

## Article

# Construction development: improvements to regional and sub-sector level estimates, UK: July 2021

Latest improvements to input data used to model sub-national and sub-sector level construction output estimates, including the impact of the changes.

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Release date:  
20 July 2021

Next release:  
To be announced

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# 1 . Main points

- The effects on the Office for National Statistics' (ONS's) capacity and capability following the start of the coronavirus (COVID-19) pandemic led to us reviewing the existing construction statistics releases, and temporarily suspending the [Output in the construction industry: sub-national and sub-sector dataset](#); data for Quarter 4 (Oct to Dec) 2019 was the last to be published on 11 February 2020, before resuming on 12 May 2021.
- The decision to suspend this dataset was also partially because of the limitations of the model used to apportion new orders data to produce sub-national and sub-sector output estimates.
- Following a quality assurance review of the input data into this model with the assistance of Barbour ABI, partially to reflect the impact of COVID-19, the ONS resumed publication of this dataset on [12 May 2021](#); this release contained quarterly sub-sector and sub-national data for the first time from Quarter 1 (Jan to Mar) 2020 to Quarter 1 2021.
- Revisions to lower-level sub-national and sub-sector output data estimates can be seen back to 2010 with notable movements explained further in this article.
- A work programme to address further limitations with the model that produces these estimates is planned for 2021 and 2022 with a view to regain national statistics status; if you would like to be involved in this development work, please contact [construction.statistics@ons.gov.uk](mailto:construction.statistics@ons.gov.uk)

## 2 . Overview of sub-national and sub-sector output estimates

The [output in the construction industry: sub-national and sub-sector dataset](#) is not designated as a [National Statistic](#), with the Office for Statistics Regulation noting in March 2019 that [further development work must be undertaken](#) before this dataset can be considered for designation.

The dataset was temporarily suspended in April 2020, with the last sub-sector and sub-national release being for the Quarter 4 (Oct to Dec) 2019 bulletin published on [11 February 2020](#). A note in the [May 2020 bulletin](#) explained the decision, noting the impact of the coronavirus (COVID-19) pandemic leading to reduced Office for National Statistics (ONS) capacity and capability. The temporary suspension was aimed at protecting the delivery and quality of other ONS outputs as well as ensuring we could respond to new demands as a direct result of the coronavirus.

The decision to suspend the dataset was also due to the limitations of the model used to apportion new orders data to produce sub-level construction output estimates, and allowed the ONS to explore obtaining further data from [Barbour ABI](#) to improve different limitations of the model.

Sub-sector and sub-national construction output data are estimated using new orders data supplied by Barbour ABI. The new orders data include project level information for new contracts awarded by type of work and by region with further supplementary information relating to the valuation, start and end date of the project and durations. New orders data are used to calculate proportions or "weights" for sub-sectors and regions. These are used to apportion top-level construction output estimates from the [Monthly Business Survey for construction and allied trades](#) (MBS) [and Value Added Tax \(VAT\) turnover data](#), to obtain sub-sector and sub-national output estimates.

Further information about the model used to produce sub-sector and sub-national estimates can be found in [Construction development: improvements to regional and sub-sector level estimates, June 2018](#).

A limitation of the model is that the supplementary information (valuation, duration, start date and end date) can change for a variety of legitimate reasons from time of new order to either the start of the project or even once the project has commenced.

Prior to the pandemic, project level information was updated on an ad hoc basis and usually only for the largest projects. As a result, for the majority of projects, changes to start and end dates of projects, projects being put on hold or altogether cancelled, or changed in valuations from time of their initial new order would largely not be captured in these estimates pre-pandemic. This is likely to be further highlighted with COVID-19, as this had a significant impact on projects being delayed as sites temporarily ceased, particularly during the first lockdown in April and May 2020.

Furthermore, sites could not operate at full capacity because of social distancing measures, so project end dates and durations will have been extended. Not accounting for COVID-19 correctly would mean estimates of sub-sector and sub-national construction output would be unrepresentative of actual construction industry activity subject to the constraints of the current model.

### 3 . Improvements to the sub-national and sub-sector construction output model

Following the suspension of the output in the construction industry: subnational and sub-sector dataset, the Office for National Statistics (ONS) reviewed the quality of input files in the latter half of 2020 and into 2021. This includes project level information such as start and end dates, and durations and valuations that are used to produce these data; initially just to understand how coronavirus (COVID-19) was impacting these.

The ONS worked with Barbour ABI to review all existing projects (over 1,110 in total) delivered from 2013. As shown in Table 1, a large element of projects experienced a change in valuation, start date, end date or duration in comparison with their initial new order. Only 37% of projects used to produce these estimates had no changes in dates, durations or valuations from the time received of the new order to the latest values as of April 2021.

Table 1: The number of each type of change for all projects valued at £50 million or more

	<b>Number of changes (out of 1112)</b>	<b>%</b>
<b>Start date change</b>	395	36
<b>Duration change</b>	492	44
<b>End change</b>	567	51
<b>Project valuation change</b>	234	21
<b>No changes to dates or valuations</b>	410	37

Source: Office for National Statistics and Barbour ABI

#### Notes

1. The data in the table does not add up to 100% as a project can have more than one type of change.

With more recent quarters (Table 2) seeing fewer changes, likely to be because they have had less time to see changes, this highlighted the need to explore wider, beyond the COVID-19 impact. We therefore took this opportunity to address the other valid reasons which lead to changes in the data from the initial new order, to ensure the latest correct data was reflected in the weights.

This is an important observation because these variables are used to create "weights", which are applied to cost curves (see [Figure 4 in Construction development: improvements to regional and sub-sector level estimates, June 2018](#)). If a sizeable element of project level information changes, for example, to valuation, start date, end date and/or duration, without being reflected in the model, this has the effect of assigning unrepresentative weights for the project at different points in its life cycle. These unrepresentative weights will lead to unrepresentative output data at the sub-national and sub-level.

Table 2: The number of projects in each quarter, by the number and type of each change

	<b>Total number of £50m+ projects placed in the quarter</b>	<b>Value changes</b>	<b>Start dates change</b>	<b>Duration changes</b>	<b>End dates change</b>
<b>Q2 2013</b>	46	9	4	9	8
<b>Q3 2013</b>	44	13	4	6	6
<b>Q4 2013</b>	43	9	3	4	4
<b>Q1 2014</b>	34	8	2	4	5
<b>Q2 2014</b>	31	10	5	9	9
<b>Q3 2014</b>	31	8	2	6	7
<b>Q4 2014</b>	32	14	5	10	11
<b>Q1 2015</b>	33	11	5	15	14
<b>Q2 2015</b>	32	9	4	11	11
<b>Q3 2015</b>	28	4	4	6	7
<b>Q4 2015</b>	25	12	6	11	11
<b>Q1 2016</b>	37	8	12	19	19
<b>Q2 2016</b>	37	9	14	21	21
<b>Q3 2016</b>	36	8	6	16	18
<b>Q4 2016</b>	30	5	9	16	19
<b>Q1 2017</b>	40	10	16	27	33
<b>Q2 2017</b>	37	6	22	26	24
<b>Q3 2017</b>	50	10	36	38	41
<b>Q4 2017</b>	18	6	10	14	17
<b>Q1 2018</b>	36	8	20	27	31
<b>Q2 2018</b>	33	6	19	19	23
<b>Q3 2018</b>	39	14	15	23	26
<b>Q4 2018</b>	33	6	19	24	28
<b>Q1 2019</b>	44	3	20	24	29
<b>Q2 2019</b>	29	4	13	13	15
<b>Q3 2019</b>	40	3	23	24	29
<b>Q4 2019</b>	39	5	23	19	26
<b>Q1 2020</b>	50	7	22	14	24
<b>Q2 2020</b>	26	4	14	11	14
<b>Q3 2020</b>	45	3	27	20	26
<b>Q4 2020</b>	34	2	11	6	11

Source: Office for National Statistics and Barbour ABI

The improvements made in early 2021 mean that all £50 million or more projects are now reviewed on a quarterly basis to ensure all the information used in the model reflects the latest position of the project. This improvement to the method will also be incorporated for future releases, starting with Quarter 2 (Apr to June) 2021 to be published on 12 August 2021.

## **4 . Impact of improvements made to the sub-national and sub-sector output model**

Following updates to reflect the latest input data used to model sub-sector and sub-national construction output, revisions back to Quarter 1 (Jan to Mar) 2010 can be seen. Data used in this article are estimates consistent with top-level current price, non-seasonally adjusted estimates as of the [Construction output in Great Britain: March 2021, new orders and Construction Output Price Indices, January to March 2021 release](#) published on 12 May 2021.

A selection of regions and sub-sectors are shown in Section 4. This is to illustrate the impact of improvements in the latest dataset published on 12 May 2021 with data up to including Quarter 1 (Jan to Mar) 2021, against the last time data were published (11 February 2020), prior to making the improvements to the input data.

### **Sub-sector impact: illustrative examples**

Figures 1 to 2 show previous top-level type of work construction estimates (data as of February 2020) on a current price, non-seasonally adjusted basis, compared with the latest published estimates (data as of May 2021). If revisions are seen at this level, it is because of revisions in either Monthly Business Survey (MBS) survey data caused by late or revised returns and/or Value Added Tax (VAT) turnover data used for a selection of industries.

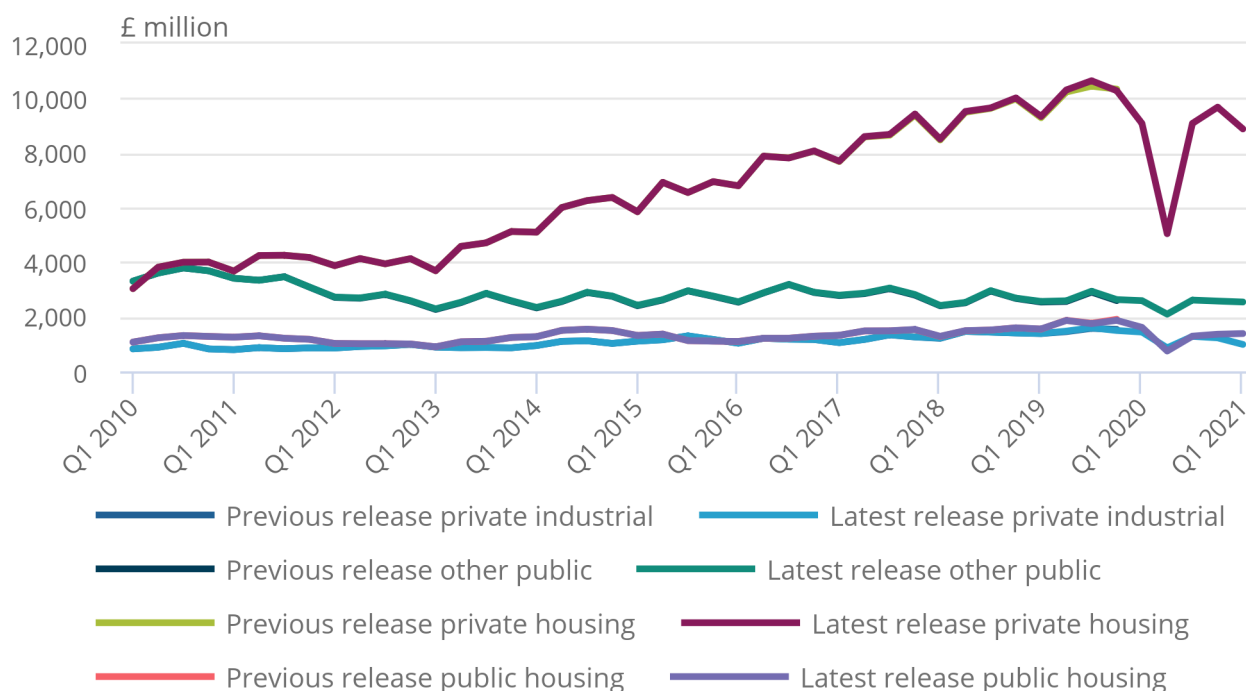
Figure 1 shows housing, private industrial and other public non-housing sector previous and current estimates. Revisions seen at this level are of a smaller magnitude. However, within these sectors, at the sub-level type of work level, revisions are more evident.

**Figure 1: Housing, private industrial and other public non-housing saw comparatively smaller revisions at the top-level in the MBS and VAT data**

11 February 2020 release compared with 12 May 2021 data, type of work level, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021, current price, non-seasonally adjusted, Great Britain

## Figure 1: Housing, private industrial and other public non-housing saw comparatively smaller revisions at the top-level in the MBS and VAT data

11 February 2020 release compared with 12 May 2021 data, type of work level, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021, current price, non-seasonally adjusted, Great Britain



Source: Office for National Statistics and Barbour ABI

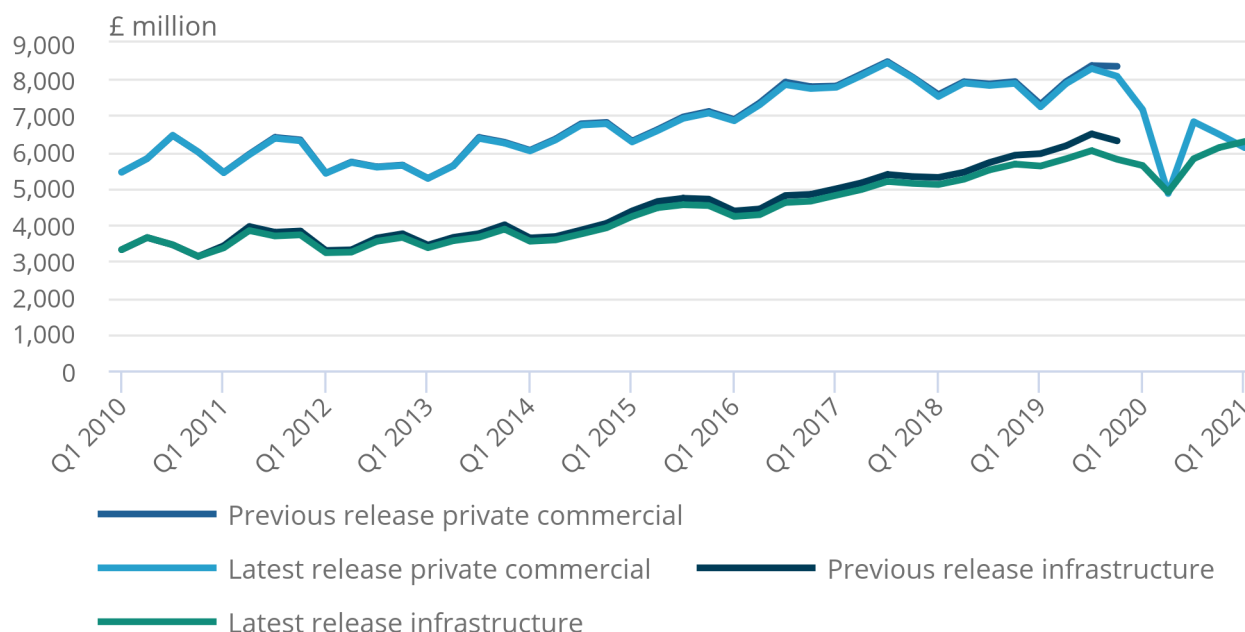
Revisions are more evident in the infrastructure sector, as shown in Figure 2, throughout the series from 2011 onwards, including at the type of work level within infrastructure.

**Figure 2: Infrastructure saw a comparatively larger revisions at the top-level in the MBS and VAT data**

11 February 2020 release compared with 12 May 2021 data, infrastructure and private commercial work, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021, current price, non-seasonally adjusted, Great Britain

## Figure 2: Infrastructure saw a comparatively larger revisions at the top-level in the MBS and VAT data

11 February 2020 release compared with 12 May 2021 data, infrastructure and private commercial work, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021, current price, non-seasonally adjusted, Great Britain



Source: Office for National Statistics and Barbour ABI

Looking at specific sub-sectors, the level of railway construction output within infrastructure (Figure 3) saw a shift in output from 2019 to 2018. This was because of a combination of changes to end dates of several large railway projects and some end dates no longer being available from their initial new order. For those without an end date we would impute an end date based off previous data for that type of work. As such more output would be apportioned earlier and likely be more representative of construction activity subject to the current assumptions made in the model.

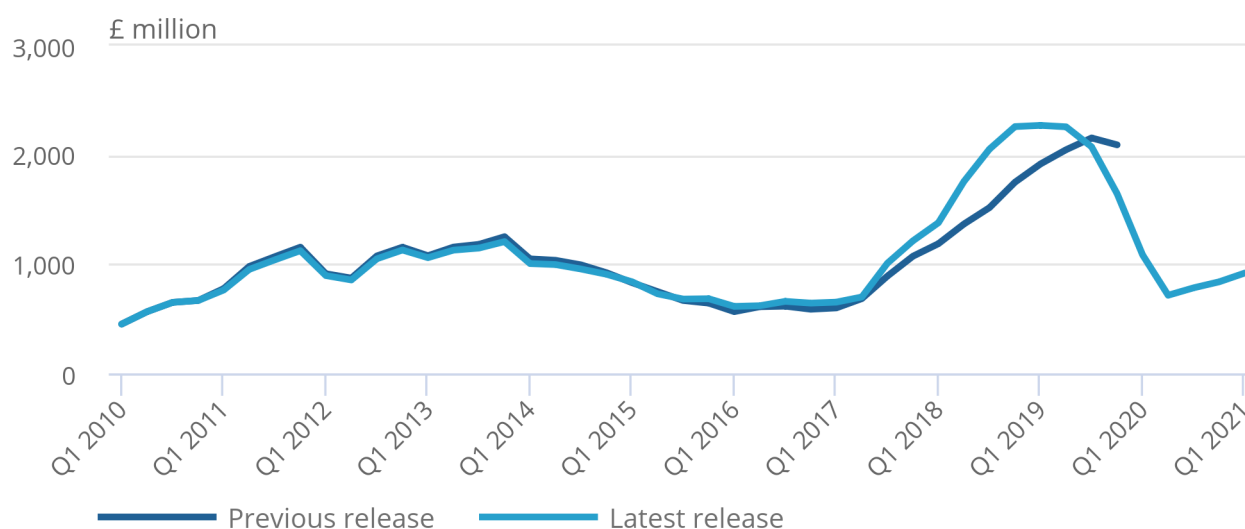


**Figure 3: Following updates to reflect the latest input data used to model sub-sector work, railway output saw a shift from 2019 to 2018**

Infrastructure 'railways' output, 11 February 2020 release compared with 12 May 2021 data, current price, non-seasonally adjusted, Great Britain, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021

**Figure 3: Following updates to reflect the latest input data used to model sub-sector work, railway output saw a shift from 2019 to 2018**

Infrastructure 'railways' output, 11 February 2020 release compared with 12 May 2021 data, current price, non-seasonally adjusted, Great Britain, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021



**Source: Office for National Statistics and Barbour ABI**

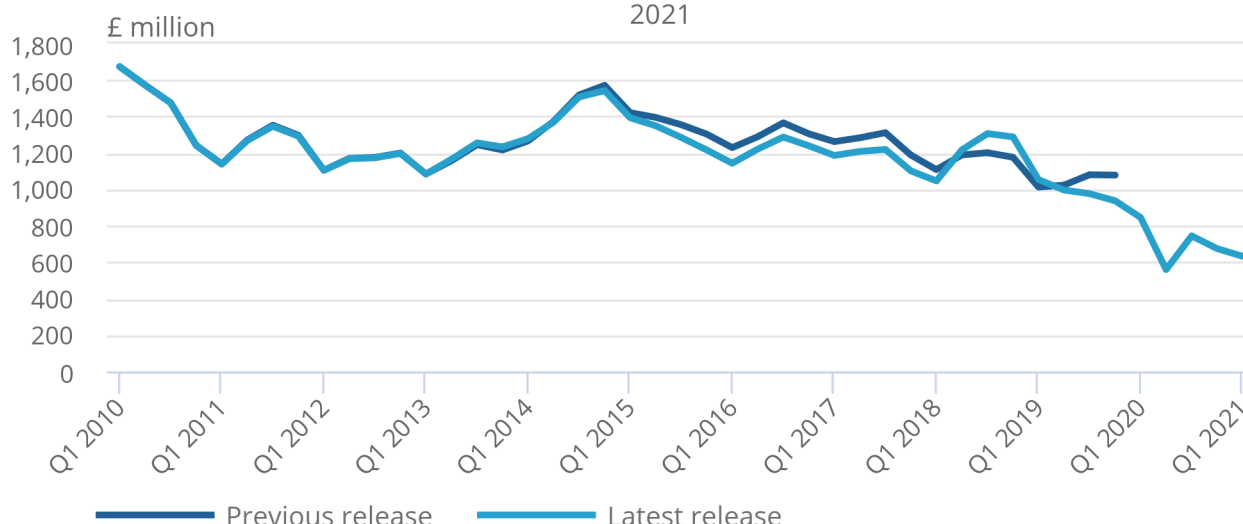
The previous and latest "shops" construction output (Figure 4) see some revisions throughout the series, increasing towards the end of 2019 when the sub-sector dataset was suspended. There were changes to end dates of many "shops" projects which started in 2017 and 2018. These changes and their impact are likely to be related to coronavirus (COVID-19), and as such more output would be seen later. This is therefore likely to be more representative of construction activity subject to the current assumptions made in the model.

**Figure 4: Following changes to end dates of “shops” type of work projects within private commercial, there was a divergence towards the end of the “previous release” series in Quarter 3 and 4 2019**

Private commercial “shops” output, 11 February 2020 release compared with 12 May 2021 data, current price, non-seasonally adjusted, Great Britain, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021

Figure 4: Following changes to end dates of “shops” type of work projects within private commercial, there was a divergence towards the end of the “previous release” series in Quarter 3 and 4 2019

Private commercial “shops” output, 11 February 2020 release compared with 12 May 2021 data, current price, non-seasonally adjusted, Great Britain, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021



Source: Office for National Statistics and Barbour ABI

## Sub-national impact: illustrative examples

Figures 5 to 8 show previous (data as of February 2020) construction output estimates for a selection of regions (London, West Midlands, Scotland, and Wales) on a current price, non-seasonally adjusted basis, compared with the latest published estimates (data as of May 2021). These new series are likely to be more representative of construction activity, subject to the current assumptions made in the model.

While most areas saw relatively small revisions, larger revisions are evident in certain areas during certain quarters, particularly London in 2018 and the West Midlands between 2017 and 2019.

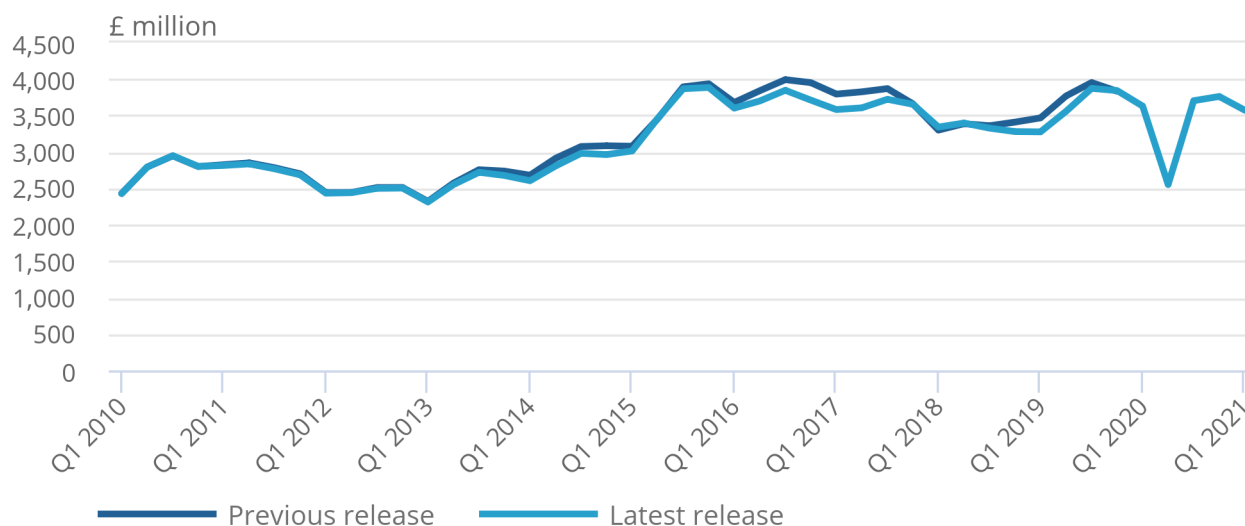
Figure 5 illustrates previous Scotland construction estimates, compared with the latest published estimates. Revisions to the value of work done in Scotland are evident from 2013 onwards because of quality assurance of project level information, reflecting date and value changes.

**Figure 5: Revised output estimates for Scotland are evident from 2013 because of improved input data**

11 February 2020 release compared with 12 May 2021 data, Scotland, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021, Current price, non-seasonally adjusted

### Figure 5: Revised output estimates for Scotland are evident from 2013 because of improved input data

11 February 2020 release compared with 12 May 2021 data, Scotland, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021, Current price, non-seasonally adjusted



Source: Office for National Statistics and Barbour ABI

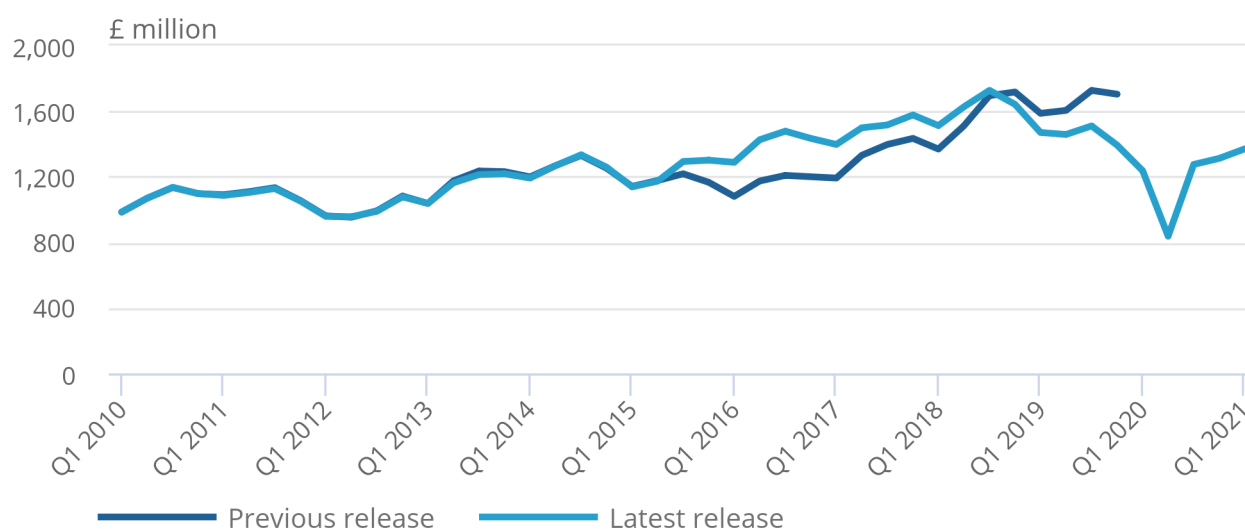
Wales construction output (Figure 6) revisions can be seen from 2015 and 2019, partially because of changes in the valuation of projects, as well as weight changes for other regions. As such, output apportioned across this period for Wales has changed.

**Figure 6: Valuation changes in Wales and weight changes for other regions led to revisions in Welsh output apportioned from 2015 to 2019**

11 February 2020 release compared with 12 May 2021 data, Wales, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021, current price, non-seasonally adjusted

## Figure 6: Valuation changes in Wales and weight changes for other regions led to revisions in Welsh output apportioned from 2015 to 2019

11 February 2020 release compared with 12 May 2021 data, Wales, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021, current price, non-seasonally adjusted



Source: Office for National Statistics and Barbour ABI

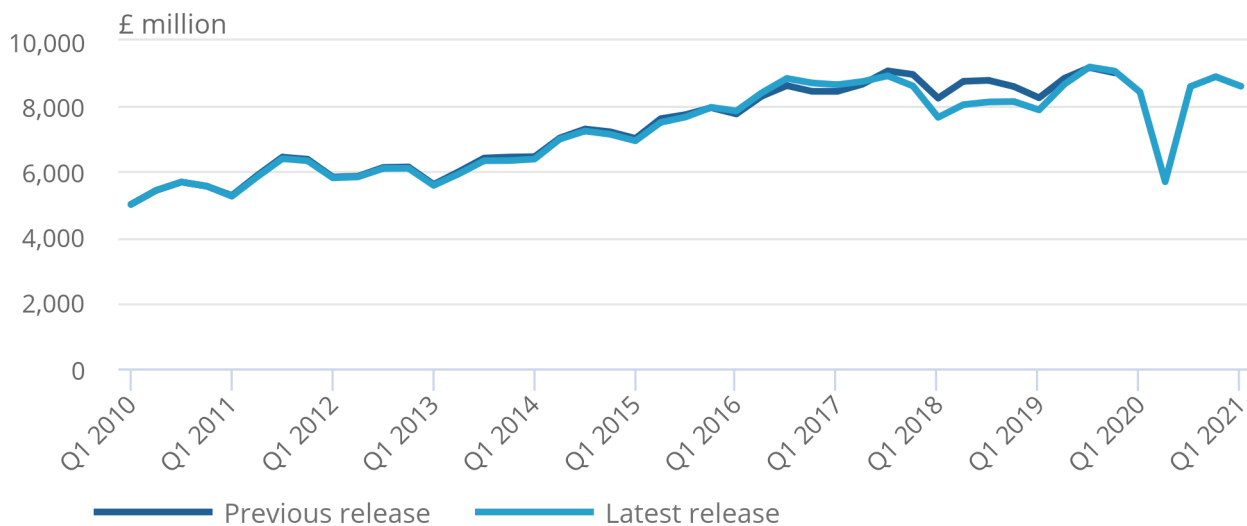
London construction output (Figure 7) in 2018 was revised downward partially because of a fall in the relative valuation of projects. As a result, the weight for London will have fallen, and so output apportioned across this period reduced.

**Figure 7: Falls in the relative valuation of London projects in 2018 led to weight changes meaning lower output in 2018**

London construction output, 11 February 2020 release compared with 12 May 2021 data, current price, non-seasonally adjusted, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021

**Figure 7: Falls in the relative valuation of London projects in 2018 led to weight changes meaning lower output in 2018**

London construction output, 11 February 2020 release compared with 12 May 2021 data, current price, non-seasonally adjusted, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021



Source: Office for National Statistics and Barbour ABI

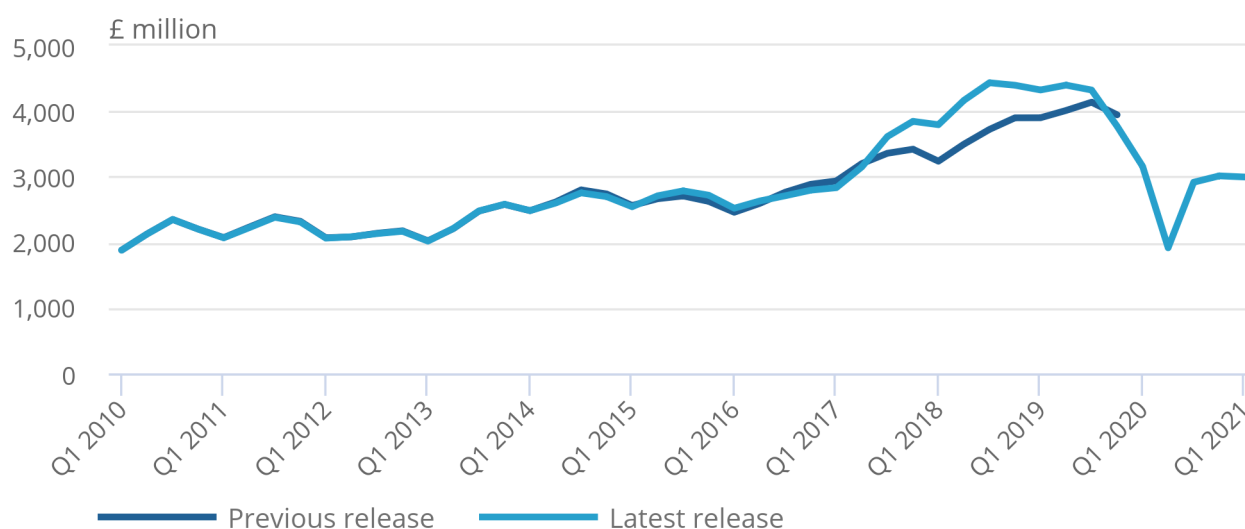
Increased values for projects in the West Midlands (Figure 8) meant construction output across 2017 to 2019 rose, as well as the total valuation of projects elsewhere reducing in valuations. As such West Midlands would have a greater weighting in the model and more output apportioned to it.

## Figure 8: Increased valuation for projects in the West Midlands from 2017 to 2019 lead to the shift in output

West Midlands output, 11 February 2020 release compared with 12 May 2021 data, current price, non-seasonally adjusted, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021

### Figure 8: Increased valuation for projects in the West Midlands from 2017 to 2019 lead to the shift in output

West Midlands output, 11 February 2020 release compared with 12 May 2021 data, current price, non-seasonally adjusted, Quarter 1 (Jan to Mar) 2010 to Quarter 1 2021



Source: Office for National Statistics and Barbour ABI

## 5 . Future developments

The improvements to reflect the latest project level information outlined in this article have meant estimates for sub-sector and sub-national construction output are likely to be more representative of construction industry activity, subject to the constraints of the current model. The work has emphasised the need to have regular updates to project level input data to ensure the weights used to apportion the Great Britain construction output level to the sub-national and sub-sector level are correct. These data will continue to be published on a quarterly basis alongside the quarterly construction output in Great Britain releases. For example, Quarter 2 (Apr to June) 2021 data for both will next be published on 12 August 2021.

Further development work is planned to investigate the current assumptions of the model. Most notably, whether new orders data are a suitable proxy to apportion low-level construction output data. The work completed to date has also illustrated how incorporating latest project valuations, start dates and end dates can lead to larger revisions than previously experienced.

Incorporating the latest information for a project can have the impact of changing weights throughout a project and leading to historic revisions. At present, the revision policy for these sub-national and sub-sector data are only limited to being constrained to equal the Great Britain construction output totals, which are subject to the [national accounts revisions policy](#).

We will continue to liaise with the Office for National Statistics (ONS) Construction Statistics Steering Group as we undertake this development work, with the aim of regaining national statistics status for this dataset. We also welcome additional input outside of this steering group, and if you would like to give feedback as a user of this data or be involved in the development work, please contact [construction.statistics@ons.gov.uk](mailto:construction.statistics@ons.gov.uk).

## 6 . Related links

### [Output in the construction industry: sub-national and sub-sector. \(XLSX, 2.1 MB\)](#)

Dataset | Released 12 May 2021

Quarterly non-seasonally adjusted type of work and regional data at current prices, Great Britain.

### [Construction development: improvements to regional and sub-sector level estimates, June 2018](#)

Article | Released 4 June 2018

Improvements to the model used to estimate regional and sub-sector level construction output data, including the impact of the changes.

### [Construction output QMI](#)

Methodology | Last revised 8 August 2019

Quality and Methodology Information for construction output in Great Britain, detailing the strengths and limitations of the data, methods used, and data uses and users.

### [New orders in construction QMI](#)

Methodology | Last revised 8 August 2019

Quality and Methodology Information for new orders in construction, detailing the strengths and limitations of the data, methods used, and data uses and users.

### [Construction statistics development: improving the understanding of new orders in the construction industry and the gap between output and new orders](#)

Article | Released 30 October 2018

Explanation and analysis as to the possible causes to explain the differences in Office for National Statistics construction output and new orders data.