

# Section 1 - Executive Summary

## Executive Summary

Network Rail (NR) and the Office of Rail and Road (ORR), engaged Arup to review and update their cost benchmarking ranges for use in the estimating process for individual projects ranging from Complex Station Redevelopments (CSR) to Major and Minor works. A sample of 50 completed Enhancement Projects, determined by Network Rail and agreed by the ORR, formed the basis of the updated ranges. An updated set of Direct Cost Unit Rates based on the same sample of 50 projects was also produced. The Indirect Cost Ranges found in the Network Rail Cost Planning Procedures manual v.3.3 were also reviewed and updated.

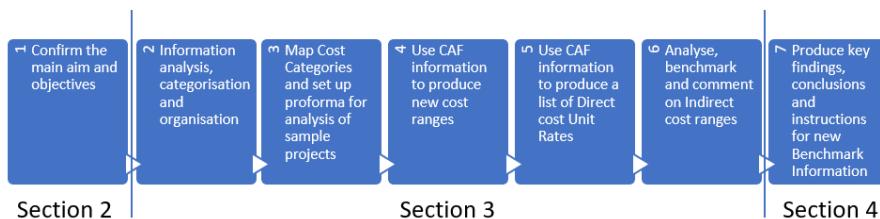
A detailed analysis was carried out and produced new cost ranges, as well as the direct cost unit rates, from the 43 CAFs selected. An analysis was also carried out on indirect cost ranges currently in use, as required by the original mandate.

The new ranges and rates produced by the analysis was then benchmarked against other NR cost plans, published industry standards, other infrastructure projects, and projects from other sectors.

International benchmarking was not carried out, due to unavailability of comparable information as well as a lack of time to produce an effective result.

## Approach

The following steps were followed in carrying out the review and range update



Each of the steps above are explained in sections 2 to 4 of the main report.

The large range of project sizes covered by Enhancement Projects would make it difficult to benchmark projects with just one set of ranges, leading to the sample projects being categorised into Major, Minor and Complex Works. The out-turn cost from the 43 sample projects helped to build a more accurate benchmarking tool.

The basic format of the ranges remains similar to the format that was previously in use, with improvements rather than an entirely new process.

## Key Conclusions and Results

- A new set of cost ranges for ORR to benchmark NR cost plans more accurately has been produced,
- The ranges are now updated using actual project out-turn cost from the samples provided by NR and agreed by ORR,
- The reporter has validated the ranges by benchmarking as widely as practically possible,
- The reporter has summarised the differences between the old ranges and the new, as well as highlighting any re-occurring issues within each category,
- The new ranges are now built into the existing Project Review Workbook and the latter has been enhanced to improve the functionality of the new ranges,
- The reporter has produced a list of direct cost unit rates with backup,
- All costs have been adjusted to Q4/2019 before incorporating into the unit rate calculations,
- The reporter has produced a direct/indirect cost split, arranged by out-turn cost, for the list of sample projects to enable the user to find comparator projects when benchmarking new cost plans and using the direct cost unit rates,
- The reporter has analysed and benchmarked the Indirect costs ranges currently in use and commented on their suitability for estimating,
- This report has been produced to be read in conjunction with the appended spreadsheets, explaining the methodology and logic in the execution of the brief.

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## Scope of works

The review was completed between November 2019 and January 2020 and focused on producing new cost ranges for established cost ratios as well as indirect cost percentages. In addition to this, the reporter has extracted various direct cost unit rates from actual out-turn cost of 43 projects and benchmarked all of the above. The original mandate has been followed as far as possible and any change in scope was agreed with both NR and ORR before incorporation in the report. The main outputs are summarised below.

### New Cost Ranges

Analysis and processing of project out-turn costs to produce new cost ranges

### Direct Cost Unit Rates

Extraction of useful direct cost unit rates for benchmarking

### Indirect Cost Percentages

Analyse, benchmark and comment on the indirect cost percentages currently in use

#### **The following activities were undertaken:**

- Analysis of all Cost Analysis Forms (CAFs) provided and confirmation of suitability of each.
- Processing of each cost breakdown to extract the relevant information to produce the new ranges.
- Enhance and improve the benchmarking system and information following review of the existing process.
- Identify potential system improvements and implement necessary changes
- Update the ranges and incorporate in Project Review Workbooks

#### **Benchmarks and Maturity**

Benchmarking done against NR cost plans provided by ORR, as well as other infrastructure and non infrastructure projects

#### **The following activities were undertaken:**

- Analysis of each cost breakdown to determine which unit rates can be produced
- Selection of most useful unit rates for each cost breakdown
- Separation of rates into RMM cost categories
- Adjustment of all CAFs to current time using BCIS general building indices
- Summarise all rates into separate project categories (Minor, Major and Complex (CSR))
- Inclusion of other benchmarked unit rates from Arup internal data base.

#### **Benchmarks and Maturity**

No Benchmarking has been carried out on the unit rates derived from the CAFs. The reporter has included external unit rates to assist the user.

#### **The following activities were undertaken:**

- The reporter has averaged the current Indirect cost percentages as the CAF breakdowns does not provide enough granularity.
- Comparison of the 43 project's out-turn cost against each indirect cost average has been carried out
- The reporter has implemented a traffic light system, with commentary, to highlight any trends or issues throughout the analysis.

#### **Benchmarks and Maturity**

- Benchmarking of each indirect cost average against external rail and non rail projects, as well as BCIS for Prelims, has been carried out.

## Conclusions

A detailed conclusion for each analysis has been included in the last section of the full report.

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## Summary of Conclusions and Results

### New Cost Ranges

#### Findings – Minor Works

- ‘Direct cost as a percentage of AFC’ remains largely unchanged and aligns with the additional NR cost plans provided. We can however see that the results show lower direct costs as percentage of AFC when compared to other infrastructure projects, as well as non infrastructure projects. Reasons for this are not analysed as part of this report,
- ‘Indirect cost as a percentage of AFC’ is higher than the previous range and is now more in line with other infrastructure projects,
- ‘Direct cost as a percentage of base cost’ also remains largely in line with previous ranges but similarly to the first bullet, it compares unfavourably with other infrastructure and non infrastructure projects,
- ‘Indirect as a percentage of base cost’ is higher than previous ranges, but now aligns better with other infrastructure and non infrastructure projects,
- ‘Base cost as a percentage of AFC’ is higher than previous ranges and now aligns better with other NR cost plans as well as other infrastructure projects,
- Prelims ranges are generally higher than previous ranges, but now align much better with other NR cost plans and external benchmarks,
- Design is also significantly lower than previous ranges. This seems to be reflected in other NR cost plans. The remaining benchmarks seems to confirm that design costs in the CAFs may need further investigation for inefficiency throughout,
- Project Management costs also produced higher percentages when compared with old ranges, however, they are generally aligned with other NR cost plans. Old ORR ranges are closer to other industry benchmarks than the new ranges.

#### Findings – Major and Complex Works

- ‘Direct as a percentage of AFC’ indicates the importance of having different ranges for different project sizes. The major and complex works ranges now straddle the old range and should provide more accurate benchmarking. As for minor works, the data did produce lower percentages when compared to other infrastructure and non infrastructure projects for both major and complex projects,
- The same comments also apply to ‘Direct as a percentage of base’ cost,
- For ‘Indirect as a percentage of AFC’ and ‘Indirect cost as percentage of base’ we can see that the new ranges are lower but better aligned with other infrastructure projects,
- ‘Base cost as a percentage of AFC’ shows an improved (higher) range compared to the old range and also aligns well with other infrastructure projects,
- Prelims ranges differ considerably from the old ranges. The new ranges are better aligned with similar external infrastructure projects as well as non infrastructure, Benchmarking prelims for the complex works is especially challenging and this is reflected in the high percentages seen from the CAF analysis,
- Design costs seem to be high compared to old ranges as well as industry standards. Reasons for this are not analysed as part of this report. However, we believe this would justify further analysis,
- We have found that comparable prelim benchmarks are quite challenging to find and therefore we advise the user to only consider the percentages taken from the CAFs, as the other benchmarks are not sufficient for comparison,
- We have found that the 3 complex projects have very similar splits between direct, indirect and other costs. Following consultation with NR, we understand that this is as expected considering the fact that they are all from the Thameslink programme (TLP).

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### Direct Cost Unit Rates

A full analysis of the 43 CAF projects was carried out after dividing them into their respective cost categories. As many unit rates as possible have been extracted from the raw data, taking into account the high level of the data provided. The new unit rates table does not provide deeper level unit rates as it was not possible to extract these from the raw data. The reporter has included a separate list of lower level unit rates for the user to consult in future benchmarking. These rates are based on external projects and are not in any way derived from the 43 sample projects.

#### Results

##### **The reporter has:**

- Produced a list of Direct cost unit rates with comprehensive backup and breakdowns to show our logic and workings throughout,
- Adjusted all costs to current Q4/2019 before incorporating in unit rate calculations,
- Produced a Direct/Indirect cost split arranged by out-turn cost for the list of sample projects to enable the user to find comparator projects when benchmarking new cost plans and to reinforce the usefulness of the new direct cost unit rates,
- Included a list of external, lower level unit rates for infrastructure projects of the larger variety. These rates are benchmarked against rates from other large consultancies as well and tested against Arup rates to indicate our confidence in each of them.

#### Benchmarks

The reporter has not benchmarked the unit rates derived from the CAFs. However, they have included other unit rates for main infrastructure cost driver items to assist the user.

#### Robustness

The unit rates are very project specific and using comparator projects from the sample project list would be advised. Weighted averages are in use as, following testing, it was found that they produce more realistic averages considering the varying project types in each category.

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### Indirect Cost Percentages

The reporter calculated the average percentages from the indirect cost ratio table currently in use by Network Rail for estimating purposes. All findings are summarised on various tables segregating minor, major and complex works categories and highlighting any re-occurring issues which stemmed from the benchmarking process. The reporter primarily benchmarked the current ranges against the 43 sample projects and expanded the benchmarking to other infrastructure projects as well as non infrastructure projects.

#### Results

##### The reporter has:

- Analysed and benchmarked the indirect costs ranges currently in use and highlighted where they are suitable, or not.
- Benchmarked against the CAFs separately from other infrastructure and non infrastructure projects as the CAF information provides the most accurate and relevant comparison of the Indirect cost percentages.
- Included large infrastructure projects in the benchmarking.
- Produced this report, to be read in conjunction with the appended spreadsheets, explaining the methodology and logic in the execution of the brief.

#### Benchmarks

The reporter has benchmarked each indirect cost average against external rail and non rail projects as well as BCIS for Prelims

#### Robustness

The comparison of the current ranges against actual project out-turn cost is most relevant and creates an accurate indication of the suitability of each range for estimating. The ranges have also been benchmarked against other rail, and non rail industry ranges.