

VALUE CREATION IN PROCUREMENT - THE KARAPIRO WTP CASE STUDY

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ABSTRACT

This paper uses the case study of the Karapiro Water Treatment Plant Upgrade to demonstrate the value that can be obtained through non-traditional procurement methods including Novation.

The Karapiro Water Treatment Plant is a 10.5 MLD conventional plant that services the town of Cambridge and surrounding areas. To deal with growth and a rationalisation of Council's treatment assets, an increase in capacity of 7 MLD was required by Council.

After conducting a feasibility analysis, a preferred treatment process for the upgrade was defined.

The questions faced by Council at that point included:

- Does the Council carry out a design based on the preferred process, thus investing a significant amount into detailed design but still be open to receiving alternative technical offers from tenderers, and thus exposed to potential redesign costs?
- Will a Main Contractor bidding on the full upgrade have the skills or interest to assess alternative technologies?
- How can Council best assure getting the optimum combination of Main Contractor and specialist process subcontractor?

Council resolved these issues by splitting the works into two separate contracts – an initial Process Equipment Contract and a second Main Contract into which the Process Contract was to be novated to ensure single point accountability.

This approach achieved the following outcomes:

- The initial Process Contract attracted several process alternatives which were able to be fully assessed before committing to the final process and detailed design. The competitive nature of this tender provided a significant cost saving over estimates for this component of the work
- Council managed the design process within the Process Equipment Contract, and made the appropriate payments for supply of equipment, thus avoiding the margin that the Main Contractor would apply on such supply
- With certainty on the scope of process equipment, Council completed the detailed design and novated the installation and commissioning component of Process Equipment Contract to the Main Contract. This provided confidence to the Main Contractor that the specialist process areas had been well developed (not just addressed in a short tender period). For Council it meant a reduced margin on the Process work and single point accountability for the whole project
- A significant overall project cost saving was achieved, while preserving Council's flexibility to select an optimum treatment process, and providing an increased choice on selection of both Process and Main Contractor.

KEYWORDS

Procurement, Novation, Water Treatment

PRESENTER PROFILE

The presenter will be:

Mike Muntisov is a Director of GHD. He has more than 35 years experience in the water industry predominantly in the water treatment field. He is the Editor of the GHD Book of Water Treatment. He was GHD's Project Director for Karapiro WTP upgrade which is the subject of today's presentation.

He will be supported by:

Gordon Macrae is a Project Engineer for Waipa District Council, he has a contracting background with over 30 years experience working in the Civil Engineering industry both in New Zealand, Australia, Ireland and the UK and more specifically over the last 14 years here in NZ working on major roading, power and three waters contracts.

1 INTRODUCTION

The Karapiro Water Treatment Plant was built in the 1960's and is a 10.5 MLD conventional plant which draws raw water from Lake Karapiro and services the town of Cambridge and surrounding areas. To deal with growth and a rationalisation of Council's treatment assets, an increase in capacity of 7 MLD was required by Council.

After conducting a feasibility analysis, a preferred treatment process for the upgrade was identified. The core process selected included plate settler clarifiers and granular media gravity filters.

Other process technologies, including advanced technologies were considered and evaluated but the selected process was preferred on the range of criteria set by council including whole-of-life cost and compatibility with the existing plant process.

The estimated cost of the upgrade works at this early concept stage was \$5.4M

2 VALUE CREATION

2.1 Scope, Preliminary Design and Cost Estimate

The next step in the project was to better define the full scope of work, carry out a preliminary design and develop a cost estimate.

As is usual in moving from feasibility concept to preliminary design, a number of elements of scope changed. Of particular significance was the identification that the raw water pumps and pontoon needed to be completely replaced as their capacity and reliability was not as originally anticipated. In addition OHS considerations lead to the need for a new Powdered Activated Carbon storage and dosing building being required. More detailed work on electrical and controls works also indicated additional scope of work.

Based on the improved definition of scope of work, the project cost based on the preliminary design of the upgrade was now estimated to be \$6.2M for the contract works, which was towards the high end of Council's contingency allowance.

2.2 Interactive design

The Karapiro WTP upgrade project was noteworthy for the interactive nature of the design. A design steering group was made up of Council's project managers, operations staff and GHD's design team.

This team considered alternative tank designs for the main process units including custom-design concrete tanks versus prefabricated stainless steel tanks. Based on a multicriteria assessment, the prefabricated tank approach was adopted.

The team was also able to optimise design arrangements for backwash storage, chemical storage and washwater handling. In many cases, the operations team identified the optimisations. On the other hand, the desirability of a building over the new process tanks was agreed and the need identified for an additional new low lift pump, both of which added to scope and cost.

With the scope now well defined, it was necessary to develop a procurement strategy that would provide the best value for money for Council while ensuring that it could keep project costs within the cost estimate whilst not sacrificing, quality, plant performance or future operability and maintenance.

2.3 Procurement Strategy

The questions faced by Council at this point included:

- Does the Council carry out a design based on the preferred process, thus investing a significant amount into detailed design but still be open to receiving alternative technical offers from tenderers, and thus exposed to potential redesign risks?
- How does Council manage the risk that the tender price from a single Main Contract exceeds its budget?
- Will a Main Contractor bidding on the full upgrade have the skills or interest to assess specialist process contractors or alternative technologies?
- How can Council best assure getting the optimum combination of Main Contractor and specialist Process subcontractor?
- How to have a single and expert entity responsible for process plant performance guarantee?
- How does Council maintain a long term relationship with a Process Contractor if they are a subcontractor to the Main Contractor?
- How does Council maintain buy-in and engagement of its Operations Team?

Council resolved these issues by splitting the works into two separate contracts – an initial Process Equipment Contract, and a second Main Contract into which the Process Contract was to be novated to ensure single point accountability.

Council utilised NZ3916 (Design and Construct) as the basis for the Process Contract and NZS3910 (Construct) for the Main Contract including the common Novation provisions within both of these contracts.

2.4 Risk Allocation

Although this approach mitigated many of the risks identified, there were risks that were still retained by Council. These included:

- Council carried the liability and management risk for ensuring two contracts integrated in terms of technical supply boundaries and respective delivery programmes and dates.
- Risk that the Main Contractor would load price for managing the novated contract, however the competitive nature of tendering probably minimized this

2.5 Outcomes and Benefits

This procurement strategy achieved the following outcomes.

For the Process Contract:

- Council got early visibility of likely contract costs allowing it to take stock against its budget at this milestone point before deciding how to move forward on scope
- The Process Contract tender attracted several process alternatives which were able to be fully assessed before committing to the final process and detailed design. This gave greater clarity of the proposed process plant and operability giving operators greater confidence and ability to effect changes
- The competitive nature of this tender provided a significant cost saving over estimates for this component of the work.
- With technology providers tendering direct it facilitated greater ability for alternative bids / technology for Councils consideration
- This tender process allowed Council's original process selection decision to be confirmed against actual market prices.
- Council had the ability to weight the tender selection to appropriately factor in quality and experience and not just price, which is an increased risk when these works are included directly in a Main Contractors scope.
- Council managed the design process within the Process Equipment Contract, and made the appropriate payments for supply of equipment, thus avoiding much of the margin that the Main Contractor would apply on such supply
- Working closely with the Process Contractor allowed the project steering group and, in particular, Council's operators to become very familiar with the process design detail and were therefore able to influence some elements. This also improved the confidence and knowledge in the equipment they were shortly to take over to operate.
- It allowed fabrication of long lead items to commence early and not slow down the mobilisation of the Main Contractor
- The long term defects liability and maintenance component of the contract was not novated but retained by Council, allowing future direct communication between Council and Process Contractor, and development of a stronger long term relationship
- The successful tenderer for the Process Contract was Filtec Ltd

For the Main Contract

- With certainty on the scope of process equipment, Council was able to complete the detailed design for the Main Contract
- Only the installation and commissioning component of the Process Equipment Contract was novated to the Main Contract.
- For Council this meant a reduced margin on the Process work while preserving single point accountability for the whole project
- the Main Contractor had confidence that the specialist process areas had been well developed (not just addressed in a short tender period)

- the successful tenderer for the Main Contract was Hamilton-based Spartan Constructions

Overall, a significant overall project cost saving was achieved while preserving Council's flexibility to select an optimum treatment process, and providing an increased choice on selection of both the Process and Main Contractor.

The contract value of the two contracts combined was \$5.6M, some \$600,000 less than the Preliminary design estimate and within a few percent of the high level feasibility study estimate. We estimate that about half of the saving was achieved from the procurement strategy and the other half from the interactive design approach described above.

3 CONCLUSIONS

Council achieved a positive overall project outcome in terms of cost and value for Council by adopting a procurement strategy that best suited the unique features of the Karapiro WTP upgrade project. In this case, it involved splitting the project into two contracts and using novation to achieve single point accountability

The use of an interactive design approach was very valuable in many ways, not least of which was the achievement of real savings, and the buy-in and engagement of Council's Operations staff.