

Industry consultation on BOS Manifesto

18 July 2024

@BUILDOFFSITE

#CollaboratingForImpact

WWW.BUILDOFFSITE.COM



Host presentation



Tom Kyle

Associate Partner
Sheppard Robson



Natalia Maximova

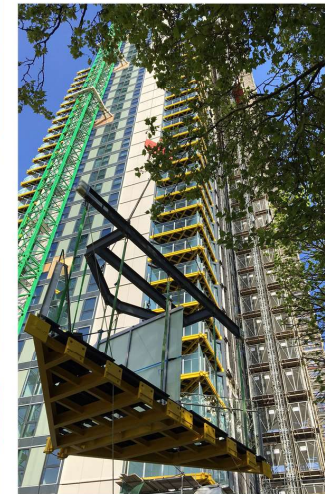
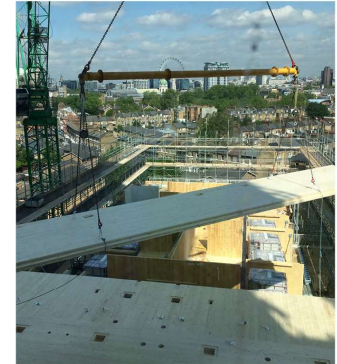
Associate Partner
Sheppard Robson

Contents

1. Introduction

2. Case Studies

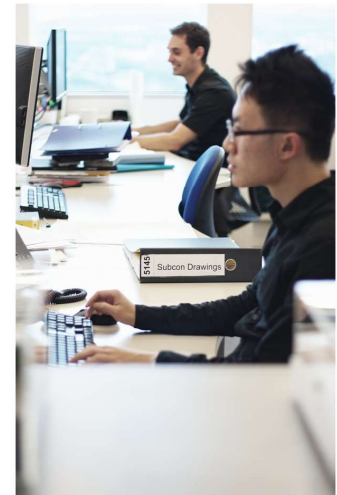
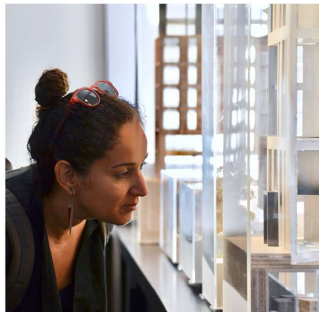
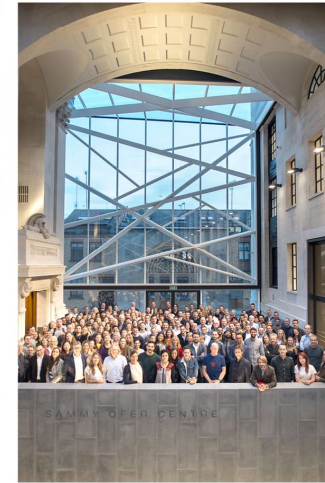
- Citizen M Hotel
- York and Manchester University Residences



Introduction

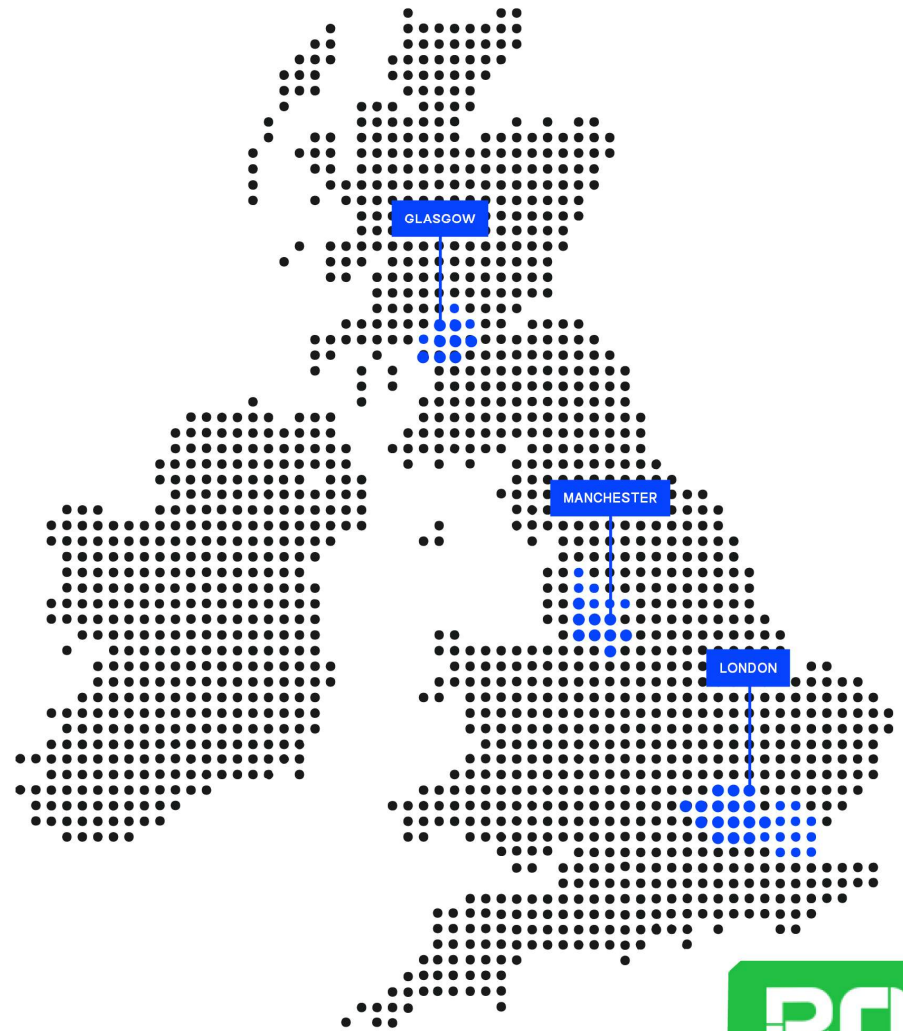
Overview

360 people
200 awards
80+ years
3 locations
36 languages



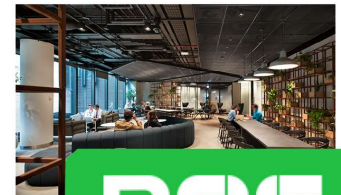
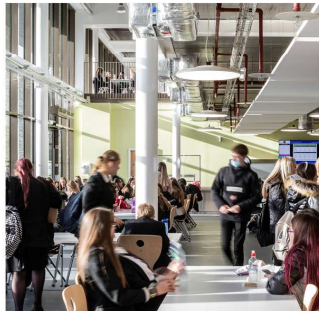
About us

360 people
3 locations

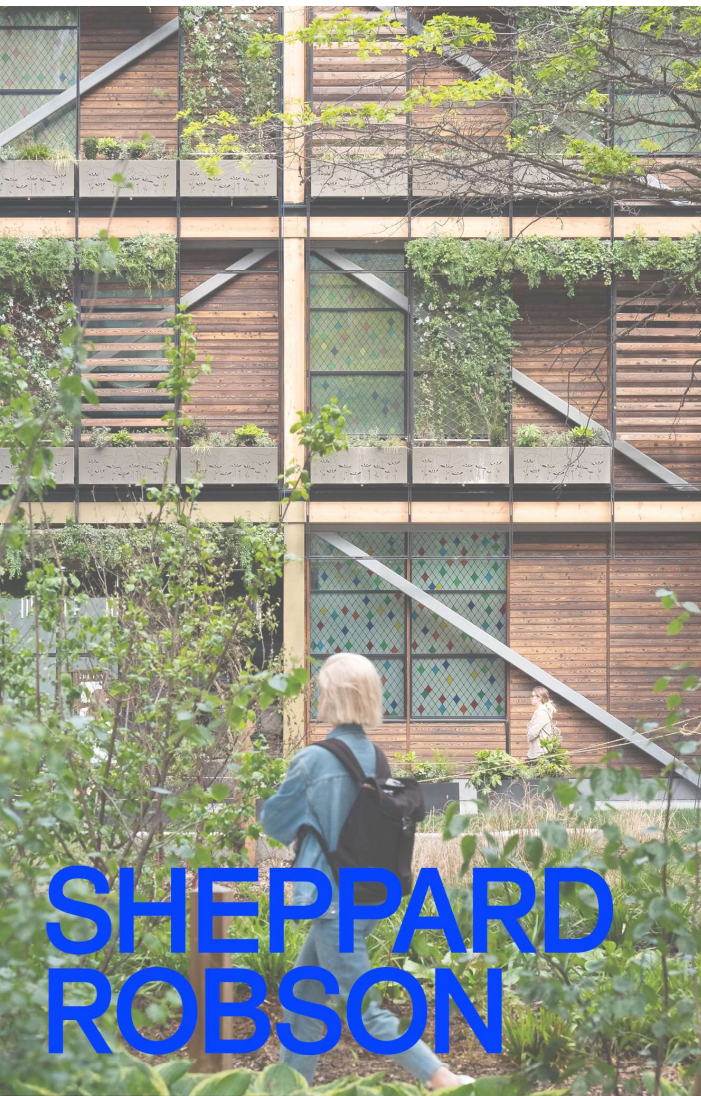


Interchange

Community
Health + Care
Homes
Hotels + Leisure
Interior Design
Masterplanning
Retail
Schools + Colleges
Science + Tech
Student Living
Universities
Workplaces



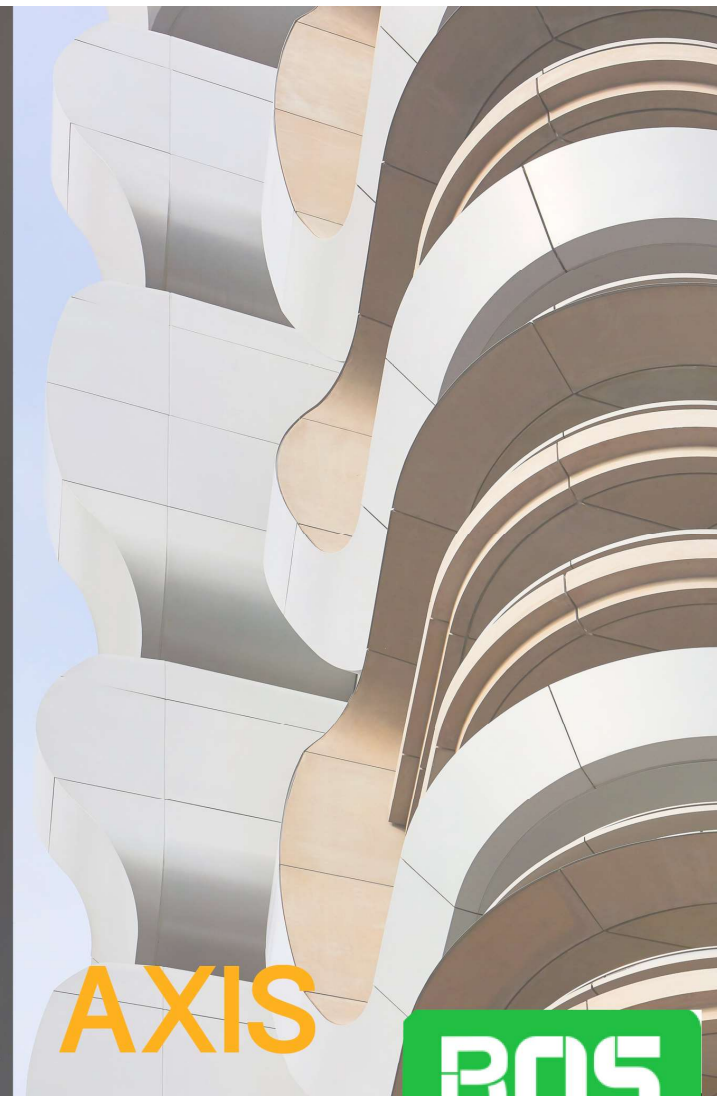
BOS
BUILDOFFSITE
COLLABORATING FOR IMPACT



**SHEPPARD
ROBSON**



ID:SR



AXIS



WWW.BUILDOFFSITE.COM

SHEPPARD ROBSON

1



Pre-manufacturing (3d primary structural systems)

2



Pre-manufacturing (2d primary structural systems)

3



Pre-manufacturing components (non-systemised primary structure)

4



Additive manufacturing (structural and non structural)



SR example: CitizenM modules
STRUCTURAL



SR example: CLT at Waingels
STRUCTURAL



SR example: Glulam beams at Notre Dame School
STRUCTURAL



Industry example: 3d printing
STRUCTURAL + NON-STRUCTURAL

KEY



Off-site and near site pre-manufacturing



Site based process improvement

5



Pre-manufacturing (non structural assemblies and sub-assemblies)

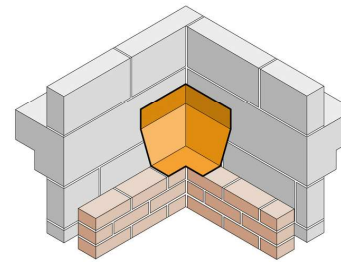


SR example: Prefabricated facade panels, 245 Hammersmith
NON-STRUCTURAL

6



Traditional building product led site labour reduction/productivity improvements



Industry example: Pre-formed system corners
NON-STRUCTURAL

7



Site process led site labour reduction/productivity/assurance improvements



Industry example: Survey drones
NON-STRUCTURAL

Ref UK GOV MMC Definition Framework

BOS
BUILDOFFSITE
COLLABORATING FOR IMPACT

WWW.BUILDOFFSITE.COM

SHEPPARD ROBSON

Government Initiatives

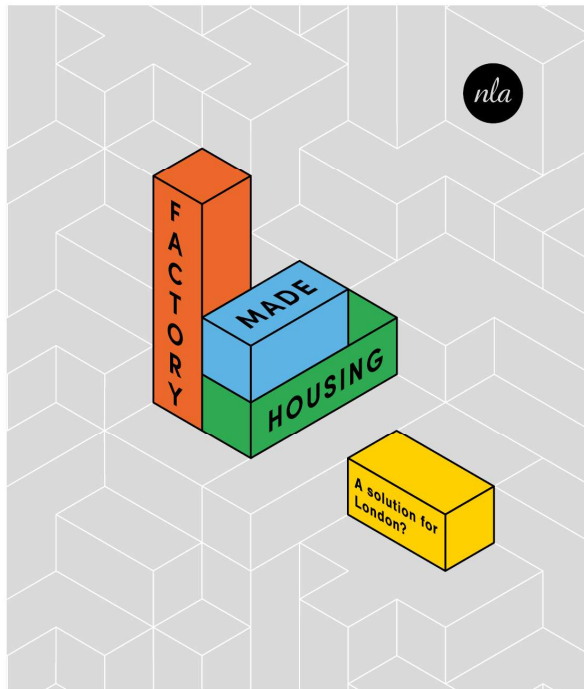


They Love a Factory Visit



Publications

Sheppard Robson has contributed to important publications recently that provide design guidance to construction industry professionals on planning for offsite construction



WWW.BUILD OFFSITE.COM

SHEPPARD ROBSON

1



Pre-manufacturing (3d primary structural systems)

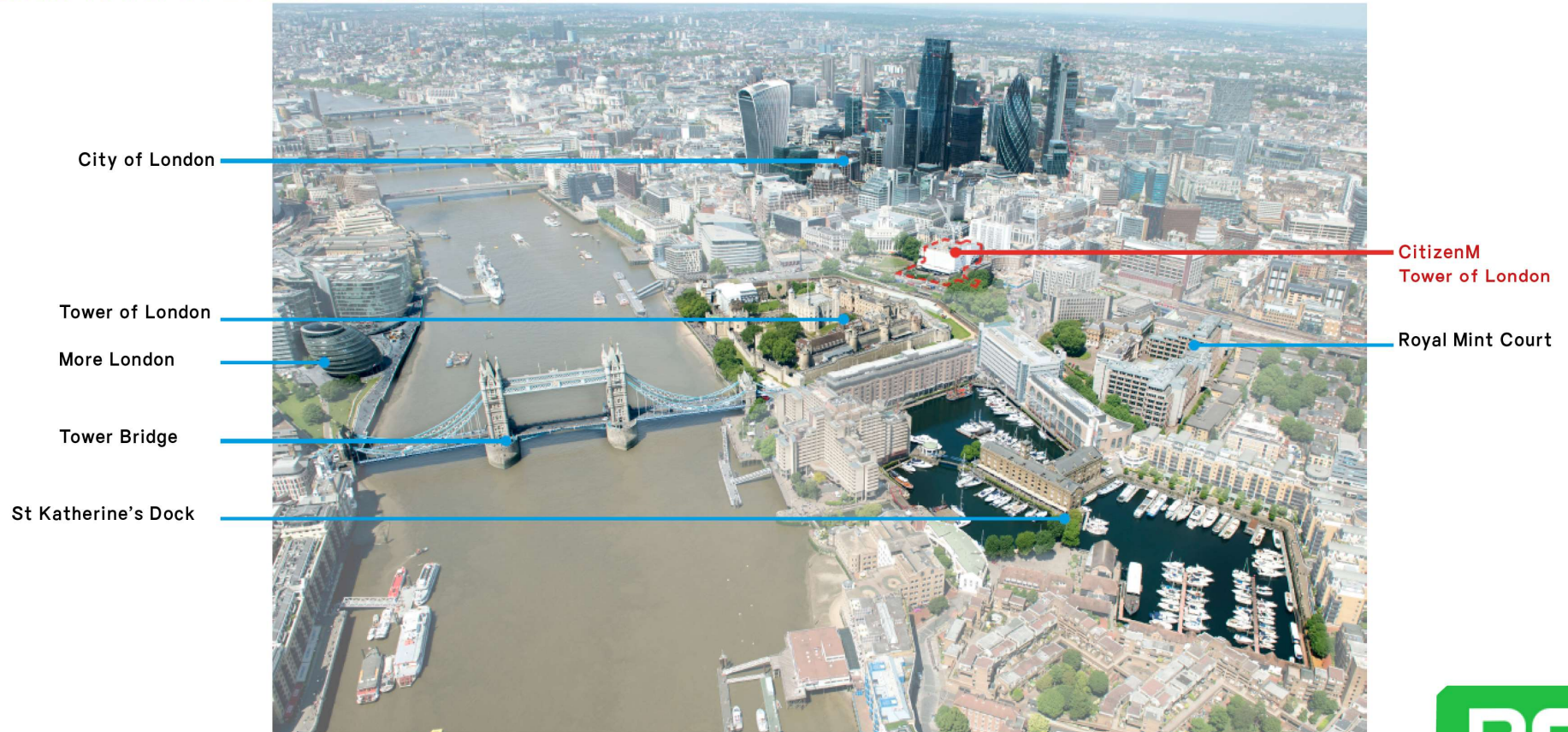
Case Studies Category 1

Citizen M Tower of London



Location

CitizenM Tower of London - Site Context



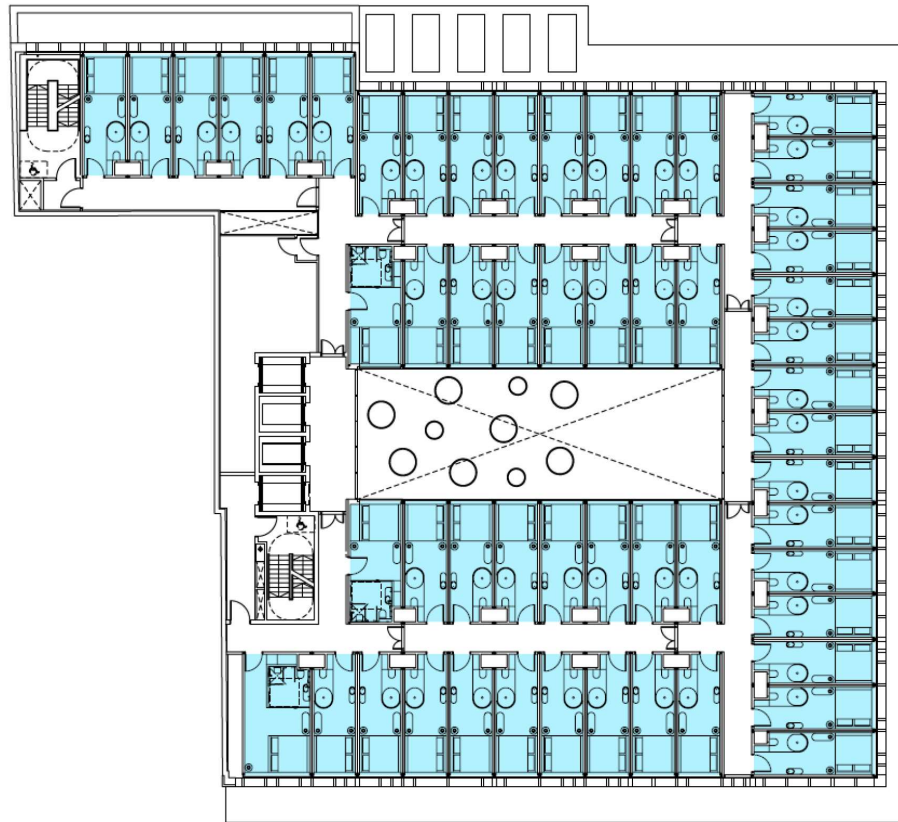
Ground Floor

CitizenM Tower of London - Underground Station



Typical Floor

CitizenM Tower of London - Typical Floor Plan



Typical Bedroom

CitizenM Tower of London - Bedroom Modules



BOS
BUILDOFFSITE
COLLABORATING FOR IMPACT

Bedrooms Under Construction

CitizenM Tower of London



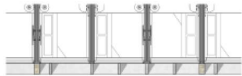
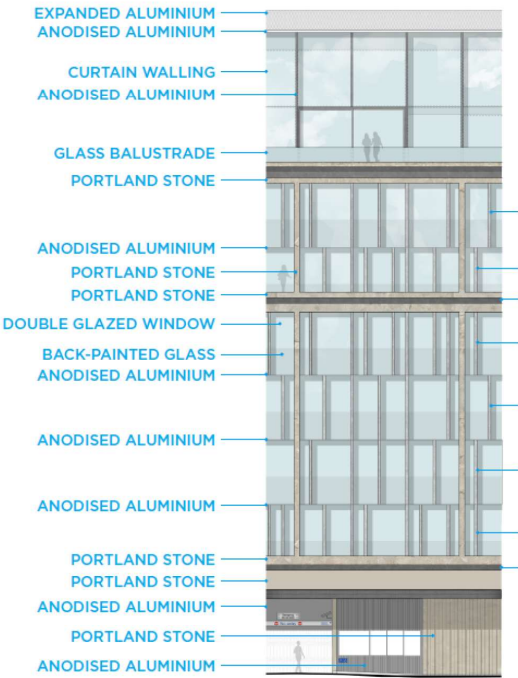
BOS
BUILDOFFSITE
COLLABORATING FOR IMPACT

WWW.BUILDOFFSITE.COM

SHEPPARD ROBSON

Facades

CitizenM Tower of London - Elevation

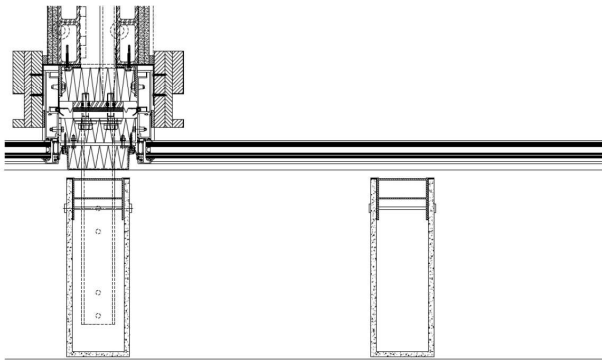
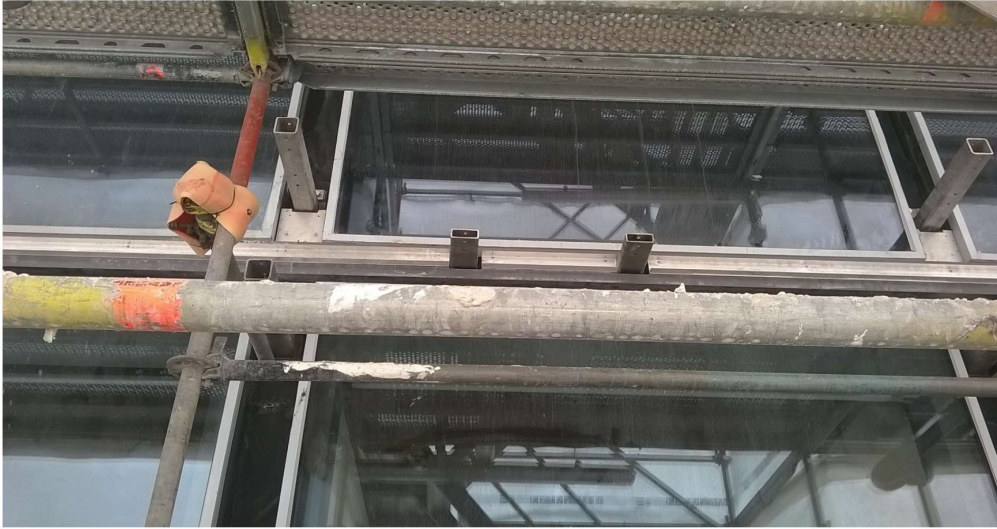


DON

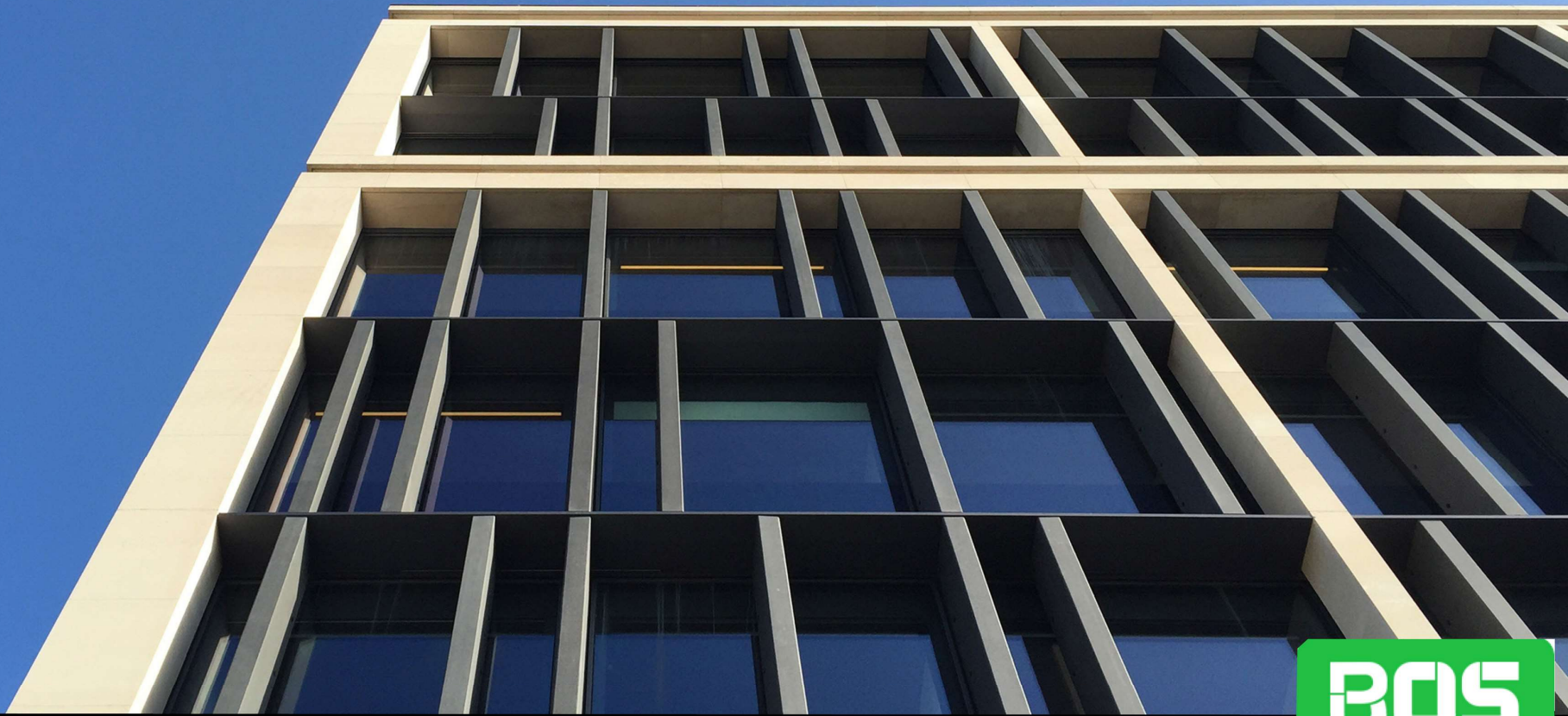
Factory Finish Facade



Connection Details



Completed Photos



WWW.BUILD OFFSITE.COM

SHEPPARD ROBSON



Controlled
ZONE
Mon-Sat
8.30 am - 5.30 pm
Sunday
8.30 am - 2.00 pm

citizen hotel

BOS
BUILDOFFSITE
COLLABORATING FOR IMPACT

WWW.BUILDOFFSITE.COM

SHEPPARD ROBSON

2



Pre-manufacturing (2d primary structural systems)

Case Studies Category 2

Student Residences, University of York



WWW.BUILDOFFSITE.COM

SHEPPARD ROBSON

MMC advantages: accelerated programme

Enabling works - Dec 19 – Apr 20

Phase 1: 4 blocks, social hub, 348 rooms - June 2020 – Sep 2021

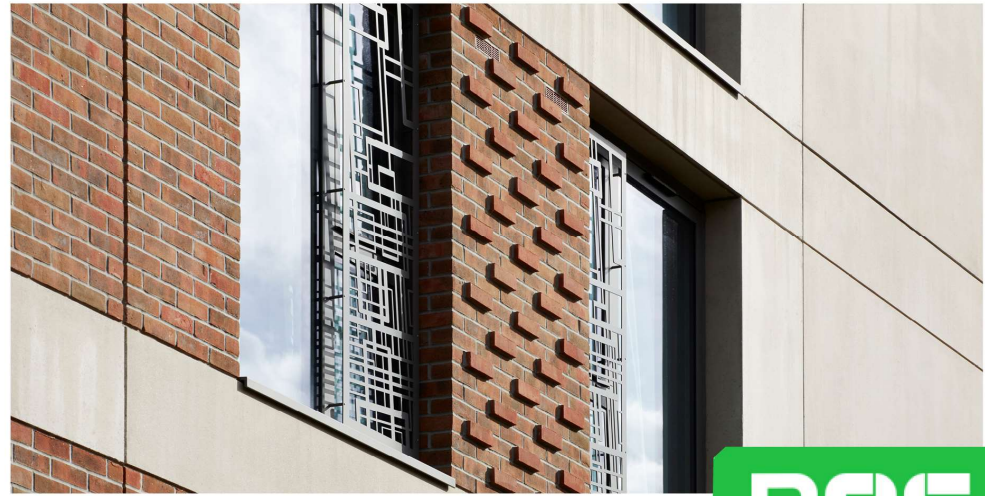
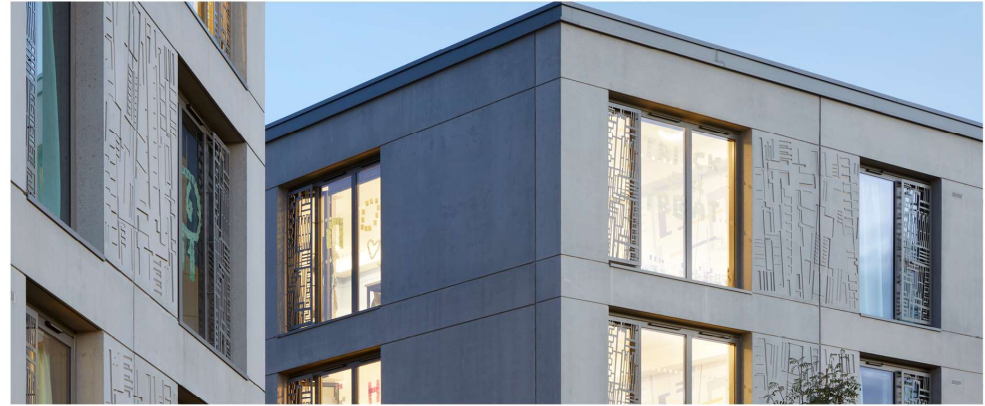
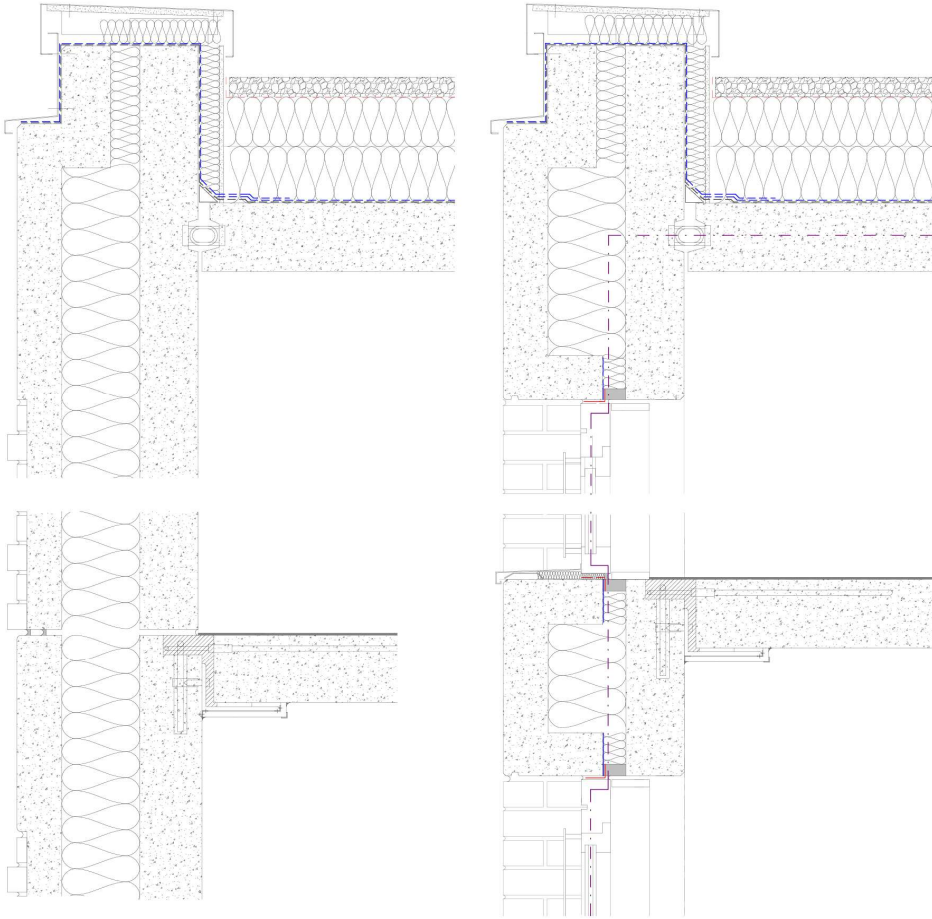
PC ahead of programme: 3 blocks, 256 rooms - occupied Jan 2022

PC ahead of programme: 4 blocks, 386 rooms - unoccupied until Sep 2022

Phase 2: 7 blocks, social hub, 490 rooms – Jun 2021 – Sep 2022

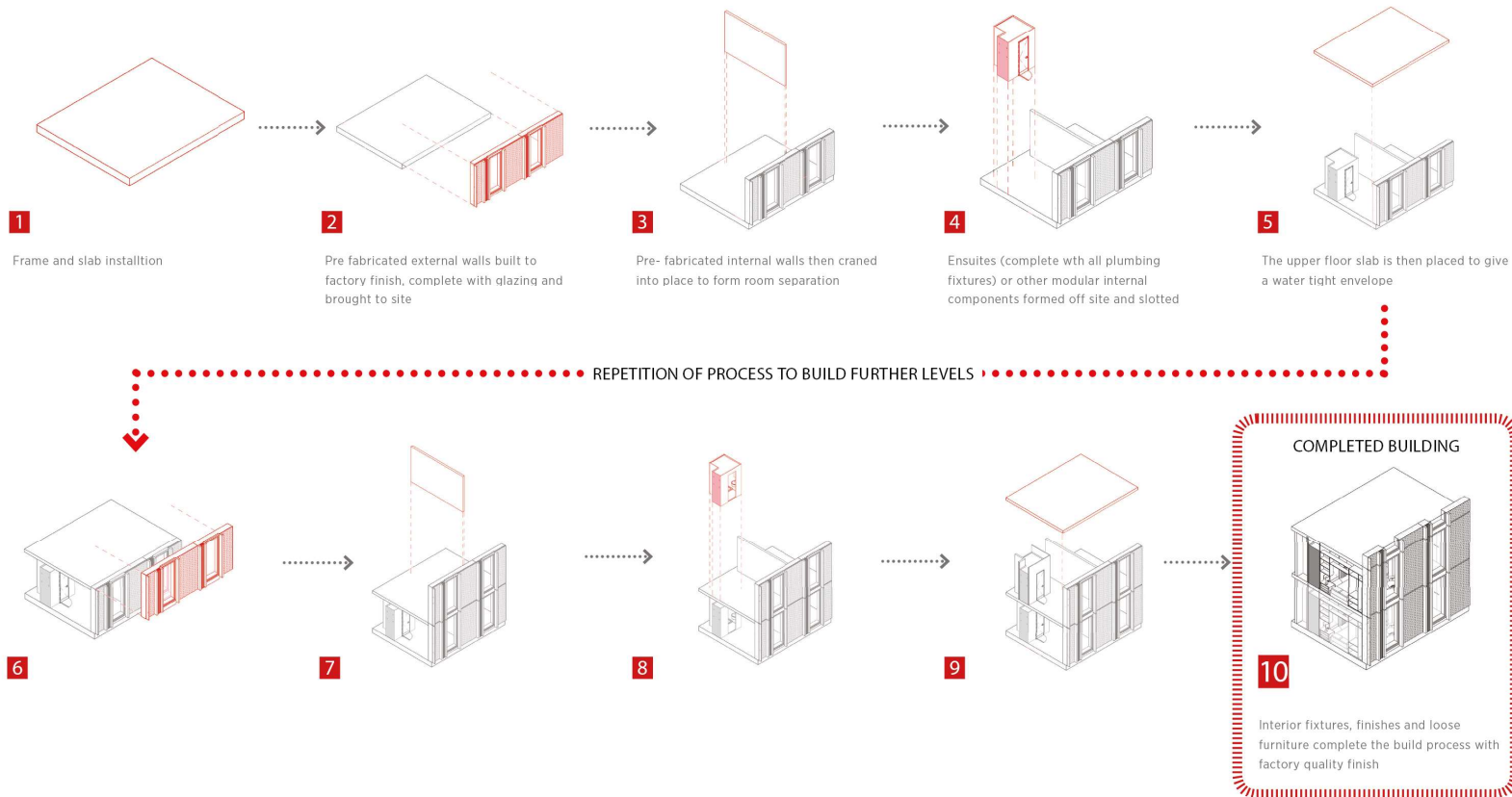


Cross-wall precast system elements



System assembly

1. 1735 facade sandwich panels
2. 2431 internal cross walls
3. 2579 floor slabs
4. 160 stair units
5. 1471 bathroom pods



System assembly



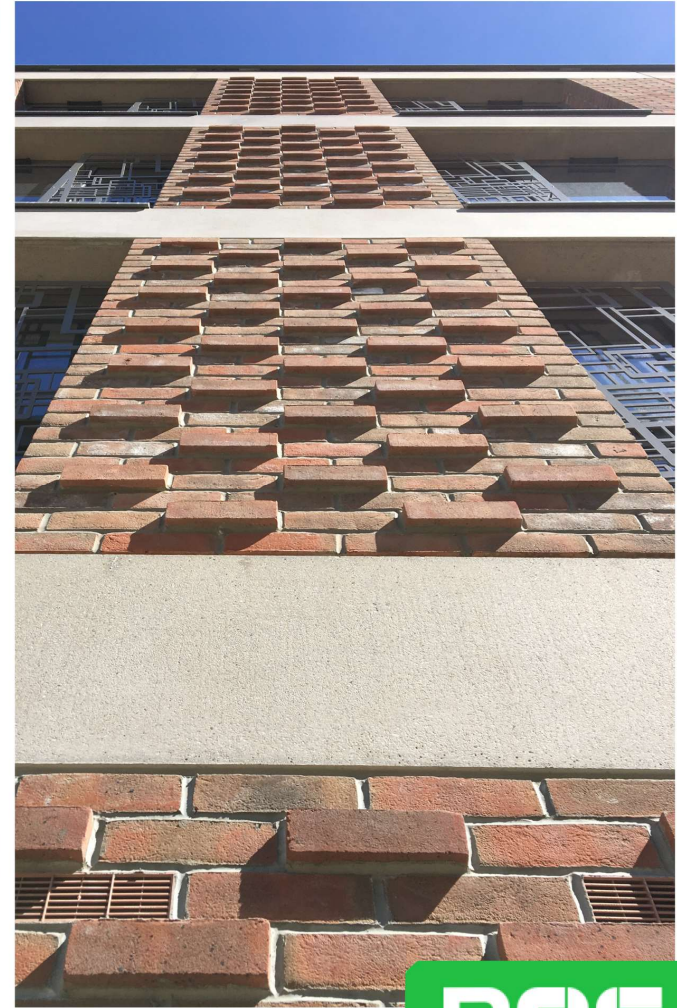


WWW.BUILDOFFSITE.COM

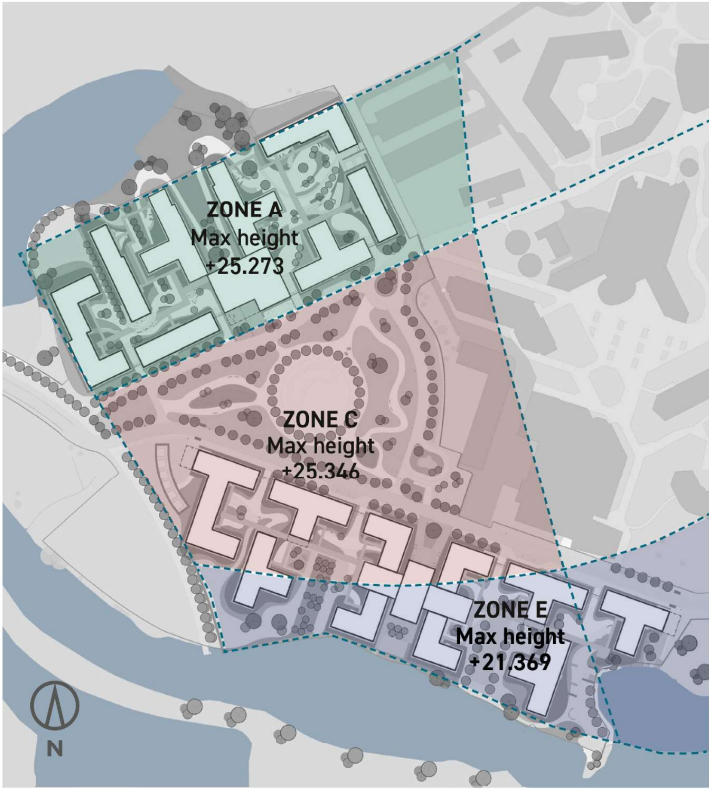
SHEPPARD ROBSON



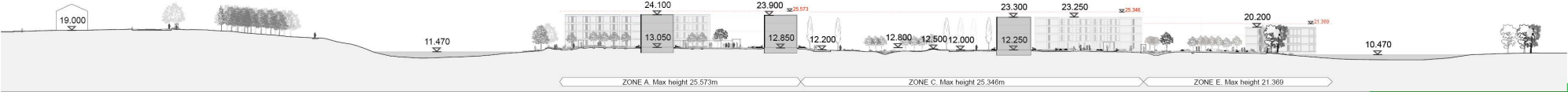
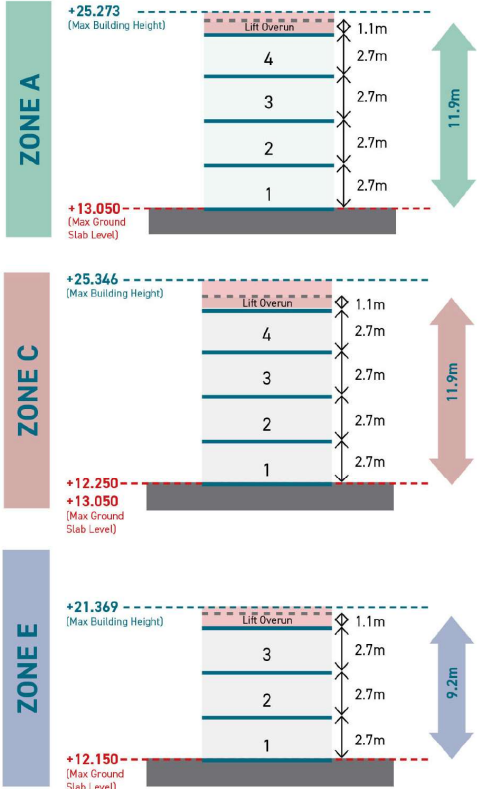
Elements



Working with planning restrictions



Proposed Zone Heights

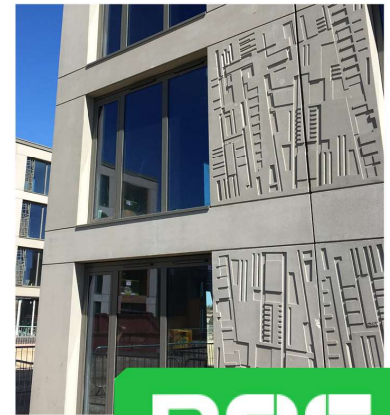
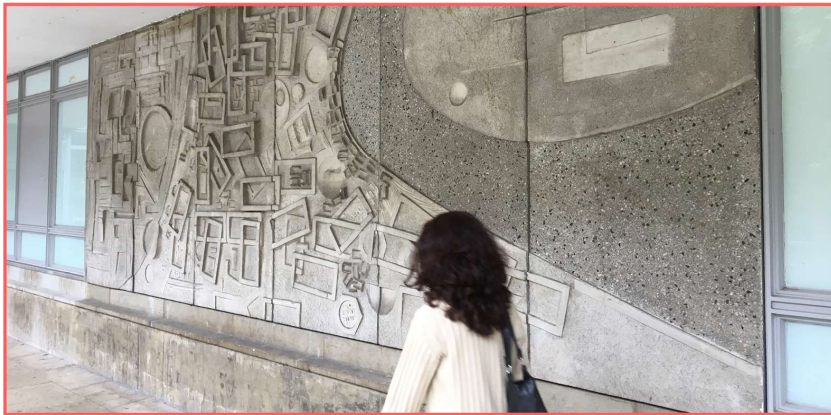
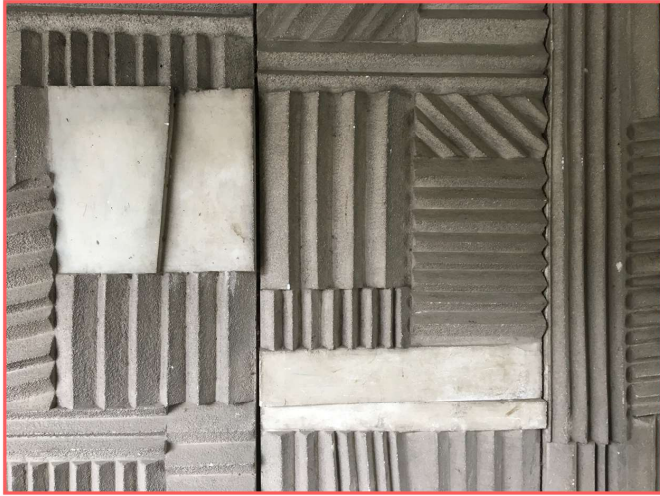


Landscape section through proposal, lakes and Badger Hill

Achieving 'Yorkness'

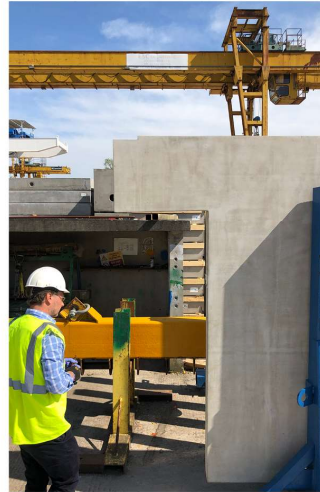


Achieving 'Yorkness'



Embodied carbon

- No structural frames + pre-stressed slim 175mm slabs
- Minimal waste during fabrication
- 49% reduction in construction waste
- Integrated façade finishes: no additional fixing
- Significantly reduced number of operatives and site traffic
- Minimised dry-lining and ceilings
- Minimal services installation
- Off-site services integration: minimal risk of on-site defects
- Durable finish: low life maintenance + whole-life carbon savings
- Efficient layouts
- 50% GGBS within in-situ concrete mix and 30% PFA in precast



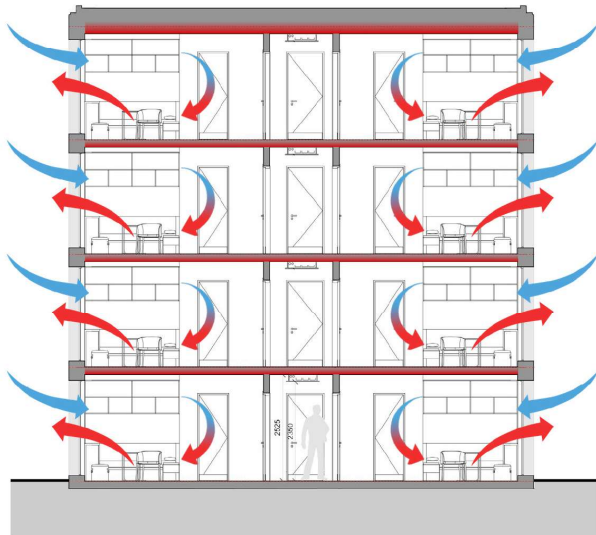
Operational carbon

- Compact build form and shallow depth
- All-electric
- Considerable thermal mass
- No requirement for mechanical vent or cooling
- Natural ventilation
- Reduced transportation (students)

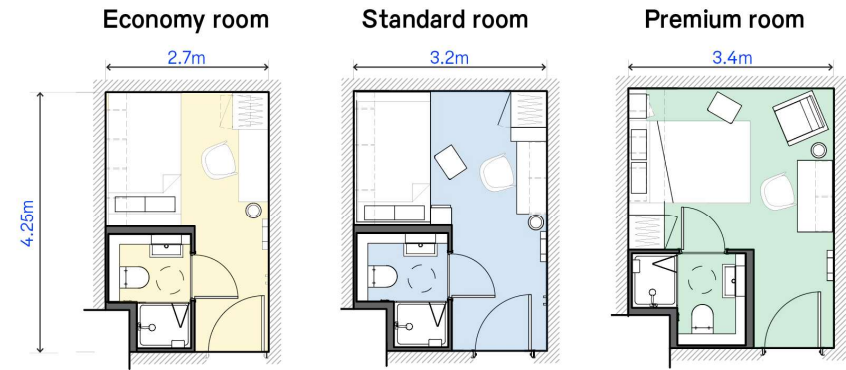


Wellbeing

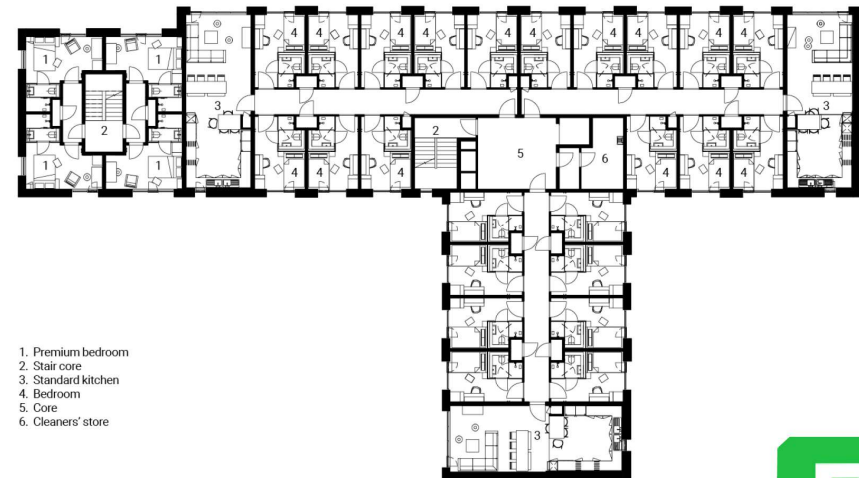
- Shallow layouts
- Natural ventilation
- Natural light and light uniformity



Typical section

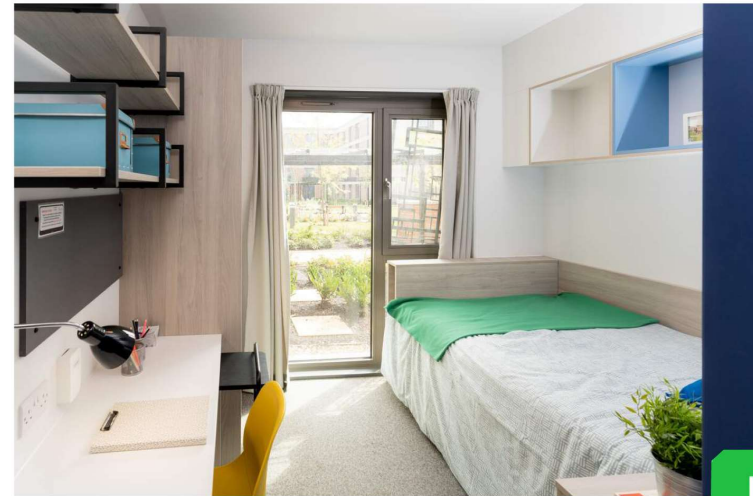


TYPICAL FLOOR PLAN



1. Premium bedroom
2. Stair core
3. Standard kitchen
4. Bedroom
5. Core
6. Cleaners' store

Wellbeing



Building performance

- Airtightness
- Enhanced acoustic performance
- Inherent fire resistance
- Robustness and longevity

Air Permeability Test Certificate



This is to certify that the following test and results have been produced in compliance with England and Wales regulation 43 of the Building Regulations 2010, Scotland Section 6 of the Domestic and Non-Domestic Handbook, Northern Ireland Technical Booklet and Isle of Man The Building Control (Approved Documents) Order 2014. A full report in line with the current approved procedures can be requested from the iATS tester.

Unique Certificate Number	10191329
Date of Test	7 th May 2021
Building name / Plot number	Block 8
Building Address	University of York, York, York YO10 5DD
r^2 (Correlation ≥ 0.98 - ≤ 1.00)	0.9964
n (Slope ≥ 0.5 - ≤ 1.0)	0.672
Envelope Area of Building m ²	1819
Report Reference	JL4145
Tester's Name	Aaron Newell
Company Name	EBSNI Ltd
iATS Tester No.	0030
Tester's level of competence	Level 2: Buildings > 4000m ²
Related party disclosure	No related party
Signed	

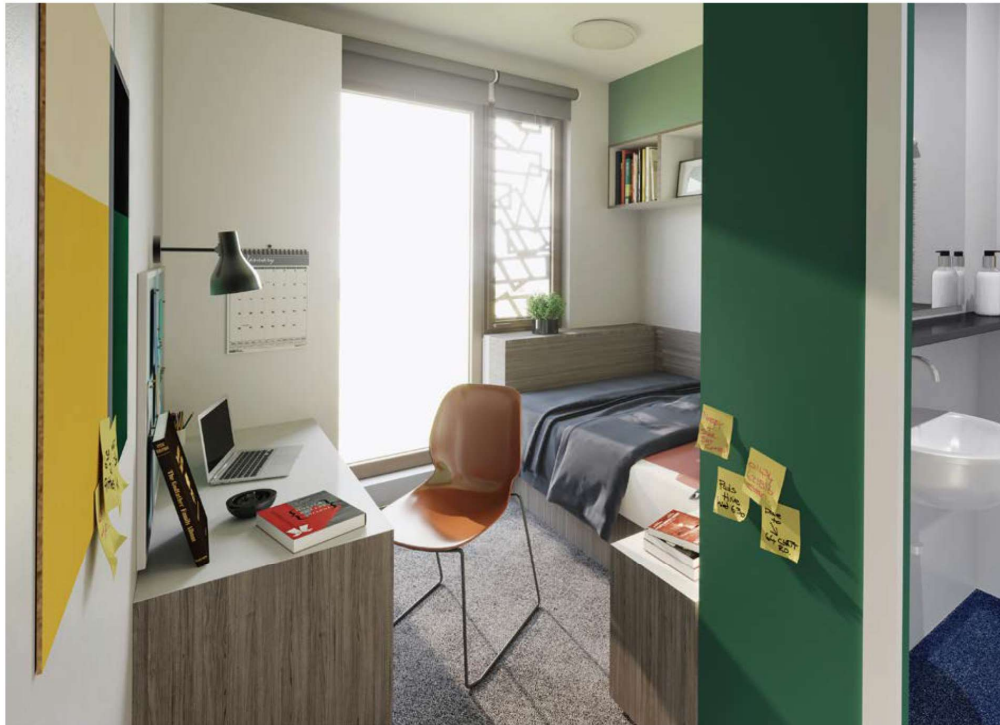
Independent Airtightness Testing Scheme
16 St Johns Business Park,
Lutterworth,
Leicestershire, LE17 4HB

e: certificate@iats-uk.org
t: 0300 688 0016
w: iats-uk.org
Company Registration No: 09309058

Measured Air Permeability
1.38
m³/(h.m²) @ 50 Pa



Reduced number of trades



CGI



Built



WWW.BUILDOFFSITE.COM

SHEPPARD ROBSON



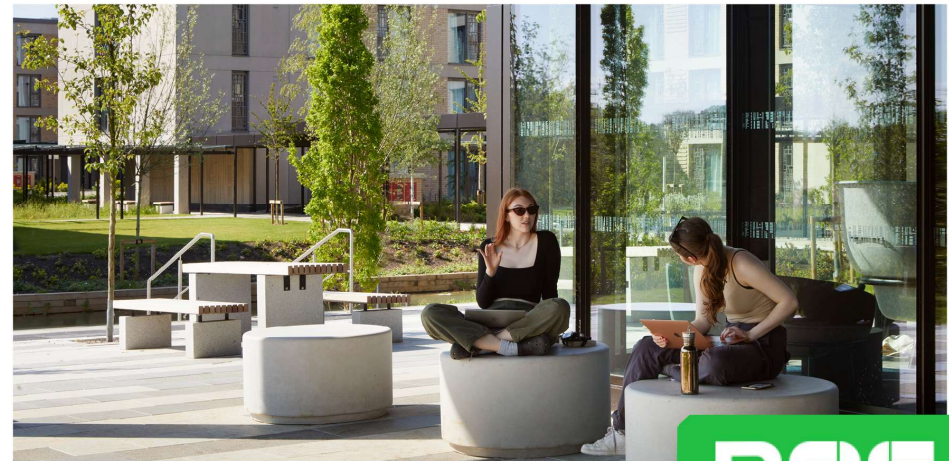
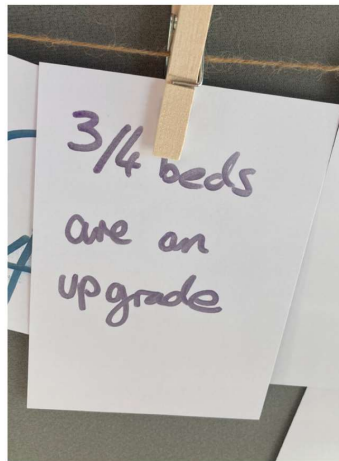
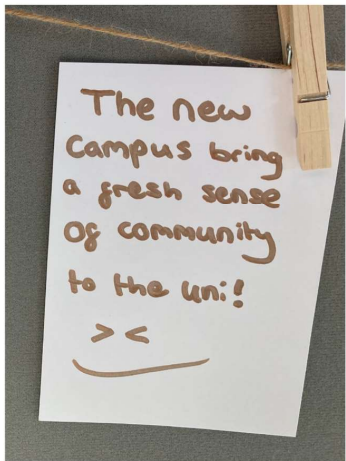
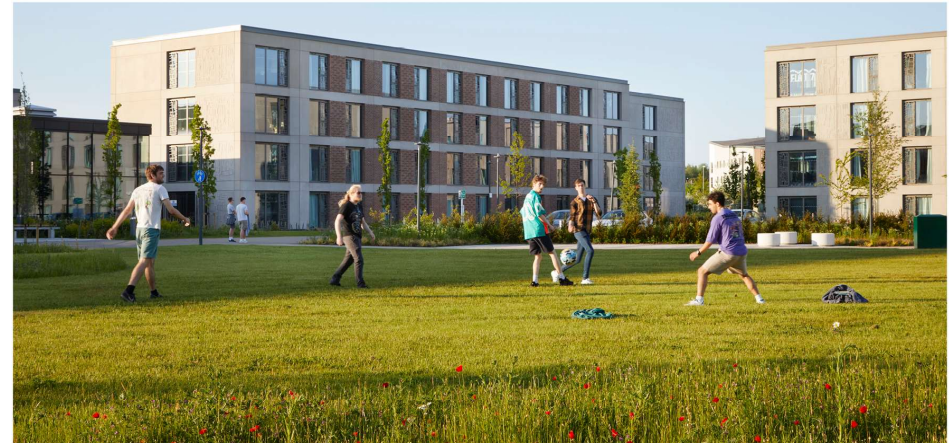
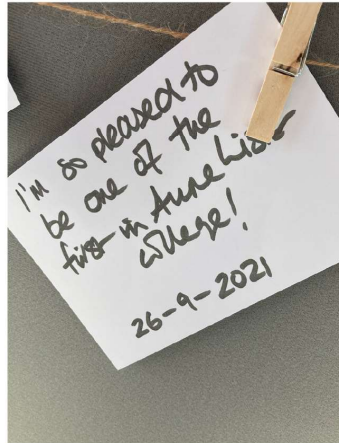


WWW.BUILDOFFSITE.COM

SHEPPARD ROBSON



Improved student experience is the ultimate gain



University of Manchester



WWW.BUILDOFFSITE.COM

SHEPPARD ROBSON

BOS
BUILD OFF SITE
COLLABORATING FOR IMPACT

Site Plan

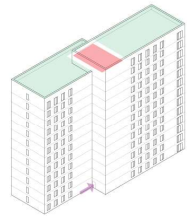
3355 bedrooms, 5 social hubs

Massing: 6-15 storeys

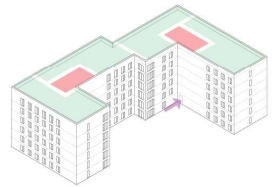
23 residential blocks

Delivered in 3 phases constructed within live campus

Significant number of mature trees



Typical High Rise



Typical Lower Rise
(2 L-Shape Blocks forming a courtyard)

- KEY**
- Central Amenity Hub
 - Local Satellite Hubs
 - Block Numbers
 - Total Levels

Lessons learned from York

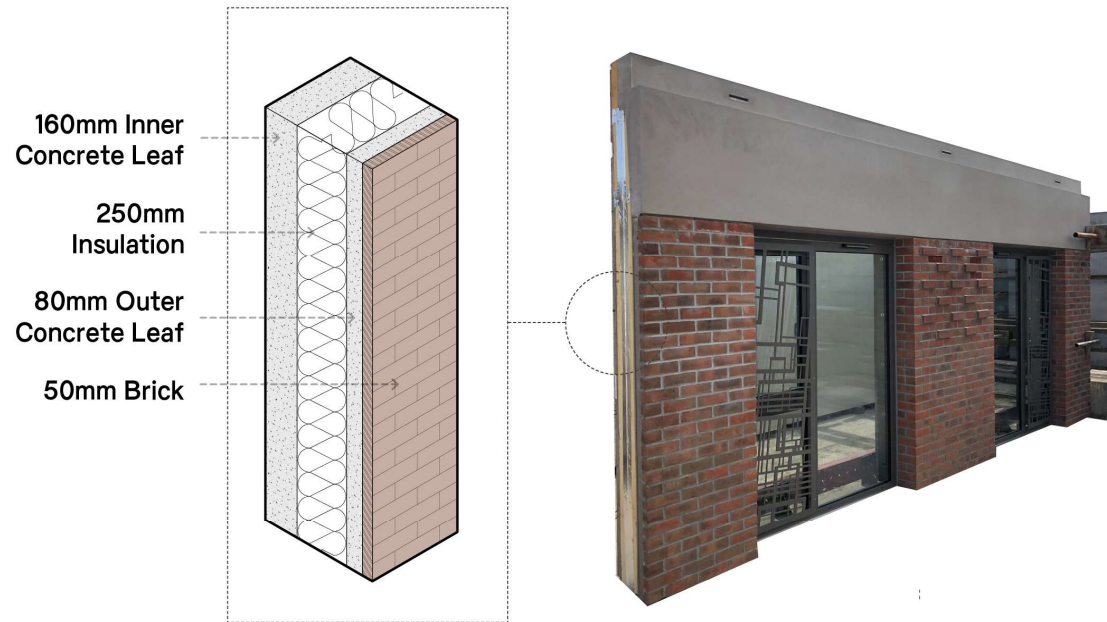
- U-values to retain the same
- Airtightness to improve from $1.38 \leq 0.6$ air changes per hour @ 50Pa
- All windows to be triple-glazed
- Changes to parapet detail
- Mechanical Ventilation with Heat Recovery (MVHR)
- Increased FTF: from 2.7 to 3.0
- Coordination of services: off-set conduits and sockets in adjacent bedrooms to avoid weak acoustics points



Why MMC was preferred

Key considerations for the choice of construction methodology:

- Programme
- Integrated façade treatment and quality
- Structural robustness
- Efficient foundation design due to spread loading
- Fire & Acoustics enhancement (3dB over Building Regs)
- Reduced floor to floor height
- Building services integration
- Maintenance over lifetime: structures and finishes
- Significantly reduced number of trades on site
- Significantly reduced number of deliveries – minimizing disturbance for existing campus
- No requirements for scaffolding / construction zone along façades
- Precision & construction tolerances: route to Passivhaus standards
- Considerable thermal mass





Industry consultation on BOS Manifesto

18 July 2024

@BUILDOFFSITE

#CollaboratingForImpact

WWW.BUILDOFFSITE.COM

