

Department for Business, Energy and Industrial Strategy

Response to House of Lords Science and Technology Select Committee report “Off-site manufacture for construction: Building for change” 2nd Report of Session 2017–19 Government Response

The Department for Business, Energy and Industrial Strategy welcomes the report of the House of Lords Science and Technology Committee on off-site manufacture for construction, and its recognition of the strategic importance of a more productive and better-performing construction sector to the UK.

As set out in the Sector Deal, the wider construction sector, which includes construction product manufacturing and associated professional services, had a turnover of £370 billion in 2016, contributing £138 billion in Gross Value Added (GVA) to the UK economy; around 9% of total value added. It also exported over £8 billion of products and services. The sector also employed around 3.1m workers, or around 9% of the UK workforce. The construction workforce is employed across the whole of the UK, with nearly 75% employed outside London and the South East. It is a major economic sector, which underpins the activities of all other sectors, which use the buildings and infrastructure the sector produces.

However, despite its importance, the sector has not delivered the same level of productivity improvements seen in other sectors of the economy. In particular, labour productivity in the construction sector has been consistently lower than that of the wider economy; around 21% lower on average since 1997. The pace of productivity improvements in the sector has also been slower than in the wider economy, meaning that over time, there is further divergence in the level of productivity between construction and the rest of the economy.

Improving the level of construction productivity could deliver significant economic benefits, as well as producing better, safer and more energy efficient and sustainable infrastructure, public buildings and homes. However, as set out in a number of reports, including the Egan Report in 1998 and the Farmer Review in 2016, these benefits can only be delivered through greater industry investment in innovation, skills and new capital equipment, as well as changes to the business model of the sector, with greater supply chain integration and collaboration between firms and clients. This requires the transformation of the construction industry from its current business model, which is based on projects and short term, to one that is more strategic and sustainable and based on long term investment. This will require the wide adoption of new construction technologies and techniques, including new digital and off-site manufacturing technologies, as well as new energy technologies and materials.

To drive this transformation and deliver these benefits, the Government has worked with the Construction Leadership Council and the wider construction sector to agree an ambitious Sector Deal. This seeks to deliver the strategic objectives for the industry of:

- a 33 per cent reduction in the whole life cost of assets;
- a 50 per cent reduction in the time taken from inception to completion of new build and refurbished assets;
- a 50 per cent reduction in greenhouse gas emissions in the built environment – thereby supporting the Industrial Strategy’s Clean Growth Grand Challenge; and
- a 50 per cent reduction in the trade gap between total exports and total imports of construction products.

To enable the delivery of these, the Sector Deal sets out a number of key commitments under the five pillars of the Industrial Strategy: ideas; people; infrastructure; the business environment; and places. These include:

Ideas

- investing an estimated £420m to support the development and commercialisation of new digital and off-site manufacturing technologies, and associated product and process standards, to provide assurance to construction clients. This includes an investment of £170m in the Transforming Construction programme, funded through the Industrial Strategy Challenge Fund.
- Developing product platforms for specific types of built asset, including new schools and homes, enabling the use of off-site manufacturing technologies to produce these.

People

- Implementing the commitments in the review of the Construction Industry Training Board, to make this a more strategic, future-focused body capable of delivering the skills the industry needs.
- Developing new apprenticeship standards and T-Level qualifications, including those relevant to new digital and off-site manufacturing technologies.

Infrastructure

- Deliver the investment set out in the National Infrastructure and Construction Pipeline, to provide confidence in future demand and enable the sector to invest in new technologies and skills.
- Implement the presumption in favour of off-site manufacturing in suitable projects, building on the mandated use of Building Information Modelling (BIM) Level 2 introduced in 2016.

Business Environment

- Embed the approach of procuring for value in relation to construction procurement and develop new infrastructure and contractor performance benchmarking.

- Improve contractual and payment practices within the construction sector, to encourage the development of more collaborative and better integrated supply chains.
- Work with the construction and financial services sectors to identify what sources of finance are needed to support the transition of the industry to a business model based on off-site manufacturing technologies.

Places

- Work to strengthen and better integrate mineral and construction products supply chains across the UK, to enable the UK materials and products sectors to meet the needs of a construction sector based on off-site manufacturing, and ensure the whole of the UK can benefit from a modernised and better performing construction sector.

The Government is committed to working with the construction sector to implement the commitments made in the Sector Deal. Delivering these would have a significant impact in supporting and accelerating the development and wide adoption of new digital and off-site manufacturing technologies, creating a more productive, profitable and sustainable construction sector, which produces better infrastructure, buildings and homes for those who live and work in the UK.

The case for off-site manufacture for construction

In the light of the health and safety benefits arising from off-site manufacture for construction, the Health and Safety Executive should work to raise the profile of these techniques and to encourage wider uptake of them. (Paragraph 45)

The Construction Division within the Health and Safety Executive (HSE) has initiated a project to better understand the health and safety risk profile of off-site construction. This will analyse the use of a range of off-site construction technologies on projects of different types and scales.

In exploring the different technologies and approaches, HSE will highlight the positive health and safety benefits of the various off-site construction methods, together with areas where there is scope for the use of these technologies to reduce health and safety risks.

Infrastructure, building and housing

We recommend that the Government explore options for the accreditation of housing built using off-site manufacture, to ensure that mortgages are available to those who wish to purchase them. (Paragraph 52)

The Government agrees that there is a need to ensure that those who wish to purchase homes manufactured off-site are able to obtain financial services products such as mortgages and home insurance. The Government's Housing White Paper, published in February 2017, recognised the potential to diversify the market and included a commitment to support a joint working group with lenders, valuers and the

industry to explore ways to give greater confidence on the quality of homes produced using off-site manufacturing technologies.

This group has been established, is chaired by industry expert Mark Farmer, and reports to the Housing Minister. Its chair is also part of the Innovation in Buildings workstream of the Construction Leadership Council. The role of the working group is to review the availability of assurance, insurance and mortgages for modern methods of construction for the residential sector, for both lenders and consumers. The group is looking at a range of opportunities to increase confidence in products, ensure homes built using new technology can access insurance and mortgages, and support the uptake of off-site manufacturing technologies across the housing market.

The group has met several times since its launch in December and is taking forward work to launch a single assurance platform assessing these new technologies later this year. This will help to ensure that mortgages and other financial services products are readily available to consumers who wish to purchase homes produced using modern methods of construction.

In addition, Innovate UK and the Research Councils have previously supported the development of both new business models for off-site construction, and related standards and accreditation processes, in order to support these. For example, the Build Off-site Property Assurance Scheme (BOPAS), which accredits production methodologies, and the Green Building Council Levering Economics for New Drivers to Energy Reduction & Sustainability (LENDERS) initiative, which enables mortgage providers to take account of energy efficiency in calculating whether mortgages are affordable for customers. The Government will work with the Construction Leadership Council to raise awareness of the availability of funding to help support the development of new business models and accreditation techniques.

The Government must set out what conditions it will attach to the extra financial support for housing to drive the uptake of off-site manufacture and other innovative technologies. (Paragraph 55)

The Government recognises the role of the off-site construction sector to increase house building and deliver 300,000 new homes each year by the mid 2020s. That is why the Housing White Paper includes specific measures to stimulate the growth of the off-site sector, including the creation of a pipeline of opportunities, to provide confidence to the sector and investors to invest in increasing their capacity.

The Government is providing finance for developers using these techniques to deliver homes. The £3bn Home Building Fund can provide finance to off-site developers, in addition to Small and Medium Enterprises (SMEs) engaged in the development or construction of homes, including new entrants to the market. So far, more than £120m of loans have been agreed for projects using off-site construction techniques. The 2017 Autumn Budget added a further £1.5bn to the Fund, specifically targeted at supporting small and medium-sized builders who cannot access the financial support they need to build.

Our Accelerated Construction programme will help ensure surplus central and local authority land is built out more quickly, and sets conditions on focusing support for SME builders and off-site construction techniques. Therefore, one of the

considerations attached on land disposed of through the Single Land Programme is the need to deliver homes using off-site construction techniques, unless scheme viability, site or market constraints do not allow this. We will also look at further ways we can incentivise the use of off-site construction techniques through our funding programmes.

We recommend that the Government, through Homes England, put pressure on housing associations and local authorities to stipulate the use of off-site manufacture, where appropriate, when procuring new housing developments. It should also consider mandating a proportion of off-site manufacture for large regeneration projects. (Paragraph 56)

The off-site industry faces a number of barriers to expansion, with the main factor being a clear and visible pipeline of demand. As such, the Government have started to take steps to address this, including encouraging the growth of the sector of the market that makes greater use of off-site construction techniques.

The Affordable Homes Programme (AHP) set out the benefits of off-site construction techniques and encourages bidders to use innovative ways of building. Bids to the programme are judged on value for money, deliverability and Homes England also capture information about the use of MMC as part of bids. In July, Homes England announced 8 strategic partnerships funded by the AHP which are worth £580m to deliver over 14,000 affordable homes by March 2022. All of these strategic partnerships have said they will use MMC to build a proportion of their homes.

Furthermore, our £450m Local Authority Accelerated Construction programme will take direct action to disrupt the market in a new and innovative way. Homes England, through the Local Authority Accelerated Construction programme, will deliver additional homes more quickly, focusing on diversifying the market by using Modern Methods of Construction and increasing the number of participants in the house-building sector. This will also support local authorities in their ambition to release surplus public sector land in their ownership with the capacity for at least 160,000 homes.

The Government wants to see Local Authorities and Housing Associations taking advantage of the opportunity to develop high-quality and cost-effective homes afforded by off-site construction techniques. We need to ensure we get the balance right in encouraging the sustainable growth of new technologies in housing, alongside increasing the overall number of new homes built.

There is an opportunity for the UK to maintain its position at the forefront of off-site manufacture globally in the commercial and high-rise residential sectors. However, we are concerned that the UK lags significantly behind other countries in the low-rise residential sector. The Construction Leadership Council and the Government have an important role to play in encouraging the use of off-site manufacture in the low-rise residential sector. This can be done by the spreading of best practice and case studies by the CLC and by the Government providing incentives to house-builders. (Paragraph 60)

This Government wants to support and sustain UK leadership in the development, commercialisation of off-site construction technologies and techniques, and its continued growth. This is why we are working with the Construction Leadership Council to increase demand for buildings produced using off-site construction techniques, to develop standards for these products and associated manufacturing technologies, and to support developers to identify and exploit opportunities in the market.

Homes England will be working with key development partners on a range of pilot projects, to demonstrate different off-site technologies on a number of sites. The purpose of these pilots is to provide a test bed for research and data collection to support both the objectives of our working group on quality assurance, insurance and finance and the wider industry.

The aim is to support the development and commercialisation of a wide range of off-site construction techniques that can both increase productivity and deliver high quality buildings. The government also aims to ensure that customers for new buildings have access to comprehensive information about these new technologies, how they work, and the benefits they can deliver are.

The Construction Leadership Council Innovation in Buildings work stream has already produced a number of resources for both housing clients and housebuilders looking at off-site construction, including a roadmap which sets out possible ways of overcoming the barriers that exist to its take up. A number of other resources are currently in development.

Skills

The Government must work with the construction sector to design new qualifications to close the current skills gap. This should be done primarily through the Construction Leadership Council as the industry lead body, but other industry bodies should be encouraged to engage in the process as well. (Paragraph 80)

The Government and the construction sector recognise the need to develop new training and qualifications frameworks to train and retrain those working in the sector in off-site construction techniques. The Construction Leadership Council is leading and co-ordinating work on construction skills, drawing on the expertise of the Construction Industry Training Board, trade associations representing a wide range of firms in the sector, and directly from construction firms.

The Government's approach to developing new apprenticeship standards is employer-led and aims to deliver the skills required by firms. Consistent with this approach, the Construction Sector Deal sets out a clear strategy for the industry to define its recruitment and skills needs – and the approach to delivering these – with support from the Government, including the Institute for Apprenticeships. The Sector Deal includes the ambition to increase apprenticeships in the sector to 25,000 per annum by 2020. To support this objective, the Sector Deal included an target to develop 50 apprenticeship standards in the sector by the end of the year, with a further increase in the number of standards, covering a wider range of trades and professions, in future years. Due to close working between Government and

industry, this target has now been achieved ahead of schedule with further frameworks under development.

The Government and the construction sector will also work together, and with education and training providers, to develop structured career pathways into and within the construction sector. This includes the delivery of high quality industry placements for students in schools, further and higher education.

As recognised by the Committee, the Government is also seeking to increase the quality and prestige of vocational education through the introduction of T Levels. Construction is due to be amongst the first T Levels launched in 2020, and as with new apprenticeship standards, the new qualification is being developed in partnership with industry. As part of the Sector Deal, the construction industry will work with the Construction Industry Training Board to develop solutions to the challenges of implementing industry placements in the construction sector, testing and trialing industry placements in the academic years leading up to 2020, and finally ensuring placements are available for up to 1,000 students taking Construction T levels from September 2020. The aim will be to increase placements to meet demand in future years.

The Construction Leadership Council has established a new future skills working group, which will bring together firms in the sector, the Construction Industry Training Board and other stakeholders. The role of the group will be to identify future skills needs, develop a comprehensive strategy for delivering these, including prioritising those areas where new apprenticeship standards or other qualifications are required. The Construction Leadership Council will also continue to review the skills, and knowledge necessary to support the use and greater adoption of digital and off-site manufacturing technologies.

The Government must ensure that young people entering the workplace are equipped with the digital skills needed for modern methods of construction, including off-site manufacture. It is important that this is reflected in post-school training provision, but also in the school curriculum so that the next generation have the basic skills necessary to undertake more specialist training. (Paragraph 81)

To ensure those entering the workplace are equipped with the skills that they need, the Government has introduced computing as a statutory national curriculum subject at all four key stages, as well as introducing new Computer Science GCSE and A Level qualifications. The content of these qualifications was developed with industry experts, to ensure pupils are equipped with the knowledge and skills required in the workplace, and to be able to be active participants in a digital world. Alongside emphasising the core principles of computer science, the curriculum also ensures that pupils become digitally literate; able to use, express themselves and develop their ideas through information and communication technology. The Government is also investing £84 million over the next four years to deliver a comprehensive programme to improve the teaching of computing and drive up participation in computer science.

In addition to the work taking place in schools to develop digital skills in the next generation, the £34m Construction Skills Fund (CSF) which is part of the National

Retraining Scheme Pilot, will pilot approaches to reskilling and upskilling individuals, including adults transferring from other industries, so that they are able to develop careers in the construction industry. This will include the digital skills needed for modern methods of construction. The Construction Industry Training Board will oversee the CSF, which will seek to establish at least 20 regional on-site training hubs nationally by March 2020.

Perceptions of the types of jobs available in the construction sector are based on the skills needed for on-site construction. We welcome the creation of the single industry platform and portal announced in the Construction Sector Deal to support construction careers and promote the new types of careers in construction to the next generation. (Paragraph 82)

The Government welcomes the Committee's support for the approach set out in the Sector Deal, of bringing together existing initiatives to promote construction careers under a single industry platform and online portal. This forms part of a programme of work, led by the Construction Leadership Council, which will also streamline the industry's careers initiatives together into a unified campaign with a common brand by the end of 2019.

The objective of this campaign will be to engage with potential recruits outside of the industry, communicating using a range of media and online platforms. This will aim to provide comprehensive information about the wide variety of roles within the construction sector, including both traditional construction roles, as well as the new roles being created by the development and use of digital and off-site manufacturing techniques.

We support the Government's plans to create new apprenticeship standards across the sector. (Paragraph 83)

The Government welcomes the Committee's support for its approach to new apprenticeship standards. As set out above, progress on construction apprenticeships has accelerated, and we have now achieved the target set out in the Construction Sector Deal (a target to develop 50 new apprenticeship standards) with more currently under development.

Alongside this, the Government, with the construction sector, must re-assess the wider operation of the Apprenticeship Levy in the construction sector and make the necessary changes to ensure the money is best spent to benefit the long-term viability of the sector. (Paragraph 83)

Employers already have considerable scope to make the levy and the wider apprenticeship system work for them. As previously stated, progress on the development and approval of new apprenticeship standards for the construction sector has been accelerated in recent months. The Government agrees that it is important that this progress is maintained, so that the construction industry is able to make best use of Apprenticeship Levy funds, and we will continue to work with the construction sector to achieve this objective.

In April 2018, the Government introduced a new flexibility to enable levy paying employers to transfer 10 per cent of their annual levy funds to other employers to

fund apprenticeships. Through the National Apprenticeship Service, Government is supporting employers and intermediaries to make the most of this flexibility, for example through joint purchasing or facilitating transfers. We recognise that this has potential to increase apprenticeships in construction, given the nature of the industry's supply chains.

Sector barriers to uptake

The construction sector needs to build trust and partnerships so that companies can work together to improve the uptake of off-site manufacture. We welcome initiatives such as the Construction Leadership Council and the Infrastructure Client Group's Project 13 but more needs to be done by other industry groups to facilitate collaboration within the sector. (Paragraph 95)

The Government agrees with the views of the Committee. It is clear that the current business model of the sector, which is based on individual projects, and focused on costs and managing cash flow, will not enable the industry to adapt to new technologies and techniques and facilitate the investment needed to deliver this. The Government will support initiatives that will deliver a more collaborative approach, and stronger and more sustainable supply chain relationships, as well as supporting the development of new technologies and techniques that will underpin a more sustainable business model within the construction sector.

The *Transforming Construction* programme will provide up to £59m funding for Collaborative Research and Development programmes (CR&D) from July 2018 to March 2022. Funded projects must be collaborative and involve a micro, small or medium-sized enterprise (SME). In particular, multidisciplinary collaboration is strongly encouraged. The programme will prioritise projects which demonstrate cross-sector collaboration and scalable solutions. A key performance indicator will be the number of business partnerships/collaborations created in through the programme.

The *Transforming Construction* programme will seek the establishment of a Core Innovation Hub (CIH) that will provide facilities for R&D, integration and commercialisation of off-site technologies. The provision of these facilities will simplify the opportunity for high growth SMEs to engage with the programme, test disruptive innovations and to collaborate with the research base.

The *Transforming Construction* programme will fund a single "network plus" for up to £2.5 million. The network plus will create a new community linking together other investments made under the *Transforming Construction* programme with the broader research base, relevant businesses and wider stakeholders. It will engage the network membership through events, communications and small-scale funding calls. It is hoped that these will help to drive the adoption of more collaborative forms of working within the sector.

The Construction Leadership Council should provide overarching, active and focussed leadership for the sector. They should gather and disseminate data including case histories, sign-post to resources and spread best practice around the sector. (Paragraph 96)

The Construction Leadership Council has led the development of the Sector Deal for the industry, and will lead on the implementation of the Sector Deal, reviewing progress at its quarterly meetings. Additionally, a number of sub-groups will be convened that, working closely with industry stakeholders, will oversee the delivery of the key commitments of the deal. Membership of these sub-groups will be extended to trade associations and professional bodies, as well as other partner organisations, to ensure they are representative of the sector as a whole and able to co-ordinate activities across it.

Designers, contractors and suppliers must all have early involvement in a project for off-site manufacture to be successful. This requires a change in business models in the sector and amongst clients, both private and public sector, as well as far greater collaboration. There is a need for a client's professional team or advisers to adopt a different approach, as outlined by the Infrastructure Client Group's Project 13 (see Figure 1), to enable off-site manufacture. We welcome moves in the construction Sector Deal to address business models in the sector and make them more effective. (Paragraph 104)

The Government welcomes the Committee's support for the proposals the sector deal sets out to improve collaboration within the sector through a change to its prevailing business model. We believe the sector deal represents the '*shared leadership by the industry, its clients and the government*' which the Farmer Review (2016) identified as being essential to achieving this change.

The sector deal sets out a number of actions aimed at creating the strong, integrated supply chains that will underpin collaboration. Firstly, the deal will deliver a new, fairer approach to contract and payment practices to ensure SMEs are not unfairly disadvantaged, reducing risk to SMEs and supporting collaborative supply chains. It will also deliver a boost to the sector's exporting capability, driven by new investments in digital and manufacturing technologies, and creating the opportunity for UK designers, contractors and suppliers to collaborate on international infrastructure projects. Finally, the deal seeks to improve access to the capital the industry needs to collaboratively invest in innovation, and further improve the technologies and techniques developed through the *Transforming Construction* programme.

At present the upfront finance required to set up off-site manufacture appears greater than the finance required for conventional construction. We welcome the commitment in the Sector Deal to identify sources of funding available to the sector.

Should this review highlight gaps in the availability of funding, we recommend that the Government work with the construction sector and the financial services sector to develop sources of funding to fill those gaps. (Paragraph 107)

The Government recognises that if the construction sector is to adopt new digital and off-site manufacturing technologies at scale, then it will need to access new sources of finance, and particularly longer term investment finance. This is likely to require the involvement of a wider range of financial services and investment finance providers than are currently engaged in providing funding to the sector.

The Government will work with the Construction Leadership Council, the British Business Bank, firms in the construction and financial services sectors and their representative bodies to identify what types of funding are required, the extent to which these can be provided by the financial services market and current providers, and any gaps in provision. Where gaps are identified, the Government will work with stakeholders to address these, to ensure that the industry has access to the finance that it needs to expand its off-site manufacturing capacity.

We will follow with interest the success or otherwise of the new models developed through the Infrastructure Client Group's Project 13. If they are successful in tackling some of the issues we have raised around risk and cash flow, the Construction Leadership Council should promote these models across the sector. (Paragraph 113)

The Government welcomes the initiative taken by the Infrastructure Client Group (ICG) in developing Project 13 as a new approach to commissioning and delivering infrastructure and construction projects and the management of infrastructure assets. The existing business model of the construction sector, which is based on individual projects and where supply chains dissolve once this is completed, is inefficient, and does not support the development of strong, collaborative relationships within the supply chain that have been the key to success in other sectors, particularly manufacturing sectors.

The ICG's Project 13 provides an alternative model, and some of the approaches that it recommends have already been successfully adopted in the public and private sectors. The Government will work with the Infrastructure Client Group to support the wider adoption of these approaches across the public and private sectors.

Many of the barriers to the greater uptake of off-site manufacture for construction facing the construction sector, such as a lack of collaboration and attitudes to risk, are cultural and can only be dealt with by the sector. The sector must look at ways to reduce the barriers and this should be led by the Construction Leadership Council. (Paragraph 120)

The Government will support the Construction Leadership Council in its efforts to change attitudes to collaboration and risk in the sector, and amongst its clients. This work will be taken forward as part of the work on the business model and supply chain.

Government actions to overcome barriers

The Construction Sector Deal is an important step forward for off-site manufacture and the wider construction sector. It is important that the Government and the Construction Leadership Council work together with the sector to make sure the Sector Deal is a success. The CLC must draw up a detailed implementation plan containing a timetable, objectives and metrics as soon as possible and hold those responsible for delivering the Sector Deal to account. This is particularly important considering the sector's problems with collaborating and working together in the past. (Paragraph 123)

The Government agrees with the Committee's recommendation, and can confirm that work on an implementation plan is already in progress with the Construction Leadership Council. As part of its oversight of the implementation of the Construction Sector Deal, the Construction Leadership Council is also committed to producing an annual report to ensure that the industry, construction clients and other stakeholders are informed of the progress made in implementing the commitments made in the Sector Deal, and the outcomes that have been achieved.

We recommend that the Government provides companies who want to bid for Government contracts with the information they need to comply with the BIM mandate. It is important that the Government enforces the mandate, as it is a significant enabler for off-site manufacture. (Paragraph 130)

The Government's 2011 Construction Strategy defined a collaborative standards-based approach, which is referred to as BIM Level 2. This was introduced to help clients and suppliers understand how BIM and digital technologies should be used consistently on construction and infrastructure projects. This standard, aimed to provide clarity to industry about what was required, enable it to invest to build the required capacity and to facilitate procurement by the public sector against a clear and objective standard. The Government currently requires all projects to be delivered according to the BIM Level 2 standard. As set out in the Government Construction Strategy 2016-2020, all central government departments use this method.

The Government continues to collaborate with industry through a number of channels, to drive the continued uptake of BIM within the construction supply chain. The information required for companies to comply with the BIM mandate is provided by the Centre for Digital Built Britain (CDBB). CDBB provides technical assistance and support to the UK's central public construction and infrastructure clients; and engages across industry and academia. It does this by working with industry and academic groups, such as the UK BIM Alliance which works to ensure that BIM Level 2 is embedded in the industry.

The Government will continue to work with institutions and industry representative bodies to increase the adoption of BIM technologies among their members and engage with different parts of the supply chain, helping them understand our needs as a client and provide them with the opportunity to feedback and share experiences and lessons learned on the challenges they face in regard to BIM Level 2 implementation. We also continue to promote international adoption of the UK's BIM standards to develop opportunities for growth and trade.

We recommend that the Government develop and publish a series of Key Performance Indicators against which the success of the "presumption in favour" can be assessed. Furthermore, where the presumption in favour is set aside and a project goes ahead that does not use off-site manufacture, the Government should publish a statement explaining why it has not been used and justifying that decision. (Paragraph 135)

In December 2017 the Government introduced the *Transforming Infrastructure Performance* (TIP) programme. TIP aims to increase the effectiveness of investment in infrastructure by improving productivity in four key areas. The first area is

Benchmarking for Better Performance. This means developing disciplined and consistent approaches to defining and measuring required outcomes.

The presumption is a cross government commitment to off-site technologies. This will provide departments with the scope to implement those technologies in a way which is appropriate to their sector. Comparing the precise performance of off-site against on-site is complex and, given that the technologies are still being defined, it is difficult to identify suitable Key Performance Indicators that can support the presumption in favour at this stage. However, it is our intention to review this on an ongoing basis.

The presumption in favour applies *‘across capital programmes, where it represents value for money’*, and therefore justification would be brought out in the business case process. Gathering and publishing this information would not support the presumption, which is an agreement between departments. However, the Government intends to share information about the progress made and the lessons learned from applying off-site manufacture for construction to public sector projects.

We recommend that the Government, using the levers we set out in Box 8, provides a steady pipeline of projects for the construction sector so that companies can plan and make the capital investments necessary for off-site manufacture. We welcome the Government’s commitment to the National Infrastructure and Construction Pipeline in the Construction Sector Deal. It is important that the Government adheres to the pipeline to provide certainty to the sector. The ‘presumption in favour’, if properly executed, will also help to do this. (Paragraph 140)

We welcome the Committee’s support of the National Infrastructure and Construction Pipeline and the Construction Sector Deal, and recognise their potential to support off-site manufacture. We work closely with industry to develop the National Infrastructure and Construction Pipeline, which shows details of planned infrastructure and construction investment across the public and private sectors. The government has produced regular updates to the pipeline since 2011. We will continue to develop the pipeline and engage with industry and other stakeholders as part of the Construction Sector Deal.

The use of national frameworks for procurement that include different suppliers should help maintain a visible and reliable pipeline. It should also ensure that there is no loss of learning between projects and that knowledge can easily be transferred from one project to the next, unlike the current system where learning is often lost as each project is re-tendered. Having different suppliers signed up to the frameworks will enable these benefits while also ensuring that there is still competition between suppliers. (Paragraph 149)

The Crown Commercial Service (CCS) pan-Government construction framework agreement is targeted for award in Spring 2019, and will be available for use by all government departments and wider public sector organisations. It will use alliancing at the core of the framework and will create a management information hub that captures data from all projects awarded under the framework. It will therefore create

and support the necessary environment for knowledge sharing across multiple projects and programmes.

There will be multiple suppliers appointed to the frameworks, to ensure that there is the required capacity and resilience of supply while maintaining the requisite competitive tension to drive value for money for the taxpayer. By CCS working closely with the Infrastructure and Projects Authority, Government Construction Board and our customers it will support a more visible and reliable pipeline available to the appointed suppliers and their supply chain that will enable them to plan resources and investment in people and resources more effectively.

We welcome the commitment to develop a definition of value and for steps the Government has taken so far to embed procuring for value in the public sector. However, more needs to be done. The Government must consider what further action it can take to embed procurement for value in the public sector and the consideration of externalities, including environmental performance, reduction of waste and health and safety in all procurement processes. (Paragraph 150)

The Crown Commercial Service pan-Government construction framework agreement, will enable contracting authorities to procure on the basis of seeking the price for just construction, or to adopt an approach that seeks the price for both construction and a given number years maintenance. Additionally, existing policies and guidance such as the HM Treasury Green Book and the *Transforming Infrastructure Performance* (TIP) programme will encourage contracting authorities to consider and measure whole-life costs as part of their decision making.

The Infrastructure and Projects Authority (IPA) introduced TIP in December 2017. The third area of TIP is 'Procurement for Growth'; within this, Government will aim to use its buying power to build smarter commercial relationships and drive supplier performance. This is a key part of our TIP strategy to unlock the benefits. Furthermore, the IPA has made a commitment to i3P, an industry platform which seeks to encourage collaboration and innovation in infrastructure.

We recommend that the Government shares intelligent client best practice in relation to off-site manufacture between departments and with other public-sector clients, such as NHS trusts and local authorities. (Paragraph 152)

The Infrastructure and Projects Authority have established Modern Methods of Construction (MMC) Working Groups which are driving forward this agenda, linking up with the Infrastructure Clients Group and other industry bodies, as well bringing together clients and delivery bodies across Whitehall. The group reports to the Government Construction Board, a body of senior officials with government construction responsibilities.

The Government also intends to use the *Transforming Infrastructure Performance* (TIP) programme to share best practice with industry, and we will continue to explore opportunities for the working groups to expand and develop to other parts of the public sector and wider industry.

The Government will continue to work with the Construction Leadership Council to implement an 'outcome based, transparent and efficient' procurement regime in line with the goals of the Business Models and Supply Chain work stream.

The Government should promote the adoption of recognised standards for off-site manufactured components within the industry by working with bodies such as the British Standards Institute and the Building Research Establishment. (Paragraph 155)

The development and adoption of standards is an area in which the UK possesses considerable expertise. A report by the Centre for Economics and Business Research in 2015 estimated that applying British Standards is worth £8.2bn to the UK economy. Furthermore, 28% of annual growth in GDP, 34% in productivity gains and £6bn of exports is attributed to applying standards.

The UK has particular expertise in the development of standards for the built environment, including the Building Research Establishment Environmental Assessment Method (BREEAM), the world leading sustainability assessment method for projects, infrastructure and buildings. Globally, over 2,250,000 buildings have been BREEAM assessed. Similarly, the UK has been an international leader in developing BIM standards and assessment methodologies, and in adopting these, with the Government playing an active role through mandating their use. The UK's BIM methodologies have been exported to USA, Australia, New Zealand, Canada, Japan, Chile, Mexico and Brazil.

The Government intends to build on these successes. To achieve this, a key element of the *Transforming Construction* programme will be the development and validation of new standards for components of buildings manufactured off-site, and the associated manufacturing techniques. These are an essential part of the programme, as they will strengthen customer confidence in the quality, safety and future performance of buildings produced using off-site construction techniques.

Her Majesty's Revenue and Customs should work with the sector to foster greater understanding of how R&D tax credits work, what the benefits are and how to meet the criteria to receive them. (Paragraph 161)

HM Revenue and Customs figures show that firms classified as being within the construction sector submitted 705 claims for R&D Tax Credit with a total value of £45m in 2015-16. This included 540 claims made by SMEs within the sector. Whilst this is low compared to some other sectors, it is likely that a number of the claims made by firms in other sectors, such as construction products, are included within the statistics for manufacturing.

The Government agrees that it is important that firms in the construction sector have access to information about the R&D Tax Credit scheme, and are able to claim if they are entitled to do so. HM Revenue & Customs publishes guidance on the R&D Tax Credit, which is available on the .gov website at (gov.uk/guidance/corporation-tax-research-and-development-rd-relief). The Construction Leadership Council will consider how best to promote the R&D Tax Credit to firms within the construction sector as part of its work on finance and investment.

We recommend that a portion of Government funding for research and development in the construction sector should focus on detailed performance data for the lifetime of buildings and infrastructure. Not only will this provide an important evidence base for improving future designs, it will also enable a comparison for whole-life cost can be made between manufactured and traditionally built buildings and infrastructure. (Paragraph 162)

Optimising whole-life performance of buildings and infrastructure is a key objective of the *Transforming Construction* programme. Projects to address this recommendation are eligible for funding from competitions within the Programme. The first competition funded from the *Transforming Construction* programme was launched on the 23 July, and offered eligible firms and other organisations the opportunity to bid for funding from a budget of £12.5m allocated to the competition (apply-for-innovation-funding.service.gov.uk/competition/203/overview). Further competitions will be launched in the future.

The role of the Government and the wider public sector is pivotal in a move to greater use of off-site manufacture. We have set out actions that we think the Government should take including implementation of the Sector Deal, committed execution of the ‘presumption in favour’ of off-site manufacture and a greater move to procuring for value rather than cost. (Paragraph 163)

The Government welcomes the Committee’s report, the areas of focus that it proposes, and the actions it sets out. We look forward to providing an update on our progress in due course.

14 September 2018