



*Project
Speed*
Briefing

Project Speed & the school building programme

February 2021



As Government plots our economic recovery from the pandemic, it has emphasised the importance of investing in our built environment.

In June 2020, the Prime Minister highlighted the need to deliver new infrastructure and buildings quicker, under the banner of Project Speed.

At the same time, he spoke of “building back better” and the subsequent National Infrastructure Strategy emphasised that through Project Speed, “vital infrastructure like schools, hospitals, transport and other networks will be delivered better, greener and faster”¹.

The COVID-19 pandemic has already produced examples of project delivery being accelerated, notably the Nightingale hospitals. Similar approaches will be required if we are to fully reshape how we deliver future infrastructure programmes.

The Association for Consultancy and Engineering (ACE) has produced this briefing note as part of a series on Project Speed, with others exploring hospitals, rail and homes. This paper was written following a joint industry roundtable held with construction firms Mace and Reds10 in Q4 2020.

Find out more at www.acenet.co.uk/project-speed.



Opportunity for the schools sector

Recent commitments to rebuilding schools including the Spending Review 2020 and National Infrastructure Strategy, how COVID-19 has affected school design, and Net Zero expectations.

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More collaborative and value driven design and procurement

How value-based procurement, standardisation and scoping can positively impact on design, and how this interacts with the recently launched Construction Playbook.

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Product mindset to deliver with Modern Methods of Construction

Why it is vital the Department for Education treats school building as a single programme, rather than a series of discrete projects.

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Making use of live ‘performance’ data

As well as providing a snapshot of a building, data can improve design, including ventilation and temperature control which are linked to educational outcomes.

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¹ HM Treasury, National Infrastructure Strategy (2020); www.gov.uk/government/publications/national-infrastructure-strategy

OPPORTUNITY FOR THE SCHOOLS SECTOR

A well-resourced education system is at the heart of social and economic progress. This was recognised in the recent Spending Review where the Chancellor announced a £2.2 billion increase in schools funding, as well as confirming that funding would be provided to rebuild 500 schools over the next decade, as well as £1.5bn to rebuild colleges².

The schools built or refurbished through this programme will be in use for decades to come. This means we must make sure that they are fit for purpose for the mid-21st century:

- We have seen how technology has transformed learning so schools must facilitate e-learning to maximise flexibility for community use and to futureproof them for sudden moves to online education, as we have seen with COVID-19.
- We know that school buildings have not historically performed well in terms of energy management so they must be fully in line with the government's net zero aspirations.
- We have learned that thermal comfort and good air quality are directly linked to pupil performance so we must make sure that schools provide the right physical environment. Factoring in the health and wellbeing as part of school design, especially in condensed urban areas with limited space, can improve pupil performance.
- We have seen through the pandemic how quickly the way we live our lives can change therefore we must make school buildings more flexible and adaptable so that local infrastructure is more resilient to whatever pressures and needs arise.
- Despite the commitments in the Spending Review we know that public finances will tighten significantly over the coming years so we must be able to build schools more cost effectively than in previous eras, as well as ensure lower maintenance and running costs for the long-term.

ACE's work with its members and with partner organisations such as Mace and Reds10 has identified three priorities we must address if we are to deliver the above objectives.

- Make school project scoping and procurement between the client and industry more collaborative and value driven.
- Ensure the private sector supply chain fully embraces the opportunities of modern methods of construction.
- Design school buildings to generate live 'performance' data and use this to constantly improve student environments and wellbeing, which in turn will improve learning outcomes.

MORE COLLABORATIVE AND VALUE DRIVEN DESIGN AND PROCUREMENT

To get the best schools possible we need to maximise collaboration between the Department for Education (DfE) and the consultants and contractors who can add value through innovation and specialist skills. Such an approach is very much in line with the principles outlined in the Construction Playbook³. This collaboration needs to start early in the process and focus on three aspects:

Collaborative scoping – At the outset of the project optioneering should be done in partnership and should address fundamental questions early on. For example, is a completely new school building needed, or can we achieve the same outcomes by remodelling and re-purposing an existing part of the school estate? Do we have the right site and fully understand issues such as ground conditions? How do we make a new or repurposed school building flexible so that its layout, day-to-day use, and even function can be adapted quickly and easily in unforeseen circumstances?

² HM Treasury, Spending Review (2020); www.gov.uk/government/topical-events/spending-review-2020

³ HM Government, The Construction Playbook: Government Guidance on Sourcing and Contracting Public Works for projects and programmes, (2020);

Value-based procurement – Cost control is important, but must be combined with a more nuanced awareness of what ‘value’ means in a school building context. Clarifying the definition of value and associated metrics that should apply to each specific project is important and the Construction Innovation Hub’s Value Toolkit⁴ is a good way to do this.

Getting the right level of standardisation – At present, school procurement is often based on tightly controlled inputs aligned to the DfE school reference design⁵. The focus is often on minimising risk to the Department and while this is understandable, it risks missing out on the innovation which the market can bring. Consultants/contractors can identify and test innovative approaches through very detailed digital design which allows a much wider range of options to be considered and gives confidence that the chosen option can be effectively delivered on site and will perform as designed. While some standardisation is sensible, a balance needs to be struck.



Case study:
Kensington Aldridge Academy

Following the unfolding of the tragic events at Grenfell Tower, the Education Skills and Funding Agency (ESFA) approached consultancy and construction group Mace and modular experts Portakabin to provide a new building for the pupils of Kensington Aldridge Academy, which is located at the base of Grenfell Tower.

The whole building was created from the ground up, with Portakabin’s own supply chain providing all mechanical and electrical (M&E) and fit out which meant that there was no delay in the programme for further procurement. The value-based approach taken helped deliver an exceptional learning environment, consisting of two libraries, science laboratories and dance studios at a record pace (built in just nine weeks) which was vital for the community considering recent tragic events.

The collaborative scoping approach taken between the ESFA, Mace, Hammersmith & Fulham, Portakabin, suppliers and subcontractors – allowed barriers to be overcome and all parties to think creatively together and address the challenges of re-building a school for over 1,000 students in a short timeframe.



⁴ Construction Innovation Hub, Value Toolkit (2020); www.constructioninnovationhub.org.uk/value-toolkit/value-definition/

⁵ Education Funding Agency (EFA), Guidance Baseline designs for schools, (2014); www.gov.uk/government/publications/baseline-designs-for-schools-guidance/baseline-designs-for-schools-guidance

Case study:
SEMH Leeds Schools

Leeds City Council is enhancing its Social, Emotional, and Mental Health (SEMH) educational facilities by providing three new schools strategically located to serve the entire city. Together, this will enable more young people's needs to be met closer to home, reducing travel time out of the city to access the learning environment they need.

The design of the new schools is based on the successful educational model adopted in Barnsley at the Springwell Academy.

The project's main challenge was to bring together the concurrent design of three similar facilities with a single deadline while maximising repeatability and standardisation. Having been appointed at feasibility stage, Hoare Lea were able to engage with Leeds City Council and the academy on a regular basis as early as possible, making the most of their ability to understand the needs of the users. Together, these approaches meant Hoare Lea could agree a clear brief and influence the design right from the beginning.

The design of one school was progressed using Revit to an appropriate level of detail. This was thoroughly interrogated as part of the Management (QM) process before Hoare Lea commenced the design on the remaining schools. The planning and Revit capability allowed Hoare Lea to produce a robust design proposal in a relatively short timescale and meet the common deadline for all three schools.

This has resulted in specifically designed learning places that are fit for the future and will radically improve the learning, support, and outcomes for some of the city's most vulnerable children.



PRODUCT MINDSET TO DELIVER WITH MODERN METHODS OF CONSTRUCTION

Treating the school building initiative as a single programme rather than a series of discrete projects is vital and DfE has made good progress on this. A key principle which is outlined in the Construction Playbook and should be reinforced, requiring DfE to move towards a product mindset delivery model.

A previous education framework on the Isle of Wight took a 'programme approach' which created an established supply chain. The client provided visibility of the development programme well in advance of the work which enabled individual suppliers to schedule other work around the planned projects, provided security of income over a longer period, and motivated them to ensure that the projects were successful. This also enabled economies in purchasing to be achieved – windows, for example could be ordered in bulk to achieve the greatest discount. The Framework delivered 10% savings year-on-year for three years.

While programme approaches can enable cost-savings, they can also facilitate modern methods of construction (MMC), such as using 'platform construction systems' whereby a standardised 'kit of parts' can be developed to deliver school buildings. These can be manufactured offsite and assembled onsite,

with benefits not just in terms of cost but of issues like airtightness, energy management and reduced site and transport costs, while also offering improved quality at the component level that translates into the delivery of better quality buildings.

MMC, including a standardised product based building platform solution and rule book, will also introduce efficiencies at the front end feasibility stage – digital product libraries and design configurators allow school options to be set out and priced in significantly less time than currently taken, this allows projects to get to site and be completed far earlier than is currently achieved.

The 2020 Spending Review pledged to make MMC a major part of the delivery of the public sector infrastructure programme, and the DfE has been one of the most proactive government departments in recognising and embracing the opportunities of MMC⁶. It is important that the wider supply chain also commits to realising the potential of MMC, whether that is consultancies designing for MMC or contractors.

The Construction Innovation Hub's (CIH) Platform Design Programme is developing a platform construction system consisting of a standardised 'kit of parts' that will be able to deliver social infrastructure buildings such as schools⁷. This will help Identify, develop and demonstrate solutions that can be deployed at scale and facilitate design integrated, manufactured components and sub-assemblies that will adhere to new interface standards. The CIH is continuing to develop this work with government departments, including the DfE.



Case study:
Green Park Village School, Reading

Green Park Village School is a two-form entry primary school with nursery, located in a 1,400-property development by Berkeley Homes in Reading.

The original concept was for the school to be built based on a traditional onsite constructed steel frame. Reds10 were able to demonstrate how this type of building – even with its non-standard shape – can be delivered to a fraction of the budget, in a significantly reduced period of time onsite, and to high-quality, using volumetric modular construction.

- Reds10 were the design and build contractor which delivered a turnkey modular solution including groundworks and landscaping
- Steel framed volumetric building including a volumetric double height multi-purpose hall
- Naturally Ventilated through mixed mode ventilation
- Smart building technology monitors energy usage and provides data to enable the building to be operated at lowest cost and with a much-reduced carbon footprint
- 99%+ waste diverted from landfill.



⁶ Department for Education, Construction Framework, (August 2020); www.gov.uk/government/publications/school-buildings-construction-framework/construction-framework-handbook

⁷ Construction Innovation Hub, Our Core Themes: Manufacturing, (2019); www.constructioninnovationhub.org.uk/manufacturing

Case study:
Platt School, Kent

Platt school is a 1FE new primary school serving the village of Platt in Kent, part funded by Kent County Council (KCC) and the DfE.

The project consists entirely of SME partners – Baxall Construction, Crofton Consulting, Evans, and Langford and Miller Bourne – that have embraced modern methods of construction. This included utilising a design for manufacture and assembly (DfMA) timber frame cassette system from Streif, with all design work undertaken using modern digital techniques to ISO 19650 standard.

Having worked together using these techniques on similar projects over the years, the companies have developed a strong understanding of both the benefits and challenges working in this ways brings.

For instance, the timber frame factory needs to notified in detail of all the holes that are required in their panelled system at an early stage, including small (50 x 50mm) cut-outs for door access egress buttons. This detail is usually not known until later in the process. The significant investment in digital design techniques has enabled Crofton Consulting to provide more detail earlier in the process than they would have using a more traditional design approach.

Using these methods, they have delivered a low carbon building services solution, which incorporates naturally ventilated teaching spaces with air quality monitoring, windows that can open, and actuated high-level louvres. This also allows a 'night-time cooling' strategy to be employed, reducing peak summertime temperatures without the need for air conditioning.

The new school is currently under construction and is scheduled for competition.



Case study:
Greatfields School, Barking, London

Greatfields is a multi-phase project that delivers a 10 FE secondary and 3 FE primary school, creating a total of 2,500 school places. New facilities are needed for residents moving to a new development, Weavers Quarter which delivers around 1,800 new homes in Barking, London.

A full turn-key primary school was completed after only seven months on site. This was 50% faster than competitor proposals and handed over six weeks early, which enabled a move out of temporary accommodation in advance.

The benefits of offsite construction were successfully realised when Mid Group teamed up with Surface to Air Architects for the delivery of the first phase of the new all-through school. Mid Group also worked with Innovaré to produce a hybrid offsite solution to meet the technical demands of the client, including precast concrete floors. The team worked together during the initial design phase to develop a scheme that not only met the requirements of the school, but could also be delivered in an exceptionally short timeframe.



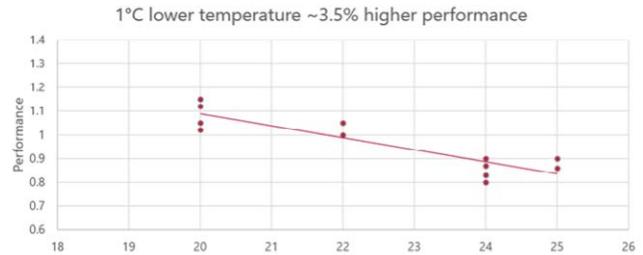
MAKING USE OF LIVE 'PERFORMANCE' DATA

We also need to make schools 'smart' buildings, generating live data across a range of parameters, including energy use, thermal comfort, and indoor air quality.

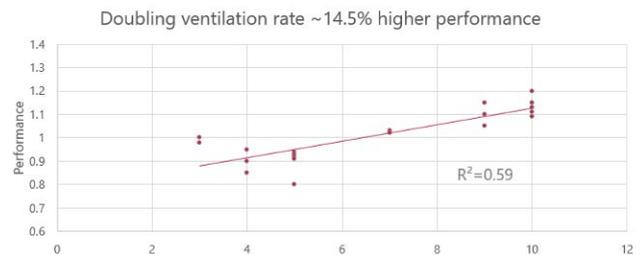
Data can be gathered on the condition of the building fabric and fittings over time, which can then be used to decide when a refurbishment will be most cost-effective. As well as improving day-to-day operational performance of the building, post occupancy evaluation (POE) studies provide data that gives valuable insights into in-use environmental performance that can be used to inform and to improve the design of school buildings.

The charts to the right show how important this is. A study carried out by the University of Denmark⁸ in 2007 demonstrates how classroom temperature and improved ventilation can have an impact on student performance. Collecting this data can be used to feedback into the design approach for future school buildings, helping to improve learning outcomes.

Performance of schoolwork as a function of classroom temperature



Performance of schoolwork as a function of classroom ventilation



Case study:

Bristol Metropolitan Academy, Bristol

The academy opened in April 2008, with capacity for 1,080 pupils as part of the Governments Building Schools for the Future programme. A year after Bristol Metropolitan Academy first opened its doors as an Academy, it was already among the most improved schools in the country, where 85% of its pupils achieved five or more GCSEs at grades A* to C.

Post occupancy evaluation (POE) studies have provided the data which has provided valuable insight into in-use environmental performance. This has been used to inform and to improve the design of school buildings.

Over a three-year period, Buro Happold carried out POE studies for the four Bristol BSF Schools, which included the Bristol Metropolitan Academy, assessing environmental and energy performance. The outcomes from this work, particularly the levels of fresh air ventilation being achieved in summer, has subsequently been used to inform the design of many schools, including St Bartholomew's School in Newbury, Chobham Academy in Stratford, and the City of London Academy, Shoreditch Park.



⁸ David P. Wyon and Pawel Wargocki, Technical University of Denmark, 'The effects of temperature, outdoor air supply rate and airborne particles on children in school classrooms' (2007)

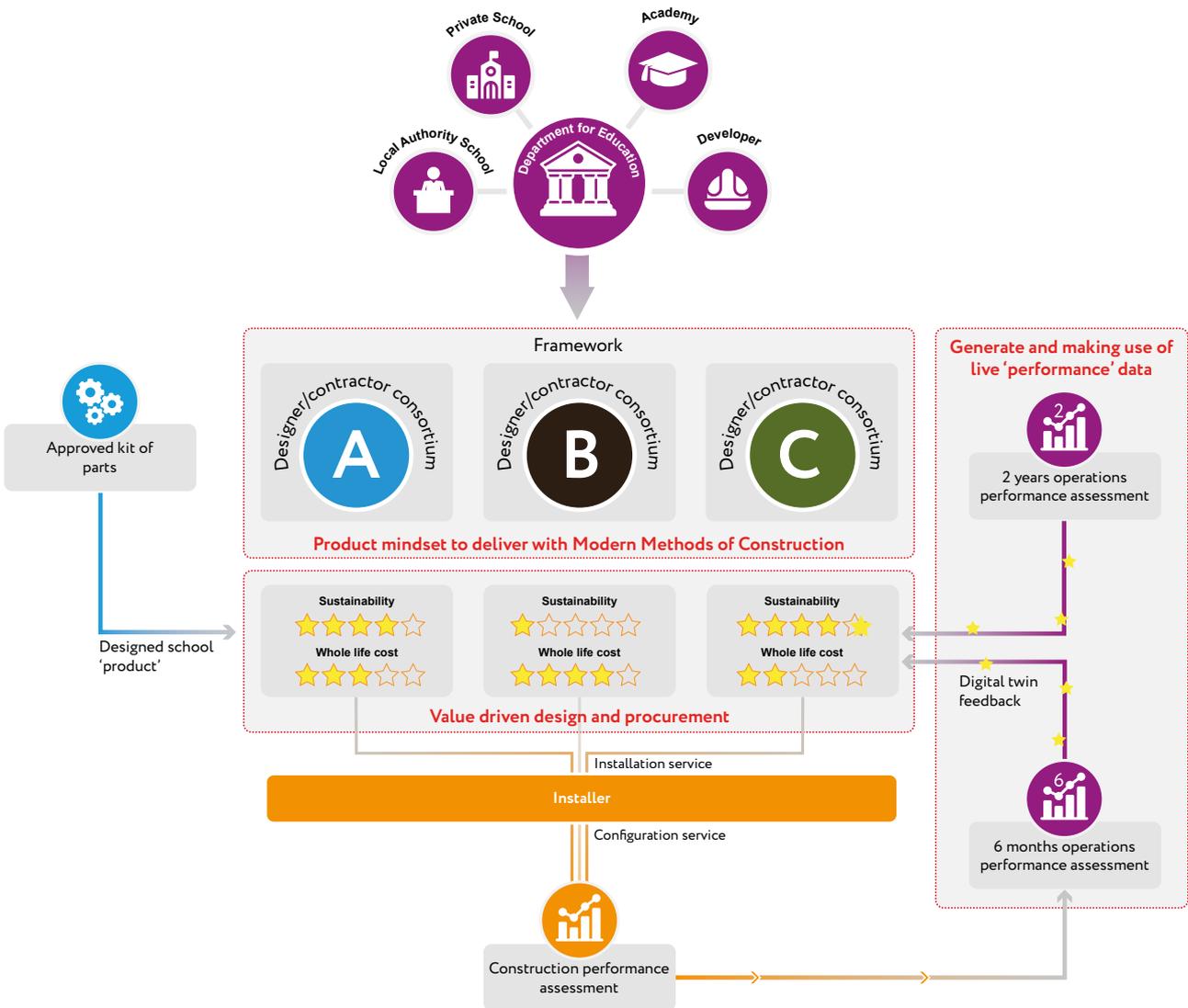
CONCLUSIONS

Creating world class schools is perhaps the most vital built environment investment we can make.

While there have been some great schools built in recent years, there have also been too many poor ones – not only have these been costly, but they have not provided the environment that will help young people learn and achieve.

Investing in education through the building of world class schools and colleges will deliver on the levelling-up agenda and be vital in the years ahead.

In this brief we have demonstrated how we can do much better. Pulling the separate themes of this brief together, we envisage a new ‘eco-system’ for the school building programme as shown below. Now only will this deliver significant investment on time and on budget, but it has the opportunity to improve educational outcomes too.





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