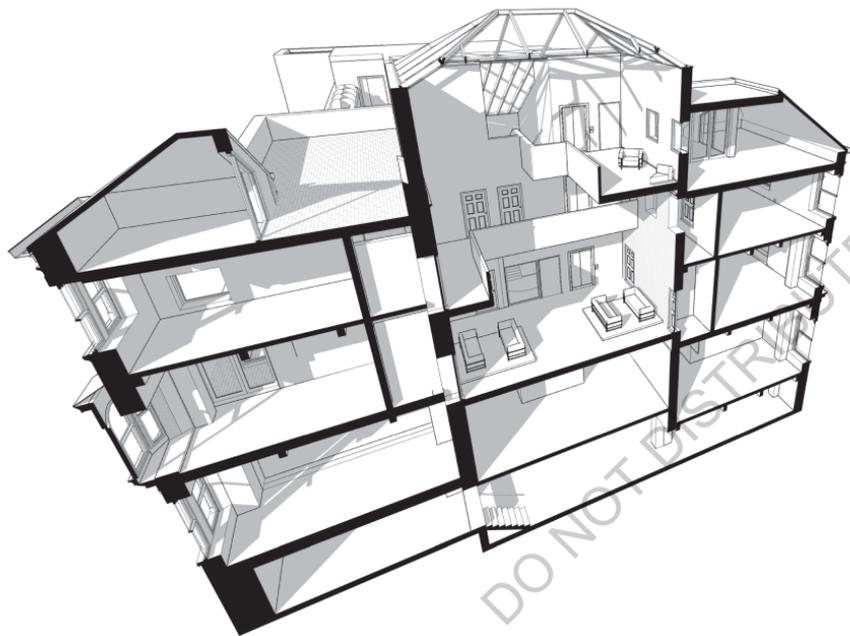


Figure 5.3 Model walkthrough view (courtesy of DLA Architecture Ltd)

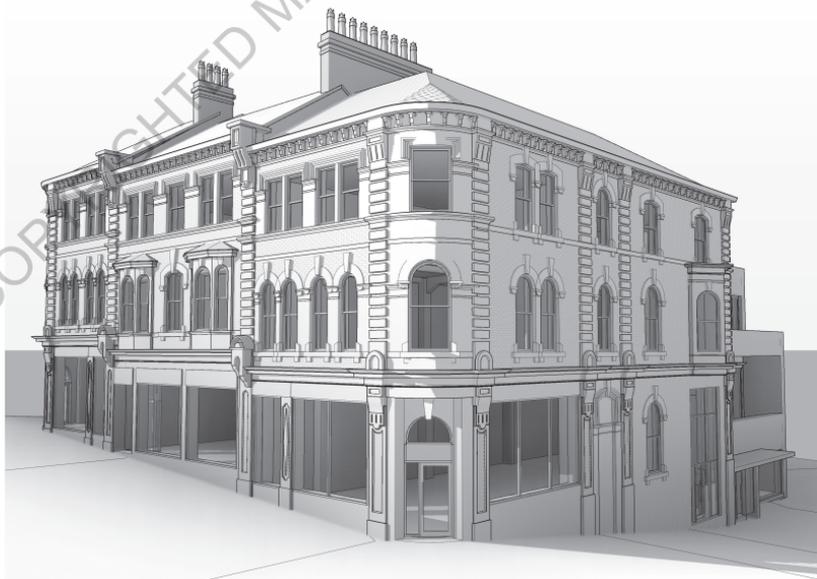


Figure 5.8 The 'green' model

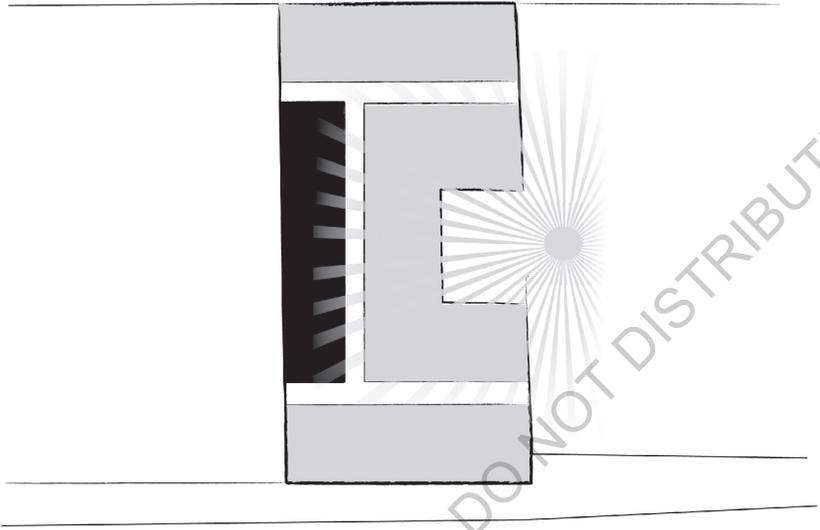


Table 12.2 BIM design phases (details)

PP-05	PP-10	PP-20	PP-30
Pre-project phase	Feasibility phase	Concept design phase	Design development phase
Program analysis	Program analysis		Lean analysis
Site analysis	Site analysis		Engineering analysis
	Building/site design modelling	Building/site design modelling	Building/site design modelling
	Electrical design	Electrical design	Electrical design
	Site layout modelling	Site layout modelling	Site layout modelling
	M&E design modelling	M&E design modelling	M&E design modelling
	Cable routing design	Cable routing design	Cable routing design
		Design reviews	Design reviews
		Design coordination/clash detection	Design coordination/clash detection
	4D Time modelling	4D Time modelling	4D Time modelling
	5D Cost estimation	5D Cost estimation	5D Cost estimation
	Existing conditions modelling	Existing conditions modelling	

Figure 14.1 Use of a drone to conduct site surveys (courtesy of Crossrail Ltd)



- **Crane/tower/scaffolding inspections** – drones provide a much easier method of inspecting high temporary and permanent structures, providing real-time footage to spot anomalies. This reduces site downtime and mitigates the risks of personnel having to work at height
- **Site planning** – overviews can be obtained quickly to inform planning sessions
- **360 degree panoramas** – a more all-round and all-encompassing experience to enhance appreciation of potential hazards and site orientation.

The site teams identified a number of other potential uses that, it is hoped, will be trialed and measured in the future, including

- **Logistics planning** – many of the site areas are large and change rapidly over a short period of time. Drones can be used to provide a dynamic visualisation, flagging up potential impacts and issues that might otherwise be overlooked – for example, large plant movement and arrangements
- **Live feeds** – these can be beamed directly to a control room for certain inspection requirements (e.g. crane clearance, logistics, personnel movement), allowing for