



Shaping the Direction of Offsite Housing

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Offsite construction for a smarter tomorrow
mcavoygroup.com

**Inspiring
brighter
futures**

Contents

- Introduction to The McAvoy Group
- Our approach to offsite housing
- **Case study** – the first affordable housing scheme built offsite in Northern Ireland
- **Cost summary analysis**

Smart Living



About The McAvoy Group

- One of the UK's leading offsite specialists
- Independent, family-owned
- Established principal contractor
- **Delivering high quality buildings** for education, healthcare, residential, commercial and infrastructure
- **Harnessing digital technology** to streamline processes and further improve the quality and efficiency of buildings
- Expansion into **offsite housing** – first project now on site

Smart facts

Facilities for affordable housing, market sale, student living, PRS, emergency housing

Smart facts

Digital technology – a vital part of our business

Smart facts

BIM Award - Contractor of the Year 2019

Smart facts

Providing bespoke offsite solutions for nearly 50 years

Smart facts

Two purpose-built offsite manufacturing centres spanning 150,000sqft

Innovations in Offsite Housing

- An innovative floor construction
- Highly flexible building system
- Roof module pre-tiled in the factory
- Bespoke housing designs

A flexible offsite solution for all housing tenures



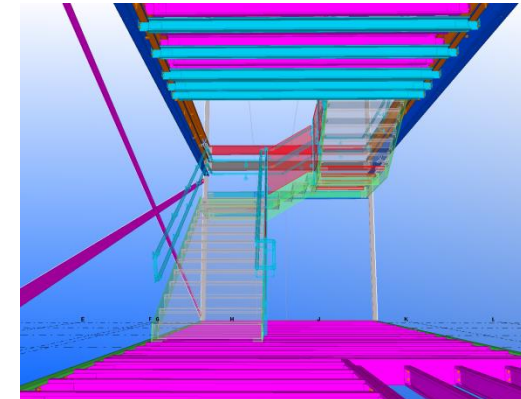
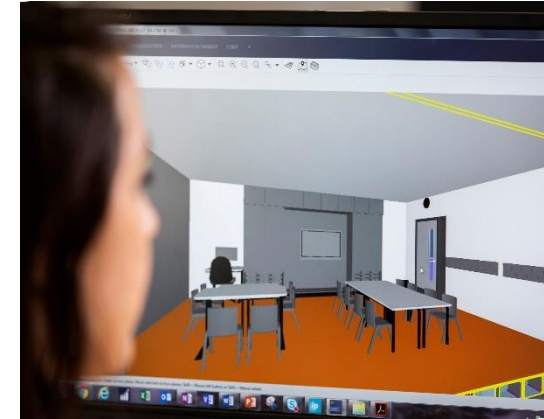
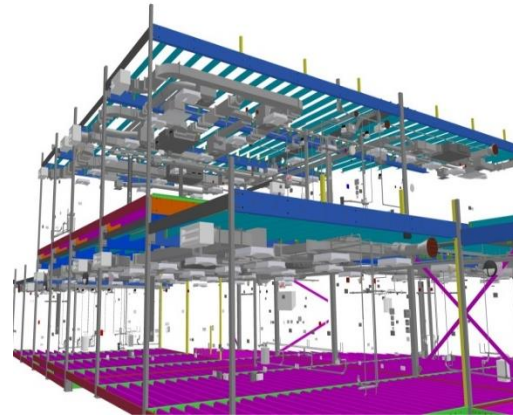
The Benefits of a McAvoy Offsite Housing Solution

- ✓ Improved certainty of delivery on time and on budget
- ✓ Reduced programme
- ✓ Faster return on investment
- ✓ BOPAS accreditation – reduced risk
- ✓ Increased collaboration
- ✓ Helping to address skills shortages
- ✓ Improved quality
- ✓ Safer work on site
- ✓ Less disruption to the local community



Our Approach to Design for Manufacture

- **Digital construction facilitates decision making** with stakeholders – use of virtual reality
- **3D modelling** – invaluable to better inform client, groundworks and module installation
- **Streamlines co-ordination of workflows** – time and cost savings
- **Clash detection** between structural and M&E elements – reduces risk of re-working in design, manufacture and on site



The First Affordable Housing Scheme Built Offsite in Northern Ireland

Client: Clanmil Housing Association

Facility: 40 new affordable homes

Site: Carrickfergus, Northern Ireland

Value: £4.7m

Type: Apartments, two-bedroom houses and detached bungalows

Partners: Knox Clayton Architects

Reducing the build
programme by around
60 per cent



Cost Summary Analysis

1	SUBSTRUCTURE	0.00
2	FRAME	0.00
3	UPPER FLOORS	0.00
4	MODULAR SYSTEM	0.00
5	ROOF	0.00
6	STAIRS & RAMPS	0.00
7	EXTERNAL WALLS	0.00
8	WINDOWS & EXTERNAL DOORS	0.00
9	INTERNAL WALLS & PARTITIONS	0.00
10	INTERNAL DOORS	0.00
11	WALL FINISHES	0.00
12	FLOOR FINISHES	0.00
13	CEILING FINISHES	0.00
14	FITTINGS, FURNISHINGS & EQUIPMENT	0.00
15	DISPOSAL INSTALLATIONS	0.00
16	WATER INSTALLATIONS	0.00
17	VENTILATION & AIR CONDITIONING	0.00
18	ELECTRICAL INSTALLATIONS	0.00
19	LIFT AND CONVEYOR INSTALLATIONS	0.00
20	FIRE AND LIGHTNING PROTECTION	0.00
21	COMMUNICATION, SECURITY AND CONTROL SYSTEMS	0.00
22	PV INSTALLATIONS	0.00
23	BUILDER'S WORK IN CONNECTION WITH SERVICES	0.00
24	SITE PREPARATION WORKS	EXCL.
25	ROADS, PATHS, PAVINGS & SURFACINGS	0.00
26	SOFT LANDSCAPES, PLANTING & IRRIGATION SYSTEMS	0.00
27	FENCING, RAILINGS & WALLS	0.00
28	EXTERNAL FIXTURES	0.00
29	EXTERNAL DRAINAGE	0.00
30	EXTERNAL SERVICES	0.00
31	MAIN CONTRACTOR'S PRELIMINARIES	0.00
	TOTAL	0.00



Agreeing Costs with Clients

- Be upfront about fees
- Discuss cash flow
- Align fees with programme
- Use RIBA stages with DFMA overlay
- Commit early to design fees to reduce risk and increase cost certainty



Cost Management – Lessons Learned

- Never try to cut corners
- Be realistic about VE options
- Work collaboratively and share risk/reward
- Hope is not a strategy
- Improve programme even further by bringing all design work forward
- Offsite provides cost certainty



Cash Flow

KPMG Smart Construction 2016

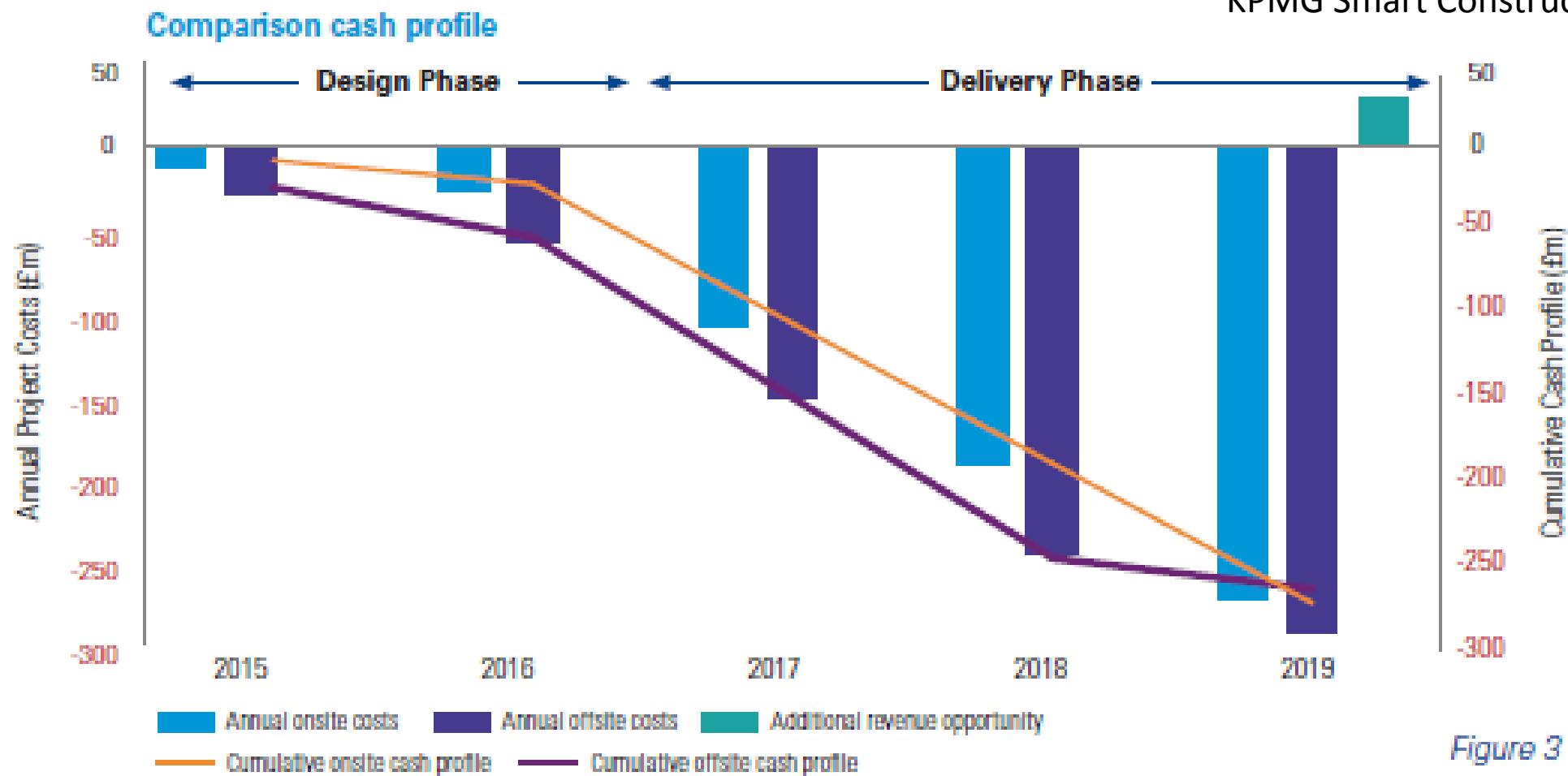


Figure 3

RIBA Stage 0	RIBA Stage 1	RIBA Stage 2	RIBA Stage 3	RIBA Stage 4	RIBA Stage 5	RIBA Stage 6	RIBA Stage 7
Deliverables for Pre-Construction and Design Fees							
Define business case and strategic brief	Develop objectives, budget and undertake feasibility with experienced design team	Prepare concept designs and budget costs. Agree procurement strategy and implement. PCSA. Surveys	Agree project strategies and develop detailed design. Submit planning	Gain planning. Complete detailed design. Place any early works orders. Surveys. CSA and enter contract	Start on site and in factory	Commission and handover. O&M manuals and COBie data	FM utilising VR and COBie output. Lessons learned
Fees payable for bespoke £10m project (10%)							
0	10% £100k	20% £300k	20% £500k	40% £900k	5% £950k	5%	£1m
Fees payable for standardised £10m project (8%)							
0	12.5% £100k	12.5% £200k	12.5% £300k	47.5% £680k	5% £720k	5%	£800k

DFMA Volumetric Principles

- ✓ Be creative (offsite does not mean boring...!)
- ✓ Engage early with experienced design and delivery team
- ✓ Stack services
- ✓ Module splits should be within walls
- ✓ Stairs/kitchens/bathrooms should not cross modules
- ✓ Loads should stack (or it's expensive!)
- ✓ Use appropriate system for building/room design
- ✓ Use grid appropriate to width of modules and use the golden ratio
- ✓ Upfront investment in design will generate cost and time savings in the long run
- ✓ Ensure infrastructure supports delivery and installation of volumetric modular
- ✓ Mix of technologies is possible (e.g. RC frame GF or concrete core above 12 storeys)
- ✓ Assume cost neutral with traditional forms of construction (lowest above ground costs are from £1,700 per sqm rising to above £3,000 per sqm)

Clanmil – The Client's Perspective

“We want to be able to deliver new homes more quickly for people on the housing waiting list whilst still maintaining our high standards of design and build quality. We also need a solution that will deliver a range of energy-efficient homes with affordable running costs for our tenants.”

“Significant time savings can be achieved with offsite construction. Offsite manufacture avoids delays caused by poor weather and it improves both quality and health and safety – with less impact on the environment. By partnering with McAvoy on this pioneering project and using advanced offsite construction technology, we believe we can reduce the build programme for these 40 new homes by around 56 weeks which is crucial to reducing waiting lists.”

Carol McTaggart, Group Director of Development, Clanmil Housing Association

Thank you

Smart offsite
solutions



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