

Appendix 8.11.B – Chandler KBS report on non- construction cost benchmarks

Wessex Water

September 2018

Business plan section	Supporting document
	Board vision and executive summary
1	Engaging customers
2	Addressing affordability and vulnerability
3	Delivering outcomes for customers
4	Securing long term resilience
5	Markets & innovation: wholesale
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8	<ul style="list-style-type: none"> 8.1 Input cost and frontier shift assumptions 8.2 Wholesale cost modelling and the calculation of catch-up 8.3 Residential retail expenditure 8.4 Cost adjustment claims covering letter 8.5 Claim WSX01 summary – North Bristol sewerage 8.6 Claim WSX02 summary – Sewage treatment works capacity programme 8.7 Claim WSX03 summary – Number of non-infrastructure water supply assets 8.8 Claim WSX04 summary – Reducing leakage by a further 15% 8.9 Claim WSX05 summary – Flooding programme 8.10 Claim WSX06 summary – Pollution reduction strategy 8.11 Assessing the costs of our enhancement programme
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Non-Construction Cost Benchmarks

PR19 Support

Wessex Water

May 2018



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1. Introduction and Scope

ChandlerKBS was commissioned by Wessex Water (WW) to benchmark non-construction costs, specifically those relating to Design and Project Management. The scope is covered by 2 phases. Phase 1 consisted of the review of the available data. Phase 2, which forms the basis of this report, consists of the calculation of benchmark costs using data from various sources available to ChandlerKBS.

We were requested by WW to provide typical percentages for the following for both Design and Project Management:

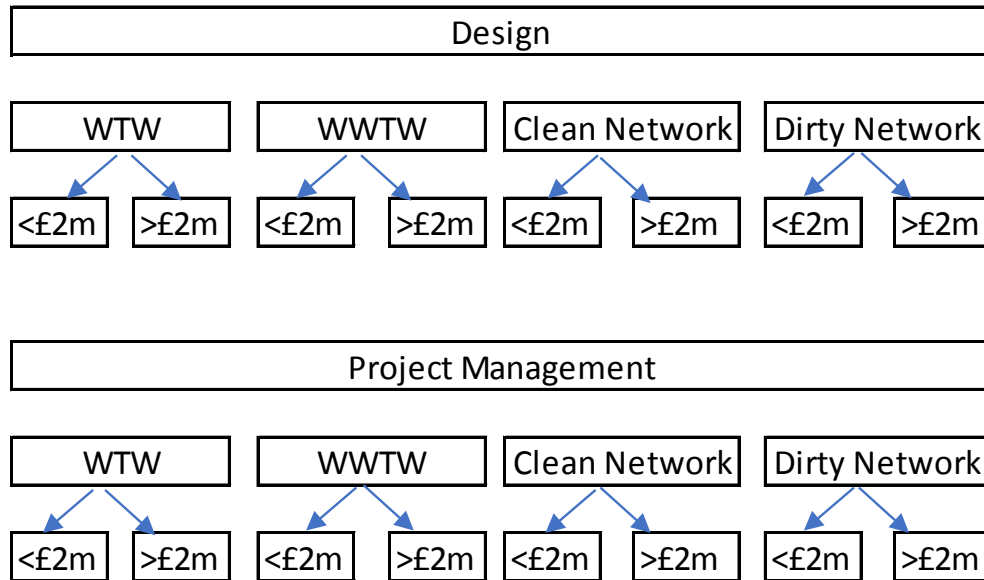
- Optioneering
- Outline design
- Detailed design
- Construction support stages of a project

The percentages were required for the separate workstream areas, i.e. Wastewater Treatment; Clean Water Treatment; Networks – Sewerage; Networks – Clean Water and further separated into 2 project ranges, i.e. projects with expenditure lower than £2m and projects with expenditure higher than £2m.

As set out by our email proposal on 18 April 2018, our planned scope was as follows:

- Review non-construction costs benchmark data and its relevance to WW's procurement model. Although we have benchmark data for non-construction costs, we noted that it may not currently be segregated into the categories WW require, for example the <£2m >£2m category.
- We noted that we did not anticipate that the %'s for design and project management will be further sub-divided into optioneering, outline, detailed design and construction support stages. However, we would confirm what activities are included in both design and project management.
- Review/unwind the original source data/models to provide %'s for the following:

Fig 1: Categorisation Overview



2. Methodology

We were able to derive the categories demonstrated in Fig 1 using the data available to us. One of our sources (Source 1) enabled us to provide percentages for the subcategories listed in the introduction. We were unable to separate optioneering from outline design therefore the subcategories we provide are as follows:

- Optioneering, feasibility and outline design
- Detailed Design
- Construction support

Our remaining sources provided benchmarks to the various stages set out in Fig 1 (without further granularity into the subcategories). For two cost model sources, where we had no visibility of the cost bandings (<£2m and >£2m), we have back-solved the split based on the average proportions from the other sources.

The final set of results for each workstream are derived from the mean averages of the results from all the sources.

As a further calculation, for information, we have applied the proportions of the subcategories identified from Source 1 to the average total design and project management percentages.

The Phase 1 paper described the various sources from which we would acquire the cost data to perform the exercise. Some changes were made during Phase 2, in that one of the sources listed in Phase 1 was removed and replaced with two different sources, and one source proved to comprise better detail than at first inspection. The final set of data sources along with the changes from Phase 1 are described in detail in the following section.

3. Benchmark Data Sources

ChandlerKBS’s cost data is sourced from five Water and Sewerage Companies (WASCs) with whom we have carried out various commissions. Phase 1 listed the sources and our expectation of each source’s utilisation. This section describes for each source the type of data, the inclusions and our confidence in their application. A summary of company sources is shown below in Table 1, which also gives our confidence gradings (0 = low; 5 = high) for data point frequency and inclusions coverage.

Table 1 also shows the rank of the sources from the lowest average total percentage throughout all workstreams (design + project management) to the highest.

Table 1.

Source	Company	Confidence/Risk		Total Percentage Rank Low to High
		Datapoints	Inclusions	
1	A	4	4	3 rd
2	B	5	3	6 th
3	C	5	4	2 nd
4	A	5	4	4 th
5*	A,C,D	0	0	n/a
6	E	3	2	5 th
7**	F	2	3	1 st

*Not used. **Outlier.

Sources 6 and 7 were used for treatment benchmarks only (clean and dirty).

We have attempted to align the inclusions with the Scope of Service document sent to us by WW. We did not have visibility of the detail contained in that document, but more

general headings were available which we are confident cover most if not all the services listed. We caveat that for each company, the various services would be covered by the two headings, Design and Project Management but not necessarily consistently for all companies, i.e. one item might be considered part of design by one company but will be included under project management by another. This would go some way to explain any swings between the design and project management proportions.

As far as the inclusions are concerned, if the general service headings were not explicitly included in other cost items, then they were deemed to be included in the non-construction costs. Where we were not confident that the services have been included in the design and project management costs, we have scored the source low in the risk grading.

3.1. Source 1 (Company A)

The percentage proportions from this source are based on contractually agreed percentage allocations for Design and Project Management for Company A's AMP5 programme. The proportions were entered into the alliance contracts for target cost purposes.

In addition to the design and construct alliance contracts (where the alliance contractors were responsible for delivering their allocated workstream programmes), we applied Company A's client on-cost allocation, which included an amount for in-house or consultant-lead design and project management costs. The client on-cost was derived from Company A's unit cost database.

As mentioned in the Phase 1 paper, the cost bandings were not in line with WW's requirement, therefore we based the split as closely as the data allowed. We calculated the <£2m and >£2m apportionments as described in the Phase 1 paper.

The contractors' cost inclusions are listed in the contract documents. The cost model report contains column which identifies the general inclusions for the client cost portion. We are satisfied that none of the services listed in the WW scoping document would be included elsewhere in the project costings and are therefore deemed to be included in the design and project management costs.

We are confident with the data coverage as the percentage allocations were applied to all alliance projects delivered during AMP5.

3.2. Source 2 (Company B)

These percentages are derived from a similar exercise we prepared for Company B for PR14. The percentages are based on cost data from projects delivered during AMP3 and AMP4.

In Phase 1 we suggested that the coverage for network projects was poor, but during Phase 2 of the exercise this proved not to be the case.

The cost bandings were not in line with WW's requirement therefore we based the split as closely as the data allowed. The bandings were as follows:

- <£100K
- £100K-£250K
- >£250K-£1m
- >£1m-£6m
- >£6m-£15m
- >£15m

We excluded the lowest and highest bands. For the <£2m apportionment we used an average of the £100K-£250K and the £250k-£1m bands and for the >£2m apportionment we used the average of the £1m-£6m and £6m-£15m bands.

The confidence in the inclusions is relatively low for Source 2 due to there being a relatively large corporate overhead associated with all projects for which we have no analysis or breakdown. We have chosen to exclude the corporate overhead in line with most other sources, this decision is reinforced by the fact that the results from Source 2 are relatively high as they stand.

3.3. Source 3 (Company C)

This set of benchmarks is based on Company B's cost model results. The models are informed by the data collection forms submitted for all the capital construction projects delivered by Company C over £100k over the last ten years.

We did not have sufficient visibility to unwind the models to separate the percentages into the project cost bands. For completeness, we have back-solved the percentage allocations to above and below £2m based on the apportionments of the other benchmark sources.

The inclusions are listed in the cost model report and we are confident that WW's requirement is covered.

3.4. Source 4 (Company A)

This set of benchmarks is based on Company A's cost model results. The models are informed by the data collection templates for most capital construction projects delivered by Company A over £100k since AMP3 but only up to AMP5.

We would have expected that the results for this source would have aligned with the results from Source 1. The fact that this does not align with Source 1 may be due to the fact that these source projects are from AMP 3 and AMP4 as well as AMP5, whereas Source 1 data is solely from AMP5.

We did not have sufficient visibility to unwind the models to separate the percentages into the project cost bands. For completeness, we have back-solved the percentage allocations to above and below £2m based on the apportionments of the other benchmark sources.

The inclusions are listed in the cost model report and we are confident that WW's requirement is covered.

3.5. Source 5 (Combination of Companies A,C and D)

We intended to use the ChandlerKBS inhouse database which is comprised of data from Companies A, C and D. However, Company D's data proved to be in a format which was not possible to analyse for this exercise. Therefore, coupled with the fact that data from Companies A and C are already used in Sources 3 and 4, this source has been abandoned.

3.6. Source 6 (Company E)

The data is sourced from Company E's estimating database which ChandlerKBS utilises for capital allowances purposes. This source covers treatment projects only – 56 sewage projects and 10 water projects (all projects were delivered in AMP6).

Other Company E data was scrutinised for network projects but the reconciliation to the project outturn costs was not possible. Therefore, we have not included them in this exercise.

The database represents costs from the delivery partners, but Company E also has a significant client cost allocation, the detail of which is not visible to us. We have therefore included a reconciliation adjustment to include for client costs based on the average difference between the contract total and the project total and we have assumed 5% for corporate overhead which was excluded. We have given this source a relatively low confidence grading both for datapoints frequency and inclusions coverage.

3.7. Source 7 (Company F)

The data is sourced from ChandlerKBS's capital allowances documents for Company F. The benchmarks are based on the data from a randomly selected sample of covers treatment projects only - 13 sewage projects and 10 water projects.

Company F's final account finance reports allocate costs into the categories that can be analysed into Design and Project Management. Some reports are coded as Design and Project Management and some need to be analysed in a bit more detail where timesheet costs and consultant costs need to be allocated retrospectively.

There is a risk that some consultant costs have been allocated to Project Management when that consultant provides both project management and design services. We are satisfied that any costs included in the WW Scoping document are covered under either the Design heading or the Project Management heading, but we cannot be certain that they have been allocated to the correct one. For this reason, we have lowered the confidence grading for inclusions to 3.

The results derived from this source contrast with all other results in that the >£2m percentages are all higher than the <£2m percentages. We could therefore exclude the data series as the projects may not be suitable. If this is desirable, we could re-run the averages without the data from Source 7 and resubmit the report accordingly.

4. Results

The overall average benchmark values for the 16 areas, as set out in Fig.1 with corresponding totals are shown in Table 2 below.

Table 2 - Average Benchmarks: Design and Project Management Level

Water Treatment					
Design <£2m	Design >£2m	PM <£2m	PM >£2m	Total <£2m	Total >£2m
14.00	12.80	23.05	18.58	37.04	31.38

Water Network					
Design <£2m	Design >£2m	PM <£2m	PM >£2m	Total <£2m	Total >£2m
11.50	6.19	24.12	16.91	35.62	23.10

Sewage Treatment					
Design <£2m	Design >£2m	PM <£2m	PM >£2m	Total <£2m	Total >£2m
12.96	10.46	24.37	17.00	37.33	27.46

Sewage Network					
Design <£2m	Design >£2m	PM <£2m	PM >£2m	Total <£2m	Total >£2m
14.49	10.97	29.79	19.93	44.28	30.90

The subcategories extrapolated from Source 1 and applied to the above averages are shown in Table 3 below.

Table 3.

Water Treatment						
	Design		Project Management		Total	
	<£2m	>£2m	<£2m	>£2m	<£2m	>£2m
Optioneering/Outline	2.88	2.67	3.16	2.46	6.04	5.12
Detailed Design	6.03	5.77	7.03	5.78	13.05	11.55
Construction Support	5.09	4.37	12.85	10.34	17.95	14.70
Total	14.00	12.80	23.05	18.58	37.04	31.38
Average Design/PM	13.40		20.81		34.21	

Water Network						
	Design		Project Management		Total	
	<£2m	>£2m	<£2m	>£2m	<£2m	>£2m
Optioneering/Outline	2.08	1.15	3.31	2.24	5.39	3.38
Detailed Design	5.22	2.81	7.36	5.26	12.58	8.07
Construction Support	4.20	2.24	13.46	9.41	17.66	11.64
Total	11.50	6.19	24.12	16.91	35.62	23.10
Average Design/PM	8.85		20.52		29.36	

Sewage Treatment						
	Design		Project Management		Total	
	<£2m	>£2m	<£2m	>£2m	<£2m	>£2m
Optioneering/Outline	5.15	4.42	3.34	2.25	8.49	6.67
Detailed Design	3.01	2.90	7.43	5.29	10.44	8.19
Construction Support	4.80	3.15	13.59	9.46	18.39	12.61
Total	12.96	10.46	24.37	17.00	37.33	27.46
Average Design/PM	11.71		20.68		32.39	

Sewage Network						
	Design		Project Management		Total	
	<£2m	>£2m	<£2m	>£2m	<£2m	>£2m
Optioneering/Outline	6.43	4.76	4.09	2.64	10.52	7.40
Detailed Design	5.93	4.66	9.08	6.20	15.01	10.86
Construction Support	2.13	1.55	16.62	11.09	18.75	12.64
Total	14.49	10.97	29.79	19.93	44.28	30.90
Average Design/PM	12.73		24.86		37.59	

See Appendix A for the details within each benchmark source, including the subcategories included in Source 1.

5. Conclusion and Recommendation

These results are based on the cost data derived from five different WASCs and, as instructed, we have not incorporated any WW data into the calculations. Also, we have not had visibility of WW's own design and project management percentages. As WW's procurement arrangement and company structure differs from all the other companies we would like to emphasise that the percentages were calculated for benchmark purposes only and should not be applied directly to any business plan estimate build-ups.



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Appendix A

Benchmark Results: All Sources

Non-Construction Benchmarks: All Sources



Water Treatment										
	Design <2	Design >2	Des Ave	PM <2	PM>2	PM Ave	Total <2	Total >2	Ave Totals	Rank
Source 1	15.29	10.64	12.96	22.33	15.43	18.88	37.62	26.06	31.84	4
Source 2	22.76	15.09	18.92	34.52	22.04	28.28	57.28	37.13	47.20	6
Source 3	9.17	6.13	7.65	22.16	17.11	19.64	31.33	23.25	27.29	1
Source 4	10.67	7.13	8.90	21.30	16.45	18.87	31.97	23.58	27.78	2
Source 6	20.16	13.07	16.61	24.62	25.52	25.07	44.77	38.59	41.68	5
Source 7	5.93	24.74	15.33	13.34	14.91	14.12	19.27	39.64	29.46	3
Average	14.00	12.80	13.40	23.05	18.58	20.81	37.04	31.38	34.21	

Backsolved values in grey

Water Network										
	Design <2	Design >2	Des Ave	PM <2	PM>2	PM Ave	Total <2	Total >2	Ave Totals	Rank
Source 1	9.24	7.18	8.21	22.33	15.43	18.88	31.57	22.61	27.09	3
Source 2	25.60	8.91	17.26	25.50	18.11	21.80	51.10	27.03	39.06	4
Source 3	5.19	4.04	4.61	24.59	17.22	20.91	29.78	21.26	25.52	1
Source 4	5.96	4.64	5.30	24.08	16.87	20.48	30.04	21.51	25.78	2
Source 6										
Source 7										
Average	11.50	6.19	8.85	24.12	16.91	20.52	35.62	23.10	29.36	

Backsolved values in grey

Sewage Treatment										
	Design <2	Design >2	Des Ave	PM <2	PM>2	PM Ave	Total <2	Total >2	Ave Totals	Rank
Source 1	14.51	9.03	11.77	22.33	15.43	18.88	36.84	24.46	30.65	4
Source 2	17.37	15.45	16.41	36.79	22.37	29.58	54.16	37.82	45.99	6
Source 3	10.27	7.28	8.77	21.67	14.02	17.84	31.93	21.30	26.62	2
Source 4	11.21	7.94	9.57	25.14	16.27	20.71	36.35	24.22	30.28	3
Source 6	15.72	10.06	12.89	32.48	20.94	26.71	48.21	31.00	39.60	5
Source 7	8.69	13.01	10.85	7.77	12.96	10.37	16.46	25.97	21.22	1
Average	12.96	10.46	11.71	24.37	17.00	20.68	37.33	27.46	32.39	

Backsolved values in grey

Non-Construction Benchmarks: All Sources



Sewage Network										
	Design <2	Design >2	Des Ave	PM <2	PM>2	PM Ave	Total <2	Total >2	Ave Totals	Rank
Source 1	14.49	11.47	12.98	22.33	15.43	18.88	36.82	26.90	31.86	1
Source 2	24.66	18.08	21.37	24.97	16.19	20.58	49.63	34.27	41.95	3
Source 3	6.85	5.22	6.03	32.62	21.84	27.23	39.47	27.05	33.26	2
Source 4	11.97	9.12	10.55	39.23	26.26	32.74	51.20	35.38	43.29	4
Source 6										
Source 7										
Average	14.49	10.97	12.73	29.79	19.93	24.86	44.28	30.90	37.59	

Backsolved values in grey

Water Treatment					
		Design		Project Management	
		<£2m	>£2m	<£2m	>£2m
Optioneering/Outline		3.14	2.22	3.06	2.04
Detailed Design		6.58	4.79	6.81	4.80
Construction Support		5.57	3.63	12.46	8.58
Total		15.29	10.64	22.33	15.43
Average Design/PM		12.96		18.88	

Water Network					
		Design		Project Management	
		<£2m	>£2m	<£2m	>£2m
Optioneering/Outline		1.67	1.33	3.06	2.04
Detailed Design		4.19	3.26	6.81	4.80
Construction Support		3.38	2.60	12.46	8.58
Total		9.24	7.18	22.33	15.43
Average Design/PM		8.21		18.88	

Sewage Treatment					
		Design		Project Management	
		<£2m	>£2m	<£2m	>£2m
Optioneering/Outline		5.76	3.81	3.06	2.04
Detailed Design		3.37	2.50	6.81	4.80
Construction Support		5.38	2.72	12.46	8.58
Total		14.51	9.03	22.33	15.43
Average Design/PM		11.77		18.88	

Sewage Network					
		Design		Project Management	
		<£2m	>£2m	<£2m	>£2m
Optioneering/Outline		6.43	4.98	3.06	2.04
Detailed Design		5.93	4.87	6.81	4.80
Construction Support		2.13	1.62	12.46	8.58
Total		14.49	11.47	22.33	15.43
Average Design/PM		12.98		18.88	



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Appendix B

Phase 1 Paper

1. Introduction

ChandlerKBS was commissioned by Wessex Water (WW) to benchmark non-construction costs. The scope is detailed in an email dated 18th April 2018. The scope is covered by 2 phases. Phase 1, which is the basis of the brief paper, consists of the review of the available data.

2. Data Sources

ChandlerKBS's benchmark sources have various levels of coverage. We intend to combine as many relevant sources as possible to provide a robust benchmark. Data is sourced from a total of four water companies, with the option of adding a further company dependent of time and the relevance of the data. Each data source will provide benchmarks at a particular level. The level of the benchmarks are as follows:

- Source 1 (Company A):

Example percentages from contract target costs with proportions into WW's required sub categories banded into project outturn costs on a sliding scale. As expected the bands are not coincident with WW's requirement (<£2m and >£2m). The bands are as follows:

>£10m
>£5m <=£ 10m
>£3m <=£ 5m
>£1m <=£ 3m
>£0.5m <=£ 1m
<£0.5m

At this stage we suggest that we use an average of the lowest three as a benchmark for <£2m and an average of the highest four for >£2m with >£1m <=£3m included in both benchmark calculations.

There is data available for all four workstreams.

- Source 2 (Company B):

This data can produce average percentages across a sample of projects at a medium level, i.e. Design and Project Management; >£2m <£2m; and into clean and dirty, infra and non-infra. There is good coverage of non-infra clean and dirty, but there is only limited data on infrastructure. There is no further sub-categorisation of design/PM available.

- Source 3 (Company C):

As Source 2 except it will be difficult to separate infra from non-infra. It could however be used as a high-level benchmark, i.e. average design and project management percentage for clean and dirty only.

- Source 4 (Company A):

As Source 2 except: cost items are difficult to allocate, not as user friendly but has the greatest number of data points.

- Source 5 (Companies A, C and D):

Using the ChandlerKBS in-house database which has data from a number of companies. This data comprises a summary of on-cost data comparing 3 companies. Although design level data is available, project management data would need to be extracted from the back up data. The results are expressed as uplifts to direct cost not as % of project. This could prove difficult to apply but scenarios could be run just to check how the benchmark compares. The data covers clean and dirty, infra and non-infra but it does not provide separate benchmarks for <£2m and >£2m.

3. Next Steps

Based on our findings from phase 1, it would appear that we have sufficient data to progress to phase 2. We suggest that we have a call on Monday 30 April to discuss the content of this paper.

During Phase 2 we will endeavour to provide percentages for each of the 16 benchmarks as illustrated in the email of 18th April, supported by further benchmarks at higher levels.

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