CITB RESEARCH

INDUSTRY INSIGHTS

SCOTLAND

Construction Skills Network
Labour Market Intelligence
2018–2022

About CITB

CITB is the Industrial Training Board (ITB) for the construction industry in Great Britain (Scotland, England and Wales). CITB uses its research and labour market intelligence to understand the sector's skills needs, and works with industry and government to make sure construction has the right skills, now and for the future.

CITB is modernising its funding approach to invest in areas that will deliver the best returns for industry, and enable the sector to attract and train talented people to build a better Britain.

About Experian

Experian's Construction Futures team is a leading construction forecasting team in the UK, specialising in the economic analysis of the construction and related industries in the UK and its regions. As such we have an in-depth understanding of the structure of the construction industry and its drivers of change. The Construction Futures team has collaborated on the Construction Skills Network employment model with the CITB since 2005, manages a monthly survey of contractors' activity as part of the European Commission's harmonised series of business surveys, and a quarterly State-of-Trade survey on behalf of the Federation of Master Builders.

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SCOTLAND

Construction output in Scotland is projected to be stable during the 2018-2022 period, 0.1% average annual growth per year, with ongoing falls in infrastructure work mitigated by growth in most of the remaining sectors. On this output prognosis, construction employment in Scotland will fall due to some productivity gains, and the decline is estimated at 0.7% a year on average. Despite this, net flows to and from the industry workforce means that Scotland still has an average annual recruitment requirement, estimated at 2,130, 0.9% of base 2018 employment, a lower ratio than for the UK at 1.2%.

KEY FINDINGS

Growth is expected to focus on the public housing sector in the long term, by

3.9%

Employment is forecast to decline by

0.7%

a year on average

Scotland has an ARR of

2,130

After three years of growth, construction output in real terms stalled in Scotland in 2016, largely due to a sharp fall in the infrastructure sector from its peak in 2015. Output is estimated to have fallen by 3% in 2017 due to declines in infrastructure, public non-housing and commercial sectors, along with stagnation in repair & maintenance (R&M) work.

Over the 2018 to 2022 period, construction output in Scotland is expected to remain stable, with ongoing falls in infrastructure activity mitigated by decent growth in the housing sectors and R&M. If the infrastructure sector was excluded from the calculations, then the rest of the construction industry is predicted to grow by an annual average rate of 1.4%.

Expansion in both public and private housing will be driven in no small part by the Scottish Government's target to build 50,000 new affordable homes by 2021, the bulk of which will be public, but a significant proportion will be delivered by the private sector. There are several big long term housing developments on site or in the pipeline, particularly around the Aberdeen area, and these should help to drive decent growth in the private housing sector.

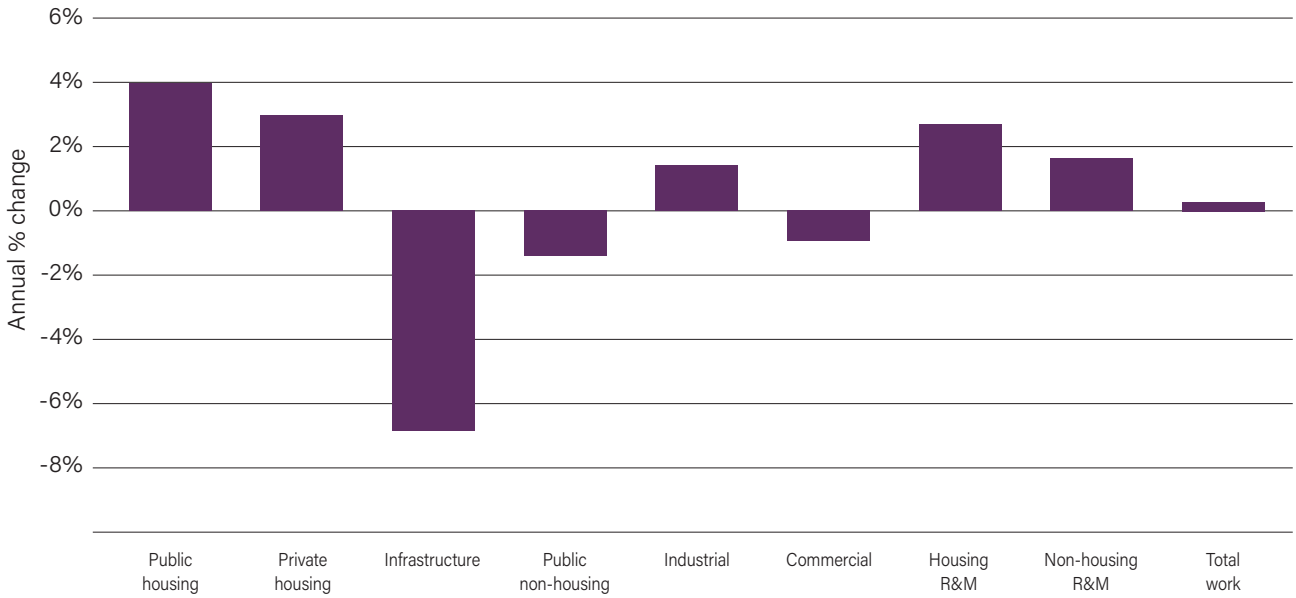
Infrastructure output in Scotland peaked in 2015 at over £3.6bn (2015 prices), a figure which represented 26% of total construction north of the border, double its share in the UK (13%). This very high level of output was being driven by a raft of largely transport projects, many of which have now completed, and output in the sector has been on the way down since 2016. While there are other programmes of work in the pipeline, they are spread over quite long timeframes and their impact on sector growth is diluted. Output is expected to continue to decline sharply over the 2018 to 2022 period, by nearly 7% a year on average, although this will still leave its level in 2022 reasonably high in a long-term context.

Construction employment is projected to experience an average annual decline of 0.7% over the forecast period, after four years of growth which took its level to within 4% of its 2008 peak in 2017. Employment is expected to be around 233,280 in 2022. As is the case across the UK as a whole, professionals and managerial/administrative occupations are expected to fare better than the trades/manual ones in Scotland.

The ARR for Scotland over the 2018 to 2022 period is estimated at 2,130, which represents 0.9% of base 2018 employment, a lower ratio than across the UK (1.2%).

While there are no occupations flagged up as having a high requirement, there are three with a medium one (a ratio of between 2.6% and 5% of base employment), civil engineers (4.5%), trades supervisors (4.1%), and logistics (3.8%).

ANNUAL AVERAGE CONSTRUCTION OUTPUT GROWTH 2018-2022 SCOTLAND



Source: CSN, Experian.
Ref: CSN Explained.

REGIONAL COMPARISON 2018-2022

	Annual average % change in output	Change in total employment	Total ARR
North East	-0.8%	-7,830	840
Yorkshire and Humber	0.8%	2,100	2,010
East Midlands	0.5%	-2,220	1,720
East of England	1.3%	2,530	4,540
Greater London	1.5%	4,020	2,010
South East	1.1%	16,550	2,250
South West	2.0%	11,520	4,480
Wales	4.6%	12,110	2,450
West Midlands	1.8%	9,660	3,390
Northern Ireland	0.5%	-1,240	310
North West	2.0%	26,720	5,470
Scotland	0.1%	-8,280	2,130
UK	**1.3%**	**65,640**	**31,600**

Source: CSN, Experian.
Ref: CSN Explained.

> Construction in Scotland needs to attract an extra 2,130 new workers per year to meet future work demands.

THE OUTLOOK FOR CONSTRUCTION IN SCOTLAND

CONSTRUCTION OUTPUT IN SCOTLAND – OVERVIEW

After three years of growth, two of them in double-digits, construction output levelled off in 2016 at £14.25bn in 2015 prices, still a new high. While the infrastructure sector contracted sharply, by 22%, from its 2015 peak, it remained the largest sector north of the border, in contrast to the UK where it is only the fifth largest. Counteracting the decline in infrastructure was strong growth in the private housing (19%) and public non-housing (14%) sectors, and more moderate expansion across all the other sectors except the industrial one.

INDUSTRY STRUCTURE

The diagram, Construction Industry structure 2016 – UK vs. Scotland, illustrates the sector breakdown of construction in Scotland, compared to that in the UK. Effectively, the percentages for each sector illustrate what proportion of total output each sector accounts for.

The Scottish construction industry has some significant differences in structure to the UK as a whole. It is more weighted towards the new work sectors, which accounted for 70% of output in 2016, compared with 64% across the UK. However, the share of new work has undoubtedly been boosted in recent years by the strength of the infrastructure sector and it is expected to drop down to close to the UK share by 2022.

Across individual sectors it is not surprising that infrastructure was proportionally more important in 2016 north of the border than in the UK (20% vs. 12%), as was the public non-housing sector (12% vs. 7%). Conversely the private housing (14% vs. 20%) and housing R&M (13% vs. 19%) took smaller shares of total output in Scotland compared with the UK. Thus, Scotland's industry is currently more weighted to the non-housing sectors than the UK's.

ECONOMIC OVERVIEW

The expected performance of a regional or national economy over the forecast period (2018–2022) provides an indication of the construction sectors in which demand is likely to be strongest.

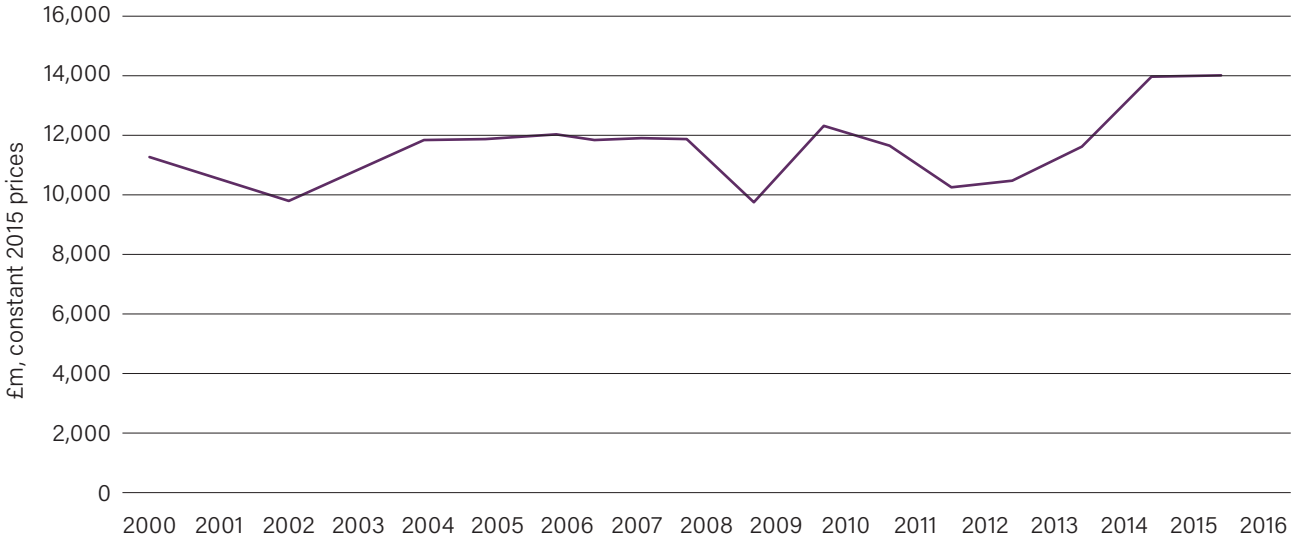
The Scottish economy underperformed the UK as a whole by around 1% in 2016, with GVA growth of just 0.6%, taking it to £126.3bn in 2013 prices. The strongest rises were in the accommodation, food services and recreation (3.7%) and wholesale and retail sectors (3.4%), but these account for only 16% of the Scottish economy combined. The much larger professional and other private services sector managed expansion of 1.8%, but public services only managed 0.4%, and manufacturing contracted slightly, for the second consecutive year.

ECONOMIC STRUCTURE

The Scottish economy remains weighted towards the manufacturing and public services sectors and away from the private service sectors. Public services and manufacturing accounted for almost a third of GVA north of the border in 2016 compared with 27% in the UK as a whole. These two sectors have tended to be slower growing than the private services ones, with manufacturing seeing no real expansion since 2000 and an annual average rise of 1.2% in public services. This compares with growth of over 3% a year on average in the fastest growing service sectors – information and communications, and professional and other private services – over the same period.

While these different growth rates during the course of the 21st century so far indicate a rebalancing of the Scottish economy, it still has some way to go before matching the UK in terms of structure.

CONSTRUCTION OUTPUT 2000-2016 SCOTLAND



Source: ONS.
Ref: CSN Explained.

CONSTRUCTION INDUSTRY STRUCTURE 2016 – UK VS SCOTLAND

Public housing	Infrastructure	Industrial	Housing R&M
3% | 5%	12% | 20%	3% | 2%	19% | 13%
Private housing	**Public non-housing**	**Commercial**	**Non-housing R&M**
20% | 14%	7% | 12%	19% | 17%	17% | 17%

UK Scotland

Source: ONS, Experian.

ECONOMIC STRUCTURE – SCOTLAND (£ BILLION, 2013 PRICES)

	Actual	Forecast (Annual % change, real terms)					
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Professional & Other Private Services	28.8	1.9	1.2	1.7	1.7	2.0	2.4
Public Services	27.4	0.9	0.7	1.5	1.8	1.9	2.3
Wholesale & Retail	14.0	1.3	0.8	1.5	1.8	2.2	2.8
Manufacturing	13.8	0.7	0.4	1.0	0.7	0.7	0.9
Finance & Insurance	8.5	0.3	0.4	1.0	1.8	2.1	2.7
Total Gross Value Added (GVA)	**126.3**	**1.2**	**0.9**	**1.5**	**1.6**	**1.8**	**2.2**

Note: Top 5 sectors, excluding construction.
Source: Experian.
Ref: CSN Explained.

FORWARD LOOKING ECONOMIC INDICATORS

GVA growth in Scotland in 2017 is estimated at 1.2%, still down on the UK rate of 1.6%, but a smaller differential than that seen in 2016.

GVA growth in Scotland is projected to continue to lag the UK's, by close to half a percent a year over the forecast period (1.6% vs. 2%), the almost inevitable consequence of two factors, the difference in economic structure mentioned on page 6, and demographic factors. The weight of an ageing and shrinking population clouds long-term growth prospects in Scotland, with demographics the catalyst to the growth shortfall relative to the UK average. While the higher relative concentration of the public sector and the presence of manufacturing can explain part of the growth gap, it is dwarfed by the population profile.

Scotland is also struggling with relatively modest growth in its important finance and insurance sector, a hangover from the financial crash and its impact on such institutions as RBS. Another risk to consider is the dependence on the oil and gas sector. Growth in Scotland during the oil price shakeout was disappointing, so any future weaknesses or shock to oil prices represents a downside risk.

Against this backdrop, the only two sectors projected to see annual average growth of 2% or more over the 2018 to 2022 period are the information and communications (2.2%) and transport and storage (2%) ones, but these accounted for only 8% of total GVA in 2016.

Scotland, like the rest of the UK, has seen the rise in inflation due to the depreciation of sterling in 2016 impact disposable incomes and household spending growth. Real household disposable incomes are estimated to have fallen by around 1% in 2017 and will recover only slowly during the forecast period, household expenditure growth is expected to fall to a marginal 0.3% in 2018 before picking up in 2019 but remain under 2% for the whole of the forecast period.

The unemployment rate in Scotland stood at 5.2% in 2016 and is estimated to have dropped to around 4.2% last year. However, it is expected to rise slightly over the next three years to around 4.8% in 2020 before subsiding again thereafter.

NEW CONSTRUCTION ORDERS – OVERVIEW

After a fall of 15% in 2015, new orders picked up by 16% in 2016 to a little over £7bn in current prices. Their level increased across all sectors except the public housing one, where they dropped by 9%. Strongest growth was in the industrial (33%), public non-housing (26%) and infrastructure sectors (23%). Industrial new orders were recovering from their lowest level since the series began in 1985, while those for public non-housing and infrastructure remain at historically high levels.

NEW CONSTRUCTION ORDERS – CURRENT SITUATION

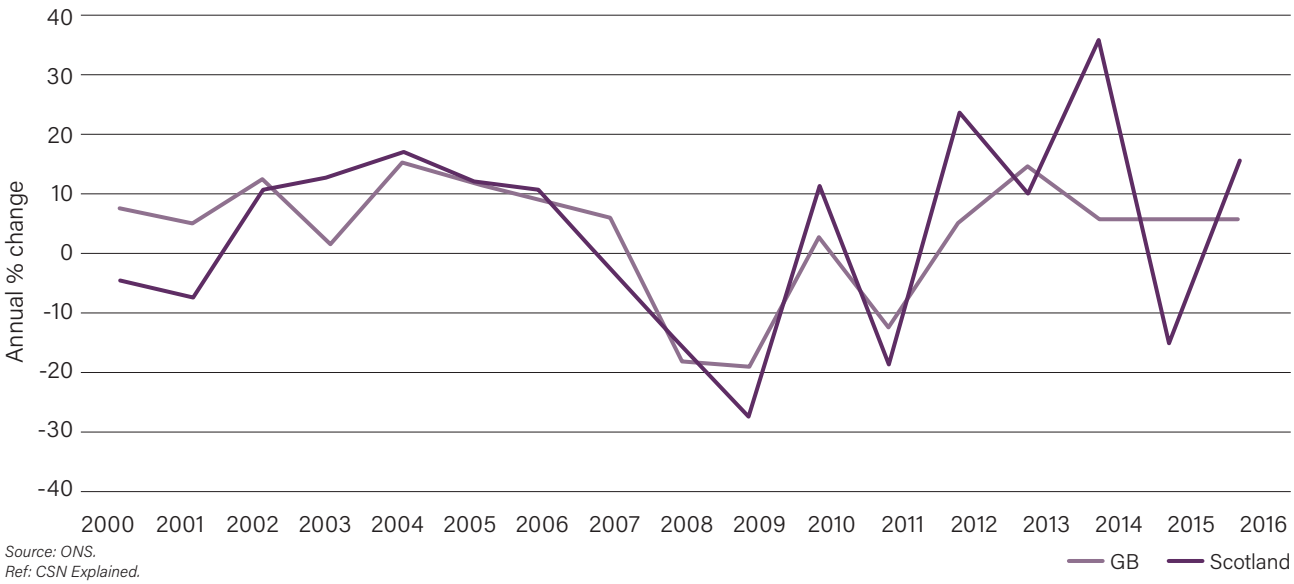
The buoyancy of new orders in 2016 was not carried on into last year, with their value in the first three quarters of 2017 totalling £3.7bn, 30% down on the corresponding period of the previous year. Big falls were seen in the public non-housing (49%), commercial (48%) and infrastructure (42%) sectors. Both the housing sectors saw growth, as did the industrial one, but as two out of these three sectors are relatively small, these gains were not enough to counteract the declines in others.

ECONOMIC INDICATORS – SCOTLAND (£ BILLION, CURRENT PRICES – UNLESS OTHERWISE STATED)

	Actual	Forecast (Annual % change, real terms)					
	2016	2017	2018	2019	2020	2021	2022
Real household disposable income (2013 prices)	98.2	-1.0	0.5	0.8	1.1	1.3	1.7
Household spending (2013 prices)	99.4	1.6	0.3	1.2	1.8	1.9	1.9
Working age population (000s and as % of all)	3,442	63.9%	63.9%	63.9%	64.3%	64.2%	63.9%
House prices (£)	138,750	2.9	1.8	2.0	2.2	2.4	3.6
LFS unemployment (millions)	0.14	-20.6	4.2	6.5	3.9	-0.1	-4.1

Source: ONS, DCLG, Experian.

NEW CONSTRUCTION ORDERS GROWTH 2000-2016 SCOTLAND VS. GB



Source: ONS.
Ref: CSN Explained.

NEW WORK CONSTRUCTION ORDERS – SCOTLAND (£ MILLION, CURRENT PRICES)

	Actual	Annual % change				
	2016	2012	2013	2014	2015	2016
Public housing	240	-13.3	-9.4	-13.3	12.8	-9.4
Private housing	1,076	-16.6	1.8	31.3	-3.7	2.0
Infrastructure	2,395	138.9	5.7	60.3	-24.7	22.8
Public non-housing	1,398	-6.1	49.5	24.6	-17.8	26.3
Industrial	325	26.0	2.1	18.1	-45.8	33.2
Commercial	1,600	26.3	4.6	30.9	-0.2	9.3
Total new work	**7,034**	**24.0**	**10.2**	**35.4**	**-15.3**	**15.6**

Source: ONS.
Ref: CSN Explained.

CONSTRUCTION OUTPUT – SHORT-TERM FORECASTS (2018-2019)

Regional Office for National Statistics (ONS) output statistics are published in current prices and are thus inclusive of any inflationary effect. At the time of writing, regional ONS construction output statistics were only available for the first three quarters of 2017.

Construction output in the first three quarters of 2017 reached £10.4bn in current prices, 3% down on its level in the same period of 2016. Growth in the new work housing and industrial sectors, along with housing R&M was unable to compensate for declines across the other sectors.

For 2017 as a whole, construction output in Scotland is estimated to have fallen by 3% in real terms, with the profile of performance reflecting that in the first three quarters of the year.

The short term (2018-2019) prospects remain muted, with a marginal annual average fall of 0.3% predicted. Sector trends are expected to remain similar to those seen in 2016, with growth in the housing sectors, but declines in infrastructure and non-housing building, except industrial work. However, the R&M sectors are projected to fare better.

The short-term outlook for public housing in Scotland is good, with expected growth of 3.7% a year on average in 2018 and 2019. There are a number of housing associations very active in new house building north of the border at present, plus local authorities have remained much more active in Scotland than across the rest of the UK and have been accounting for around a third of new public starts over the past three years – the share was just 10% across the UK as a whole. This means that Scottish local authorities will be better placed to gear up quickly in terms of expansion to meet government targets.

The West of Scotland Housing Association currently has 96 new homes in development, 62 at Earl's Green in Troon and 34 at Townend, Symington. It is also drawing up plans for a new scheme on Fielden Street in Camlachie, Glasgow. The estimated start date for the project is June 2018. Grampian Housing Association are currently taking forward 93 flats and 46 houses on seven developments across Aberdeen, Aberdeenshire and Moray. The majority of the current work on site is due to complete by mid-2018, but more will undoubtedly join the pipeline.

Despite recent strong growth, private housing output in Scotland is still well below pre-recessionary levels, thus there is plenty of headroom for expansion. The housing market north of the border looks in reasonable health when judged by house price movements. The ONS house price index for Scotland shows annualised growth of 3.6% in the year to November 2017, up from 2.9% in the preceding month.

Aberdeen seems to be seeing significant expansion in the level of new house building, with another long-term residential-led project, Grandhome at the Bridge of Don, now up and running, joining the 3,000-home scheme at Countesswells. This new community development will ultimately contain around 7,000 new homes, of which 600 are expected to be built in phase 1. Infrastructure enabling works are currently underway. Moda Living are taking forward a 400-apartment scheme in the Holland Park area of Glasgow, along with some commercial development. The estimated cost of the project is £105m and it is scheduled to start in the first half of 2018. These are just a limited example of projects currently on site or in the pipeline, which should lead to robust growth of around 6.5% a year on average in the short term.

In contrast, further sharp falls are expected in infrastructure output over the next couple of years, estimated at around 11% a year on average, as more of the large projects that drove very strong growth between 2013 and 2015 complete. The Queensferry Crossing is now complete, as are the bulk of motorway upgrades, with the Aberdeen Western Peripheral Route due to finish in 2018. The £2.6bn Beatrice offshore wind farm project is now underway, with a total of 84 turbines generating 588MW of electricity due to be operational by end 2019. However, the construction element of such projects is relatively small.

Public non-housing output is projected to fall by 3% a year on average in 2018 and 2019. A substantial number of schools funded under the Schools for the Future programme completed in 2016 and 2017 and there is much less work in the pipeline. Health work is also expected to subside as major projects complete, with much less work in the pipeline. Completion of the £150m Royal Hospital for Sick Children in Edinburgh is due in spring 2018, while work on the £213m Dumfries & Galloway Royal Hospital is scheduled to finish later in the year. One major new project has entered the health pipeline and that is the refurbishment or rebuilding of Monklands Hospital in Lanarkshire. A business case is currently being worked up for the scheme, worth an estimated £150m, and the earliest prospective start date for construction work is the second half of 2019.

Bucking the short-term trend in the non-housing building sectors will be the industrial construction sector, which has seen a substantial increase in new orders in recent quarters. Work is due to start on the Edinburgh International Business Gateway in 2018. This £700m mixed-use development, situated close to Edinburgh Airport, with include a mix of residential, commercial and light industrial facilities. GlaxoSmithKline (GSK) is intending to invest £110m expanding its Montrose site, with a state-of-the-art production facility to manufacture respiratory medicines. Construction on the project is expected to start in mid-2018 and complete at the beginning of 2020. Chivas brothers have recently confirmed that from 2019 all its operations will take place at its Kilmalid site near Dumbarton, which will involve the construction of a new £40m bottling plant and offices.

The commercial construction sector was the one identified as most vulnerable to post-Referendum uncertainties, and while it is the London market that is expected to be worst hit, Scotland has a sizeable finance and business services sector that could be impacted. Having said that, Edinburgh's largest speculative office development is due to start shortly, Capital Square, which will have a total of 122,000 square metres of space across 8 floors when completed in 2020. However, in contrast plans to expand the Union Square shopping centre in Aberdeen seem to have gone on the back burner as have those for the extension of the Braehead shopping centre. Overall, output is expected to see annual average declines of around 3% over the short term.

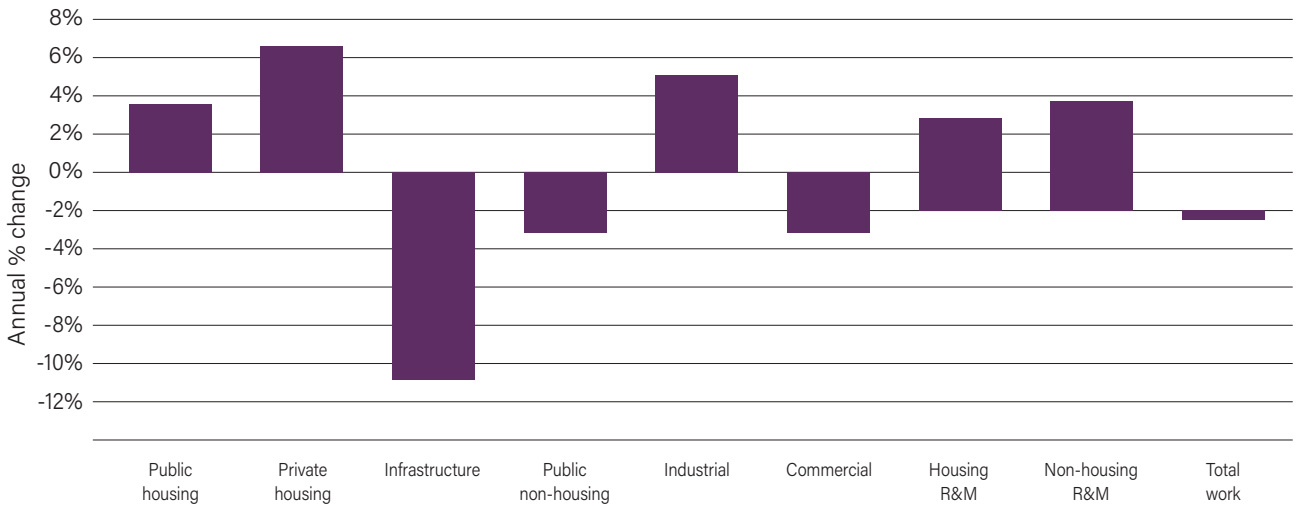
Previous research has indicated that disposable incomes and consumer spending tend to be the two variables that impact most on housing R&M expenditure. Therefore, in a period when the former is under pressure and growth in the latter is

CONSTRUCTION OUTPUT – SCOTLAND (£ MILLION, 2015 PRICES)

	Actual	Forecast (Annual % change)			Annual average
	2016	**2017**	**2018**	**2019**	**2018-2019**
Public housing	668	12%	5%	3%	3.7%
Private housing	1,953	5%	10%	4%	6.5%
Infrastructure	2,861	-9%	-16%	-6%	-10.9%
Public non-housing	1,737	-13%	-2%	-4%	-3.0%
Industrial	243	22%	10%	0%	5.1%
Commercial	2,453	-4%	1%	-7%	-3.1%
New work	**9,916**	**-4%**	**-2%**	**-3%**	**-2.2%**
Housing R&M	1,921	4%	3%	4%	3.3%
Non-housing R&M	2,418	-4%	3%	4%	3.9%
Total R&M	**4,339**	**0%**	**3%**	**4%**	**3.6%**
Total work	**14,255**	**-3%**	**0%**	**0%**	**-0.3%**

Source: Experian.
Ref: CSN Explained.

ANNUAL AVERAGE CONSTRUCTION OUTPUT GROWTH 2018-2019 SCOTLAND



Source: Experian.
Ref: CSN Explained.

> Output growth is forecast to be stable over the next five years (0.1% average annual growth 2018-2022).

decelerating, a slowing of growth or a contraction in the housing R&M sector would be expected. However, across the UK as a whole, and in some regions and nations, this relationship seems to have broken down in 2017. This includes Scotland where output in the sector is estimated to have grown by 4% in real terms, although this is down from the 7% increase seen in 2016. It may be that a quieter housing market, in which UK housing transactions have stalled at around 1.2 million for the past four years, is leading to home owners spending more on significant improvements to their properties rather than trading up. Given the ongoing upward profile of output in the sector, the prognosis is for further growth over the short term.

CONSTRUCTION OUTPUT – LONG-TERM FORECASTS (2018-2022)

For the 2018-22 forecast period, with the exception of infrastructure, construction output across the rest of the industry is generally increasing, albeit modestly, broadly in line with the rest of the UK. In the case of infrastructure, there has been exceptionally high activity throughout the past three years. Such high activity will inevitably reduce, although it must be emphasised that even in 2022, output in the sector will remain significantly higher than the historical average in Scotland.

Total construction output in Scotland (including infrastructure) is projected to be largely stable over the five years to 2022. However, this disguises good growth in the housing sectors, against falls in infrastructure work, and a more mixed picture for the non-housing sectors.

Infrastructure output in Scotland peaked in 2015 at over £3.6bn (2015 prices), a figure which represented 26% of total construction north of the border, double its share in the UK (13%). This very high level of output was being driven by a raft of largely transport projects, many of which have now completed. There are other programmes of work in the pipeline, such as the £3bn A9 dualling one, on which some activity has already started, but these tend to be spread over a number of individual projects and over a long period, thus their impact on output is less pronounced. Focus in the infrastructure sector may move away from transport projects towards energy ones. Plans are in the pipeline for a tidal energy project in the Pentland Firth. Marine Licence and Section 36 applications for the offshore elements of the project have already been submitted to Marine Scotland and a planning application in respect of the onshore elements is underway. The estimated cost of the project is £200m and if all goes according to plan work should start in 2019/20.

The Scottish Government's target of 50,000 new affordable homes by 2021 should benefit both the public and private sectors, with 70% to be delivered as social housing and the remaining 30% by the private sector. Glasgow City Council adopted its new Glasgow City Development Plan at the end of March 2017. The plan assesses a realistic level of affordable housing provision for the city at around 1,000 units a year.

The Link Group Ltd, the parent company of West Highland Housing Association plans to deliver 350 new properties in the Oban and Dunbeg area over the next four years. As well as the private schemes mentioned in Section 2.8 of the report, many of which are long-term ones, East Lothian Council has recently given the go-ahead for the redevelopment of Blindwells open-cast coal mine. The project will include more than 3,200 new homes, to be built over a 12 to 15-year period. Given housing demand pressures it is difficult to see anything but an upward trend in the absence of an economic downturn, thus annual average growth of close to 4% for the public housing and 3% for the private housing sectors is projected for the 2018 to 2022 period.

The 3% average annual short term decline in public non-housing output is expected to ease to around 1% over the longer term, mitigated in part by the University of Glasgow's £1bn expansion plans. Enabling work has started on the Learning and Teaching Hub site on University Avenue – the first new permanent building of the development – and Multiplex has recently been appointed as Programme Delivery Partner.

For the Industrial sector, manufacturing output has largely stagnated in Scotland over the past two years, and the prospects are for only very modest growth over the 2018 to 2022 period at around 0.7% a year on average. The transport and storage work is projected to see better growth, of around 2% a year on average, which suggests that demand should be stronger for distribution and logistics facilities than factories, although it is unlikely to be that robust for either. This means that after 2018, industrial construction is projected to stagnate, giving an annual average growth rate over the whole period of 1.6%.

The prospects for growth in the areas that drive demand for commercial space do not look any better than for the industrial sector. Only the relatively small information and communications sector is expected to see annual average growth of over 2%, with the biggest one, professional and other private services managing only 1.8%. This suggests that general demand for commercial space will be muted over the medium term, although there are always requirements for bespoke space. In the earlier part of the forecast period, commercial construction output is expected to be impacted by Brexit uncertainties, with a return to growth in the latter part, giving an overall prognosis of a modest fall, estimated at 0.7% a year on average, over the 2018 to 2022 period.

BEYOND 2022

The potential pipeline beyond 2022 is dominated by the same transport projects mentioned in last year's report, namely A9 dualling, which is scheduled to continue until 2025, the Aberdeen to Inverness rail upgrade, which is due to run well into the next decade, improvements to the A96, currently scheduled to complete by 2030, and the upgrading of the Highlands Main Line, which once started is scheduled to last to 2025.

There are plans to extend HS2 to Scotland, but it is unlikely that any work on such a scheme would start before 2030 at the earliest.

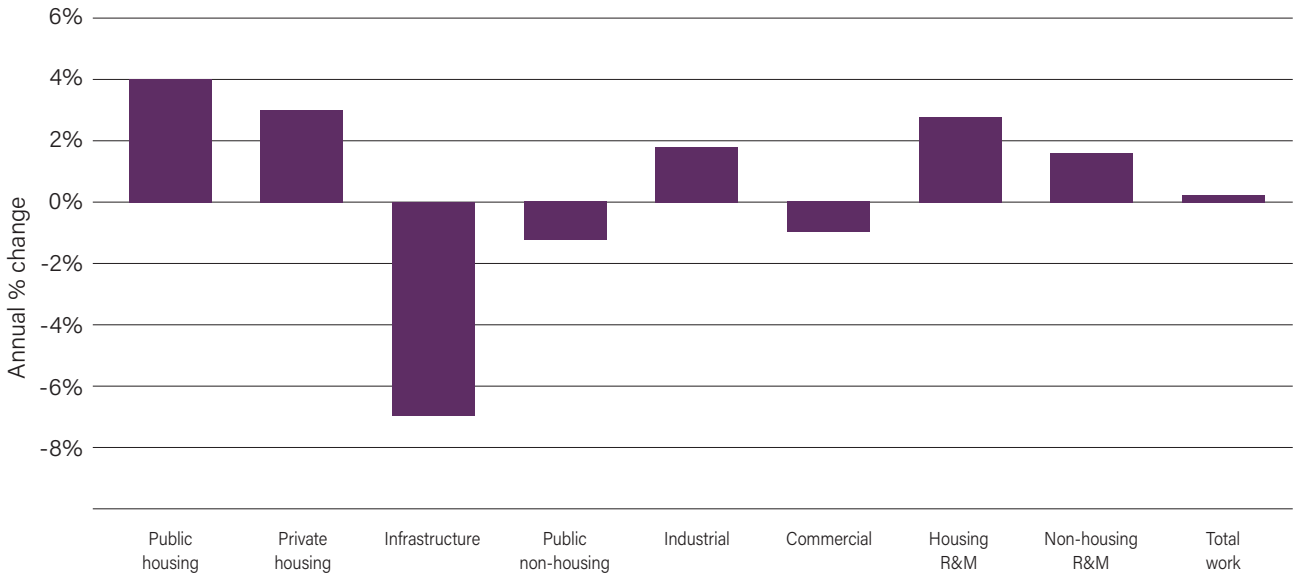
One of the most exciting possibilities north of the border is the development of a spaceport near Campbeltown on the west coast of Scotland. Leading UK space science and technology firms QinetiQ and Telespazio VEGA UK are working with Discover Space UK on investigating the potential of the former RAF Machrihanish site that incorporates Campbeltown Airport for the project.

CONSTRUCTION OUTPUT – SCOTLAND (£ MILLION, 2015 PRICES)

	Estimate	Forecast (Annual % change)					Annual average
	2017	2018	2019	2020	2021	2022	2018-2022
Public housing	751	5%	3%	5%	6%	2%	3.9%
Private housing	2,044	10%	4%	3%	-2%	1%	2.9%
Infrastructure	2,612	-16%	-6%	-6%	-3%	-2%	-6.7%
Public non-housing	1,503	-2%	-4%	0%	0%	1%	-1.1%
Industrial	298	10%	0%	-1%	0%	0%	1.6%
Commercial	2,357	1%	-7%	-2%	1%	4%	-0.7%
New work	**9,565**	**-2%**	**-3%**	**-1%**	**0%**	**1%**	**-0.9%**
Housing R&M	1,994	3%	4%	3%	3%	1%	2.6%
Non-housing R&M	2,328	3%	4%	2%	1%	-2%	1.7%
R&M	**4,322**	**3%**	**4%**	**2%**	**2%**	**-1%**	**2.1%**
Total work	**13,887**	**0%**	**0%**	**0%**	**0%**	**0%**	**0.1%**

Source: CSN, Experian.
Ref: CSN Explained.

ANNUAL AVERAGE CONSTRUCTION OUTPUT GROWTH 2018-2022 SCOTLAND



Source: CSN, Experian.
Ref: CSN Explained.

CONSTRUCTION EMPLOYMENT FORECASTS FOR SCOTLAND

TOTAL CONSTRUCTION EMPLOYMENT FORECASTS BY OCCUPATION

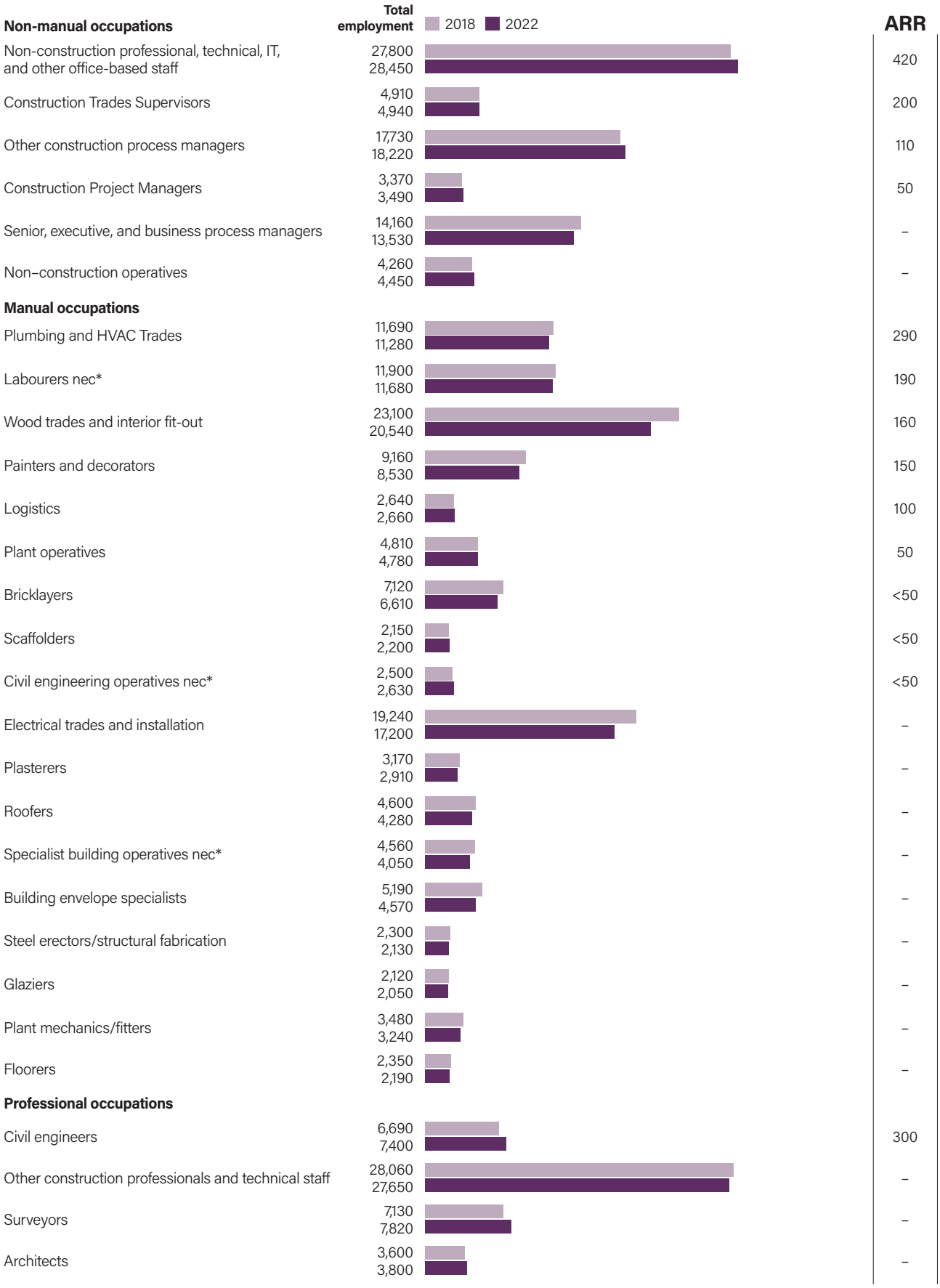
The table presents actual construction employment (SICs 41-43, 71.1, and 74.9) in Scotland for 2016, the estimated total employment across 28 occupational categories in 2017 and forecasts for the industry for 2018 to 2022. A full breakdown of occupational groups is provided in Section 5 of CSN Explained.

According to data from the Labour Force Survey (LFS), construction employment in Scotland reached around 231,540 in 2016, a 4% increase on the previous year. Employment is estimated to have risen by a further 4% in 2017 to around 241,560, just 4% below its 2008 peak. However, given largely static output over the next five years, productivity gains mean that employment is predicted to fall by 0.7% a year on average, and total 233,280 in 2022.

As is the case across the UK as a whole, professionals and managerial/administrative occupations are expected to fare better than the trades/manual ones in Scotland. Eleven out of the 28 occupational categories are expected to see some growth, the strongest for civil engineers (2.5%), surveyors (2.1%) and architects (1.4%).

TOTAL EMPLOYMENT BY OCCUPATION – SCOTLAND

Annual recruitment requirement (ARR) by occupation



*Source: ONS, CSN, Experian. Ref: CSN Explained. *Not elsewhere classified.*

ANNUAL RECRUITMENT REQUIREMENTS (ARR) BY OCCUPATION

The annual recruitment requirement provides an indication of the number of additional workers that would need to be recruited into construction each year in order to realise forecast output. The recruitment requirement takes into account existing flows into and out of construction, such as the movement of people between industries, migration, sickness, and retirement, it is therefore the number of extra new workers the sector needs to attract on top of those flows.

The ARR for Scotland over the 2018 to 2022 period is estimated at 2,130, which represents 0.9% of base 2018 employment, a lower ratio than across the UK (1.2%).

In terms of the figures for Scotland overall, there are currently no construction occupations forecast as having an acute shortage of workers, although particular attention should be given to the recruitment of trades supervisors, logistics and civil engineers. At a more localised level, there may be areas of under provision and in some cases over provision of workers. These variances are in part due to specific regional characteristics such as the obvious differences in the urban areas of the Central Belt compared with the rural areas of the Highland and Islands as well as parts of the Borders region. It is the current challenge of the construction industry to understand these regional variances and CITB is working with the industry and partner agencies on local skills supply and demand.

Over the past couple of years, there has been considerable feedback from employers particularly in the house building sector that they cannot source certain tradespeople such as bricklayers or joiners. Part of this squeeze on labour has been the result of significant increases in house building since its low point. For similar reasons, this squeeze on labour will also be felt across industry as during 2014 and 2015 Scottish construction output rose by over 30% and it is inevitable that short term difficulties in labour supply will emerge against this backdrop. These difficulties should reduce over the five-year forecast period.

The increase in infrastructure spending across the rest of the UK but its reduction in Scotland may lead to a small net flow of workers from Scotland to other parts of the UK.

Please note that all of the ARRs presented in this section are employment requirements and not necessarily training requirements. This is because some new entrants to the construction industry, such as skilled migrants or those from other industries where similar skills are already used, will be able to work in the industry without the need for significant retraining.

Non-construction operatives is a diverse occupational group including all of the activities under the SICs 41-43, 71.1, and 74.9 umbrella that cannot be classified elsewhere, such as cleaners, elementary security occupations nec. and routine inspectors and testers. The skills required in these occupations are highly transferable to other industries and forecasting such movement is hazardous given the lack of robust supportive data. Therefore the ARR for non-construction operatives is not published.

ANNUAL RECRUITMENT REQUIREMENT BY OCCUPATION – SCOTLAND

	2018-2022
Non-manual occupations	
Non-construction professional, technical, IT, and other office-based staff	420
Other construction process managers	110
Senior, executive, and business process managers	–
Construction trades supervisors	200
Construction project managers	50
Manual occupations	
Wood trades and interior fit-out	160
Labourers nec*	190
Electrical trades and installation	–
Painters and decorators	150
Plumbing and HVAC Trades	290
Bricklayers	<50
Plant operatives	50
Logistics	100
Plasterers	–
Roofers	–
Scaffolders	<50
Specialist building operatives nec*	–
Building envelope specialists	–
Steel erectors/structural fabrication	–
Glaziers	–
Plant mechanics/fitters	–
Floorers	–
Civil engineering operatives nec*	<50
Professional occupations	
Other construction professionals and technical staff	–
Civil engineers	300
Surveyors	–
Architects	–
Total (SIC 41-43)	**1,830**
Total (SIC 41-43, 71.1, 74.9)	**2,130**

Source: CSN, Experian.
*Ref: CSN Explained. *Not elsewhere classified.*

COMPARISONS ACROSS THE UK

It remains the case that the strongest economic growth will be in the south-east corner of England – Greater London, the South East and the East of England – which are the only three regions projected to see higher GVA growth than the UK rate of 2% a year on average to 2022.

The picture is more mixed across the regions and nations in construction terms although, generally, overall economic performance tends to drive stronger construction growth in the south-east corner of England, except where major infrastructure schemes have an impact.

Construction output growth is projected to be strongest in Wales, averaging 4.6% a year over the 2018 to 2022 period. The Welsh construction market is the third smallest in the UK, at an estimated £5.7bn (2015 prices) in 2017, and the start of work on the Wylfa nuclear power station will have a major impact on Welsh output levels. However, growth is not entirely reliant on this project, with others, such as the M4 upgrade around Newport and the commitment to build 20,000 new affordable homes by 2020/21 making significant contributions.

Construction output in Scotland is likely to remain largely static over the 2018 to 2022 period as further falls in infrastructure output from its very high peak in 2015 is counteracted by good growth in the housing sectors, with Scotland's target for affordable homes set at 50,000. The new Queensferry Crossing is now complete, as are the major motorway upgrades, with the Aberdeen Western Peripheral Route due to finish by spring 2018. There are other sizeable infrastructure projects ongoing, such as the dualling of the A9 between Perth and Inverness, but work on these will be spread over a long time period, thus their impact on growth is diluted.

Northern Ireland has experienced something of a boom in commercial construction activity over the past few years, driven in large part by a substantial expansion of hotel provision in Belfast. However, this may be slackening, while the current political impasse is likely to impact negatively the timing of new infrastructure and other public projects, leading to relatively modest total output growth of 0.5% a year.

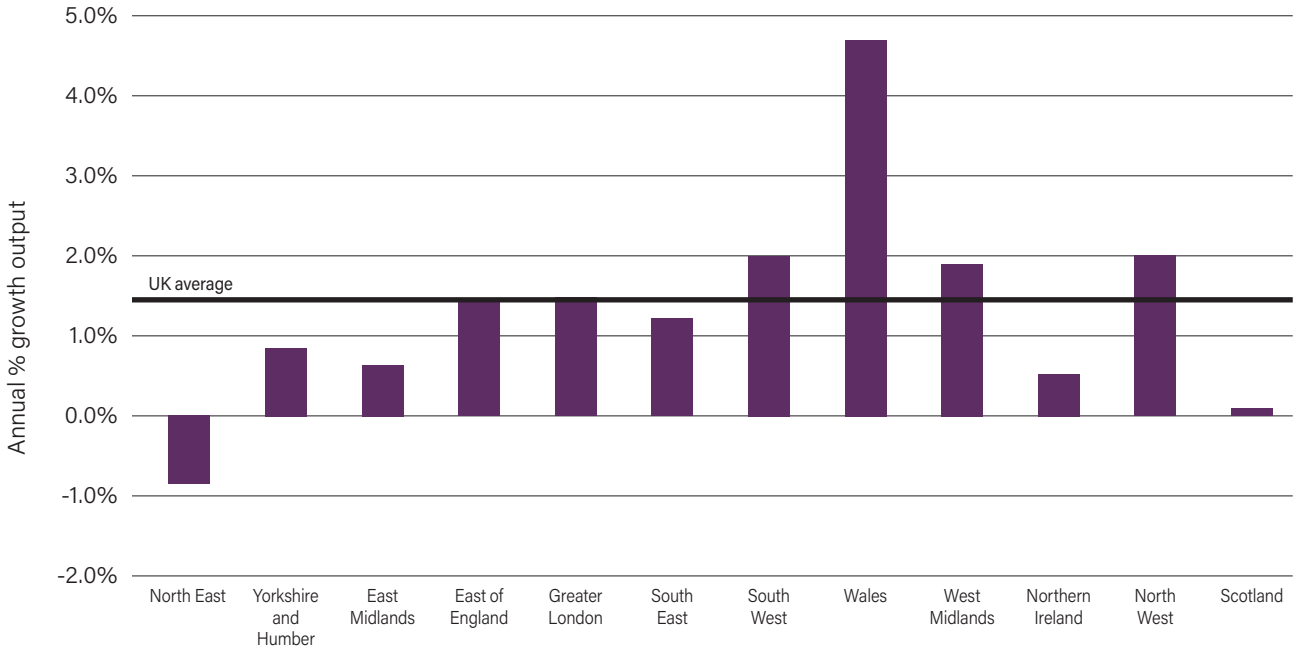
It is the case across the English regions that growth in the construction sector will tend to reflect expansion in the wider economy, unless the region benefits from the siting of major infrastructure projects. Both the South West and North West, which lead the English region growth rankings with 2% a year on average, will benefit from new nuclear build, at Hinkley Point in the case of the former and Moorside in the case of the latter. Enabling works at Hinkley Point have been ongoing for some time while some work at Moorside is projected to begin in 2022. London, and the East Midlands and West Midlands will also see good growth in infrastructure activity as work on High Speed 2 builds up over the forecast period. The strong infrastructure growth in the West Midlands should enable it to experience annual average expansion in total construction output of 1.8%, just behind the South West and North West.

London only manages average yearly growth of 1.5%, as while it benefits from strong infrastructure growth and above average expansion in the housing sectors, commercial construction in the capital is the most vulnerable to a more cautious attitude from investors and developers due to Brexit uncertainty.

Employment growth across the regions and nations tends to mirror that of output, but at a lower level to take account of expected productivity gains and with some minor adjustments depending on whether output growth is in high or low labour intensive sectors. Annual average employment growth is projected to range from a high of 2.1% in Wales to a low of -1.6% in the North East, against a UK rate of 0.5%.

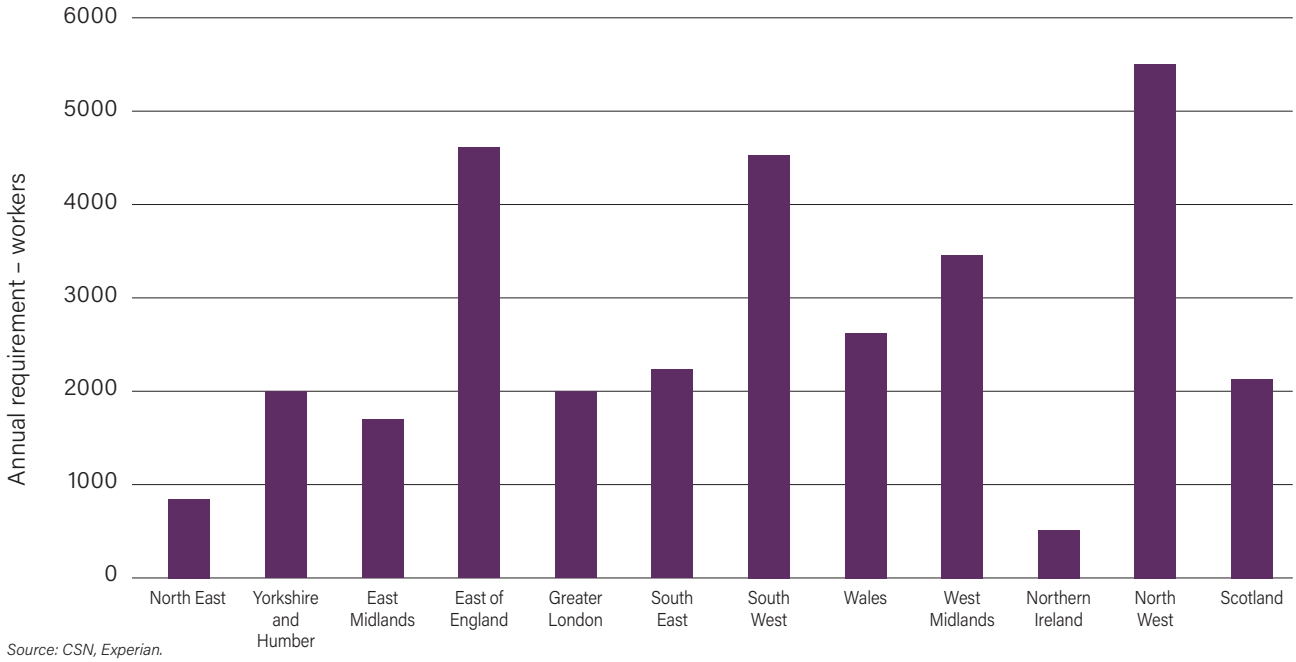
As the annual recruitment requirement (ARR) takes into account known supply-side factors, such as intra-regional labour movements and movements between other industries and construction, the pattern can look significantly different to the profile of output and employment, as some regions and nations have historically strong net inflows and some suffer from large net outflows. For the 2018 to 2022 period, the largest absolute ARRs are for the North West (5,470), the East of England (4,540) and the South West (4,480). However, relative to base employment, Wales has the largest ARR (2.2%), followed by the South West and North West (1.9%). London is the biggest region for construction employment, but has a relatively low ARR at 2,010, just 0.5% of base 2018 employment, as the capital tends to act as a magnet for the workforce from other regions and internationally anyway.

ANNUAL AVERAGE OUTPUT GROWTH BY REGION 2018-2022



Source: CSN, Experian.
Ref: CSN Explained.

ANNUAL RECRUITMENT REQUIREMENT (ARR) BY REGION 2018-2022



Source: CSN, Experian.

> Housing sectors will be important with annual average growth rates of 2.9% for Private housing and 3.9% for Public housing.

CSN EXPLAINED

This appendix provides further details and clarification of some of the points covered in the report.

CSN METHODOLOGY gives an overview of the underpinning methods that are used by the CSN, working in partnership with Experian, to produce the suite of reports at a UK, national and regional level.

GLOSSARY provides clarification of some of the terms that are used in the reports.

NOTES has some further information relating to the data sources used for the various charts and tables. This section also outlines what is meant by the term 'footprint', when talking about the areas of responsibility that lie with a Sector Skills Council (SSC) or Sector Bodies.

DEFINITIONS explains the sector definitions used within the report and provides examples of what is covered in each.

OCCUPATION GROUPS gives a detailed breakdown of the 28 occupational groups into the individual standard occupational classification (SOC) codes that are aggregated to provide the employment and recruitment requirement.

CSN METHODOLOGY

BACKGROUND

The Construction Skills Network has been evolving since its conception in 2005, acting as a vehicle for CITB and CITB Northern Ireland to collect and produce information on the future employment and training needs of the industry.

The CSN functions at both a national and regional level. It comprises a National Group, 12 Observatory groups, a forecasting model for each of the regions and countries, and a Technical Reference Group. An Observatory group currently operates in each of the nine English regions and also in Wales, Scotland and Northern Ireland.

Observatory groups currently meet twice a year and consist of key regional stakeholders invited from industry, Government, education and sector bodies, all of whom contribute their local industry knowledge and views on training, skills, recruitment, qualifications and policy. The National Group also includes representatives from industry, Government, education and other SSCs and Sector Bodies. This Group convenes twice a year and sets the national scene, effectively forming a backdrop for the Observatories.

At the heart of the CSN are several models that generate forecasts of employment requirements within the industry for a range of occupational groups. The models are designed and managed by Experian under the independent guidance and validation of the Technical Reference Group, which is comprised of statisticians and modelling experts.

The models have evolved over time and will continue to do so, to ensure that they account for new research as it is published as well as new and improved modelling techniques.

Future changes to the model will only be made after consultation with the Technical Reference Group.

THE MODEL APPROACH

The model approach relies on a combination of primary research and views from the CSN to facilitate it. National data is used as the basis for the assumptions that augment the models, which are then adjusted with the assistance of the Observatories and National Group. Each English region, Wales, Scotland and Northern Ireland has a separate model (although all models are interrelated due to labour movements) and, in addition, there is one national model that acts as a constraint to the individual models and enables best use to be made of the most robust data (which is available at the national level).

The models work by forecasting demand and supply of skilled workers separately. The difference between demand and supply forms the employment requirement. The forecast total employment levels are derived from expectations about construction output and productivity. Essentially, this is based upon the question 'How many people will be needed to produce forecast output, given the assumptions made about productivity?'.

The annual recruitment requirement (ARR) is a gross requirement that takes into account workforce flows into and out of construction, due to such factors as movements between industries, migration, sickness and retirement. However, these flows do not include movements into the industry from training, although robust data on training provision is being developed by CITB in partnership with public funding agencies, further education, higher education and employer representatives. Thus, the ARR provides an indication of the number of new employees that would need to be recruited into construction each year in order to realise forecast output.

Estimates of demand are based upon the results of discussion groups comprising industry experts, a view of construction output and integrated models relating to wider national and regional economic performance. The models are dynamic and reflect the general UK economic climate at any point in time. To generate the labour demand, the models use a set of specific statistics for each major type of work to determine the employment, by trade, needed to produce the predicted levels of construction output. The labour supply for each type of trade or profession is based upon the previous year's supply (the total stock of employment) combined with flows into and out of the labour market.

The key leakages (outflows) that need to be considered are:

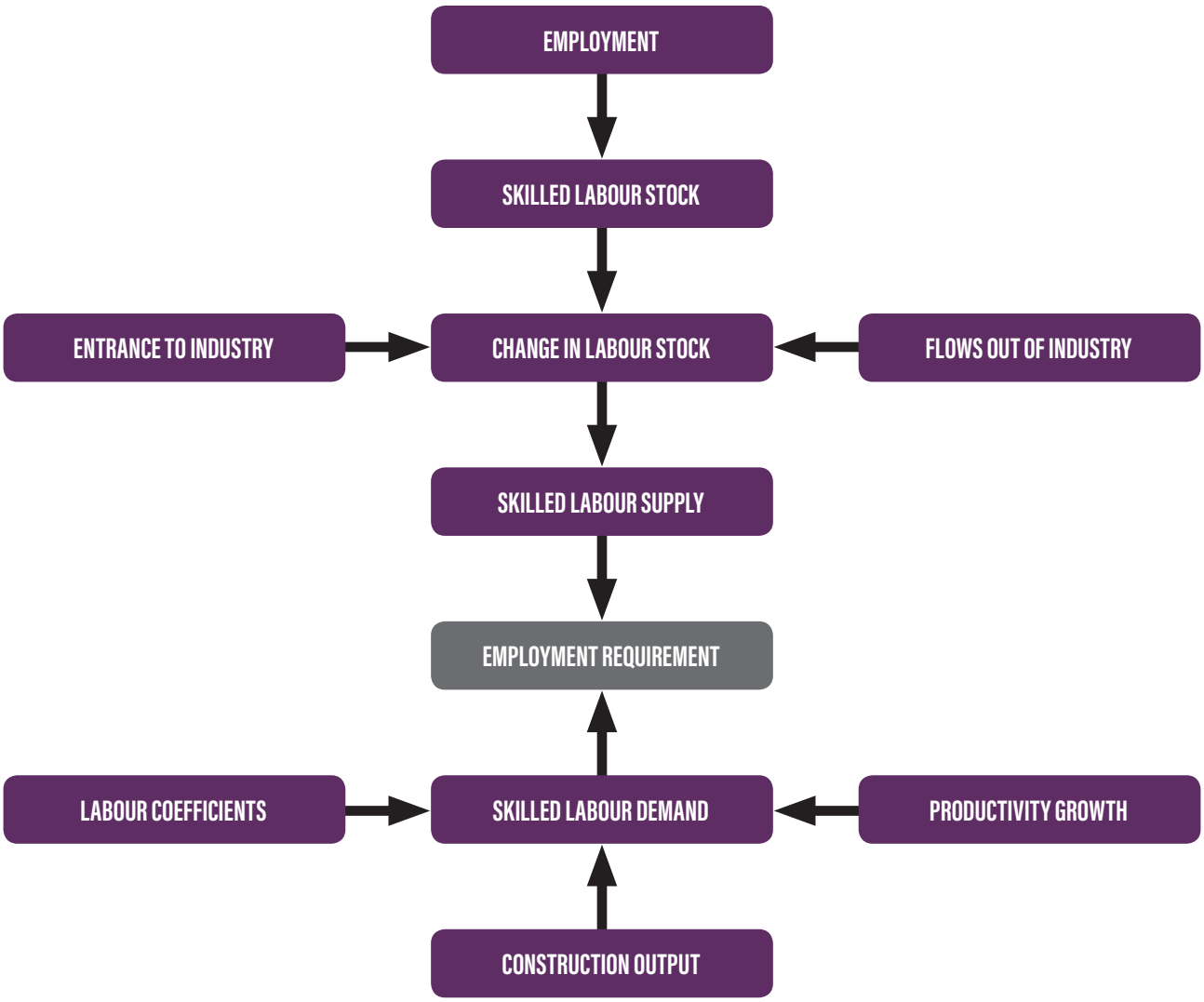
- Transfers to other industries
- International/domestic out migration
- Permanent retirements
  (Including permanent sickness)
- Outflow to temporary sickness and home duties.

The main reason for outflow is likely to be transfer to other industries.

Flows into the labour market include:

- Transfers from other industries
- International/domestic immigration
- Inflow from temporary sickness and home duties.

The most significant inflow is likely to be from other industries. A summary of the model is shown in the flowchart.



GLOSSARY OF TERMS

Building envelope specialists – any trade involved with the external cladding of a building other than bricklaying, e.g. curtain walling.

Demand – this is calculated using construction output data from the Office for National Statistics (ONS) and the Department of Finance and Personnel Northern Ireland (DFP), along with vacancy data from the National Employer Skills Survey, produced by the Department for Education and Skills. These data sets are translated into labour requirements by trade using a series of coefficients to produce figures for labour demand that relate to forecast output levels.

GDP (gross domestic product) – total market value of all final goods and services produced. A measure of national income. GDP = GVA plus taxes on products minus subsidies on products.

GVA (gross value added) – total output minus the value of inputs used in the production process. GVA measures the contribution of the economy as a difference between gross output and intermediate outputs.

Coefficients – to generate the labour demand, the model makes use of a set of specific statistics for each major type of work, to determine employment by trade or profession, based upon the previous year's supply. In essence, this is the number of workers of each occupation or trade needed to produce £1m of output across each sub-sector.

LFS (Labour Force Survey) – a UK household sample survey that collects information on employment, unemployment, flows between sectors and training. Information is collected from around 53,000 households each quarter (the sample totals more than 100,000 people).

LMI (labour market intelligence) – data that is quantitative (numerical) or qualitative (insights and perceptions) on workers, employers, wages, conditions of work, etc.

Macroeconomics – the study of an economy at a national level, including total employment, investment, imports, exports, production and consumption.

Nec – not elsewhere classified, used as a reference in LFS data.

ONS (Office for National Statistics) – organisation producing official statistics on the economy, population and society at both a national and local level.

Output – total value of all goods and services produced in an economy.

Productivity – output per employee.

SIC codes (Standard Industrial Classification codes) – from the United Kingdom Standard Industrial Classification of Economic Activities produced by the ONS.

SOC codes (Standard Occupational Classification codes) – from the United Kingdom Standard Occupational Classification produced by the ONS.

Supply – the total stock of employment in a period of time, plus the flows into and out of the labour market. Supply is usually calculated from LFS data.

NOTES

NOTES

1 Except for Northern Ireland, output data for the English regions, Scotland and Wales is supplied by the Office for National Statistics (ONS) on a current price basis. National deflators produced by the ONS have been used to deflate prices to a 2005 constant price basis, so that the effects of inflation have been stripped out.

2 The annual average growth rate of output is a compound average growth rate, i.e. the rate at which output would grow each year if it increased steadily over the forecast period.

3 Only selected components of gross value added (GVA) are shown in this table and so do not sum to the total.

4 For new construction orders, comparison is made with Great Britain rather than the UK, owing to the fact that there are no orders data series for Northern Ireland.

5 Employment numbers are rounded to the nearest 10.

6 The tables include data relating to plumbers and electricians. As part of SIC 43, plumbers and electricians working in contracting are an integral part of the construction process.

7 A reporting minimum of 50 is used for the annual recruitment requirement (ARR). As a result some region and devolved nation ARR forecasts do not sum to the total UK requirement.

8 The Employment and ARR tables show separate totals for SIC41–43 and SIC41–43, 71.1 and 74.9. The total for SIC41–43 covers the first 24 occupational groups on the relevant tables and excludes civil engineers, other construction professionals and technical staff, architects and surveyors. The total for SIC41–43, 71.1 and 74.9 includes all occupations.

FOOTPRINTS FOR THE BUILT ENVIRONMENT SECTOR

CITB and CITB Northern Ireland are responsible for SIC 41 Construction of buildings, SIC 42 Civil engineering, SIC 43 Specialised construction activities and SIC 71.1 Architectural and engineering activities and related technical consultancy.

The table summarises the SIC codes (2007) covered by CITB and CITB Northern Ireland:

CITB and CITB Northern Ireland	
SIC Code	**Description**
41.1	Development of building projects
41.2	Construction of residential and non-residential buildings
42.1	Construction of roads and railways
42.2	Construction of utility projects
42.9	Construction of other civil engineering projects
43.1	Demolition and site preparation
43.3	Building completion and finishing
43.9	Other specialised construction activities nec
71.1	Architectural and engineering activities and related technical consultancy

The CSN's current baseline forecast assumes that a deal between the UK and EU will be agreed within a four year time horizon, with some form of trade access to the single market. As it is unlikely that the trade terms will be as favourable as the current situation, the forecast includes a small downgrade to the UK's long term export and investment projections, compared to the pre-Brexit vote baseline. No adjustments have been made to underlying population projections in the base case as it is too early to assess any potential slowdown in EU migration.

DEFINITIONS: TYPES AND EXAMPLES OF CONSTRUCTION WORK

Public sector housing – local authorities and housing associations, new towns and government departments
Housing schemes, care homes for the elderly and the provision within housing sites of roads and services for gas, water, electricity, sewage and drainage.

Private sector housing
All privately owned buildings for residential use, such as houses, flats and maisonettes, bungalows, cottages and the provision of services to new developments.

Infrastructure – public and private

Water
Reservoirs, purification plants, dams, water works, pumping stations, water mains, hydraulic works etc.

Sewerage
Sewage disposal works, laying of sewers and surface drains.

Electricity
Building and civil engineering work for electrical undertakings, such as power stations, dams and other works on hydroelectric schemes, onshore wind farms and decommissioning of nuclear power stations.

Gas, communications, air transport
Gas works, gas mains and gas storage; post offices, sorting offices, telephone exchanges, switching centres etc., air terminals, runways, hangars, reception halls, radar installations.

Railways
Permanent way, tunnels, bridges, cuttings, stations, engine sheds etc., signalling and other control systems and electrification of both surface and underground railways.

Harbours
All works and buildings directly connected with harbours, wharves, docks, piers, jetties, canals and waterways, sea walls, embankments and water defences.

Roads
Roads, pavements, bridges, footpaths, lighting, tunnels, flyovers, fencing etc.

Public non-residential construction[1]

Factories and warehouses
Publicly owned factories, warehouses, skill centres.

Oil, steel, coal
Now restricted to remedial works for public sector residual bodies.

Schools, colleges, universities
State schools and colleges (including technical colleges and institutes of agriculture); universities including halls of residence, research establishments etc.

Health
Hospitals including medical schools, clinics, welfare centres, adult training centres.

Offices
Local and central Government offices, including town halls, offices for all public bodies except the armed services, police headquarters.

Entertainment
Theatres, restaurants, public swimming baths, caravan sites at holiday resorts, works and buildings at sports grounds, stadiums, racecourses etc. owned by local authorities or other public bodies.

Garages
Buildings for storage, repair and maintenance of road vehicles, transport workshops, bus depots, road goods transport depots and car parks.

Shops
Municipal shopping developments for which the contract has been let by a Local Authority.

Agriculture
Buildings and work on publicly financed horticultural establishments; fen drainage and agricultural drainage, veterinary clinics.

Miscellaneous
All work not clearly covered by any other headings, such as fire stations, police stations, prisons, reformatories, remand homes, civil defence work, UK Atomic Energy Authority work, council depots, museums, libraries.

Private industrial work
Factories, warehouses, wholesale depots, all other works and buildings for the purpose of industrial production or processing, oil refineries, pipelines and terminals, concrete fixed leg oil production platforms (not rigs); private steel work; all new coal mine construction such as sinking shafts, tunnelling, etc.

Private commercial work[1]

Schools and universities
Schools and colleges in the private sector, financed wholly from private funds.

Health
Private hospitals, nursing homes, clinics.

Offices
Office buildings, banks.

Entertainment
Privately owned theatres, concert halls, cinemas, hotels, public houses, restaurants, cafés, holiday camps, swimming pools, works and buildings at sports grounds, stadiums and other places of sport or recreation, youth hostels.

Garages
Repair garages, petrol filling stations, bus depots, goods transport depots and any other works or buildings for the storage, repair or maintenance of road vehicles, car parks.

Shops
All buildings for retail distribution such as shops, department stores, retail markets, showrooms, etc.

Agriculture
All buildings and work on farms, horticultural establishments.

Miscellaneous
All work not clearly covered by any other heading, e.g. exhibitions, caravan sites, churches, church halls.

New work

New housing
Construction of new houses, flats, bungalows only.

All other types of work
All new construction work and all work that can be referred to as improvement, renovation or refurbishment and which adds to the value of the property.[2]

Repair and maintenance

Housing
Any conversion of, or extension to any existing dwelling and all other work such as improvement, renovation, refurbishment, planned maintenance and any other type of expenditure on repairs or maintenance.

All other sectors:
Repair and maintenance work of all types, including planned and contractual maintenance.[3]

[1] Where contracts for the construction or improvement of non-residential buildings used for public service provision, such as hospitals, are awarded by private sector holders of contracts awarded under the Private Finance Initiative, the work is classified as 'private commercial'.

[2] Contractors reporting work may not always be aware of the distinction between improvement or renovation work and repair and maintenance work in the non-residential sectors.

[3] Except where stated, mixed development schemes are classified to whichever sector provides the largest share of finance.

OCCUPATIONAL GROUPS

Occupational group Description, SOC (2010) reference.	
Senior, executive, and business process managers	
Chief executives and senior officials	1115
Financial managers and directors	1131
Marketing and sales directors	1132
Purchasing managers and directors	1133
Human resource managers and directors	1135
Property, housing and estate managers	1251
Information technology and telecommunications directors	1136
Research and development managers	2150
Managers and directors in storage and warehousing	1162
Managers and proprietors in other services nec*	1259
Functional managers and directors nec*	1139
IT specialist managers	2133
IT project and programme managers	2134
Financial accounts managers	3538
Sales accounts and business development managers	3545
Construction project managers	
Construction project managers and related professionals	2436
Other construction process managers	
Production managers and directors in manufacturing	1121
Production managers and directors in construction	1122
Managers and directors in transport and distribution	1161
Waste disposal and environmental services managers	1255
Health and safety officers	3567
Conservation and environmental associate professionals	3550
Non-construction professional, technical, IT, and other office-based staff (excl. managers)	
IT operations technicians	3131
IT user support technicians	3132
Finance and investment analysts and advisers	3534
Taxation experts	3535
Financial and accounting technicians	3537
Vocational and industrial trainers and instructors	3563
Business and related associate professionals nec*	3539
Legal associate professionals	3520
Inspectors of standards and regulations	3565
Programmers and software development professionals	2136
Information technology and telecommunications professionals nec*	2139
Estate agents and auctioneers	3544
Solicitors	2413
Legal professionals nec*	2419
Chartered and certified accountants	2421
Business and financial project management professionals	2424
Management consultants and business analysts	2423
Receptionists	4216
Typists and related keyboard occupations	4217
Business sales executives	3542
Bookkeepers, payroll managers and wages clerks	4122
Records clerks and assistants	4131
Stock control clerks and assistants	4133
Telephonists	7213
Communication operators	7214
Personal assistants and other secretaries	4215
Sales and retail assistants	7111
Telephone salespersons	7113
Buyers and procurement officers	3541
Human resources and industrial relations officers	3562
Credit controllers	4121
Company secretaries	4214
Sales related occupations nec*	7129
Call and contact centre occupations	7211
Customer service occupations nec*	7219
Elementary administration occupations nec*	9219
Chemical scientists	2111
Biological scientists and biochemists	2112
Physical scientists	2113
Laboratory technicians	3111
Graphic designers	3421
Environmental health professionals	2463
IT business analysts, architects and systems designers	2135
Conservation professionals	2141
Environment professionals	2142
Actuaries, economists and statisticians	2425
Business and related research professionals	2426
Finance officers	4124
Financial administrative occupations nec*	4129
Human resources administrative occupations	4138
Sales administrators	4151
Other administrative occupations nec*	4159
Office supervisors	4162
Sales supervisors	7130
Customer service managers and supervisors	7220
Office managers	4161
Construction trades supervisors	
Skilled metal, electrical and electronic trades supervisors	5250
Construction and building trades supervisors	5330
Wood trades and interior fit-out	
Carpenters and joiners	5315
Paper and wood machine operatives	8121
Furniture makers and other craft woodworkers	5442
Construction and building trades nec* (25%)	5319

Bricklayers

Bricklayers and masons	5312

Building envelope specialists

Construction and building trades nec* (50%)	5319

Painters and decorators

Painters and decorators	5323
Construction and building trades nec* (5%)	5319

Plasterers

Plasterers	5321

Roofers

Roofers, roof tilers and slaters	5313

Floorers

Floorers and wall tilers	5322

Glaziers

Glaziers, window fabricators and fitters	5316
Construction and building trades nec* (5%)	5319

Specialist building operatives not elsewhere classified (nec*)

Construction operatives nec* (100%)	8149
Construction and building trades nec* (5%)	5319
Industrial cleaning process occupations	9132
Other skilled trades nec*	5449

Scaffolders

Scaffolders, stagers and riggers	8141

Plant operatives

Crane drivers	8221
Plant and machine operatives nec*	8129
Fork-lift truck drivers	8222
Mobile machine drivers and operatives nec*	8229

Plant mechanics/fitters

Metalworking production and maintenance fitters	5223
Precision instrument makers and repairers	5224
Vehicle technicians, mechanics and electricians	5231
Elementary process plant occupations nec*	9139
Tool makers, tool fitters and markers-out	5222
Vehicle body builders and repairers	5232

Steel erectors/structural fabrication

Steel erectors	5311
Welding trades	5215
Metal plate workers and riveters	5214
Construction and building trades nec* (5%)	5319
Smiths and forge workers	5211
Metal machining setters and setter-operators	5221

Labourers nec*

Elementary construction occupations (100%)	9120

Electrical trades and installation

Electricians and electrical fitters	5241
Electrical and electronic trades nec*	5249
Telecommunications engineers	5242

Plumbing and heating, ventilation, and air conditioning trades

Plumbers and heating and ventilating engineers	5314
Pipe fitters	5216
Construction and building trades nec* (5%)	5319
Air-conditioning and refrigeration engineers	5225

Logistics

Large goods vehicle drivers	8211
Van drivers	8212
Elementary storage occupations	9260
Buyers and purchasing officers (50%)	3541
Transport and distribution clerks and assistants	4134

Civil engineering operatives not elsewhere classified (nec*)

Road construction operatives	8142
Rail construction and maintenance operatives	8143
Quarry workers and related operatives	8123

Non-construction operatives

Metal making and treating process operatives	8117
Process operatives nec*	8119
Metalworking machine operatives	8125
Water and sewerage plant operatives	8126
Assemblers (vehicles and metal goods)	8132
Routine inspectors and testers	8133
Assemblers and routine operatives nec*	8139
Elementary security occupations nec*	9249
Cleaners and domestics*	9233
Street cleaners	9232
Gardeners and landscape gardeners	5113
Caretakers	6232
Security guards and related occupations	9241
Protective service associate professionals nec*	3319

Civil engineers

Civil engineers	2121

Other construction professionals and technical staff

Mechanical engineers	2122
Electrical engineers	2123
Design and development engineers	2126
Production and process engineers	2127
Quality control and planning engineers	2461
Engineering professionals nec*	2129
Electrical and electronics technicians	3112
Engineering technicians	3113
Building and civil engineering technicians	3114
Science, engineering and production technicians nec*	3119
Architectural and town planning technicians*	3121
Draughtspersons	3122
Quality assurance technicians	3115
Town planning officers	2432
Electronics engineers	2124
Chartered architectural technologists	2435
Estimators, valuers and assessors	3531
Planning, process and production technicians	3116

Architects

Architects	2431

Surveyors

Quantity surveyors	2433
Chartered surveyors	2434

*Not elsewhere classified

CITB RESEARCH

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