

IMPROVING THE INTEGRATION AND COMMISSIONING OF NEW ASSETS



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ABSTRACT

Yarra Valley Water has seen a rapid expansion in its capital delivery program due to population growth and land development, rising from \$88M in 2003/04 to an average of over \$200M per annum for the last 5 years.

Operational perspective in the design and construction is critical to produce higher quality new assets which function effectively and meet our customers' needs. Operational involvement is also required to successfully commission and integrate new assets into the live network. To maintain this high value operational input across a much larger capital program, Yarra Valley Water has formed an "Asset Integration Team" made up of dedicated operations resources who work directly with the Project Managers responsible for capital works.

The Asset Integration Team is responsible for:

- Design reviews with a focus on ensuring new assets will be safe and easy to operate and maintain.
- Support during construction, commissioning and acceptance testing
- Acceptance of the commissioned assets, and integration into existing networks
- Acceptance of required documentation e.g. manuals, drawings, procedures, etc.

The team was first introduced in 2007-08 to assist with the Pressure Management Program and was subsequently expanded to include all new major water and sewer assets. In 2015 the team was expanded again to include Treatment Plant projects. Over this time, median commissioning times have reduced from 8 months to 4 months.

This paper will outline the benefits that the Asset Integration Team provides to Yarra Valley Water, including a case study on the new Wallan Sewerage Treatment Plant.

1.0 INTRODUCTION

Expansion in YVW's capital delivery program in 2007, particularly due to a significant increase in the number of growth assets and the Pressure Management Program resulted in significant pressure on the business to deliver. The challenge for Operations has always been finding the balance between servicing the needs of the planners, designers and the commissioning and integration of new assets, whilst at the same time operating the networks.

The need for dedicated operational resources across the capital delivery process was identified in 2007/2008. A trial of the new process was first undertaken to deliver the Pressure Management Program which involved the integration of Pressure Managed Areas (PMA's) that had been constructed and commissioned (but not integrated) from previous years. This approach of assigning dedicated operational resources to work directly with the Project Managers was extremely successful.

2.0 DISCUSSION

The graph below shows the increase in capital expenditure and population which is reflective of the increase in new assets requiring commissioning and integration into the existing infrastructure networks.

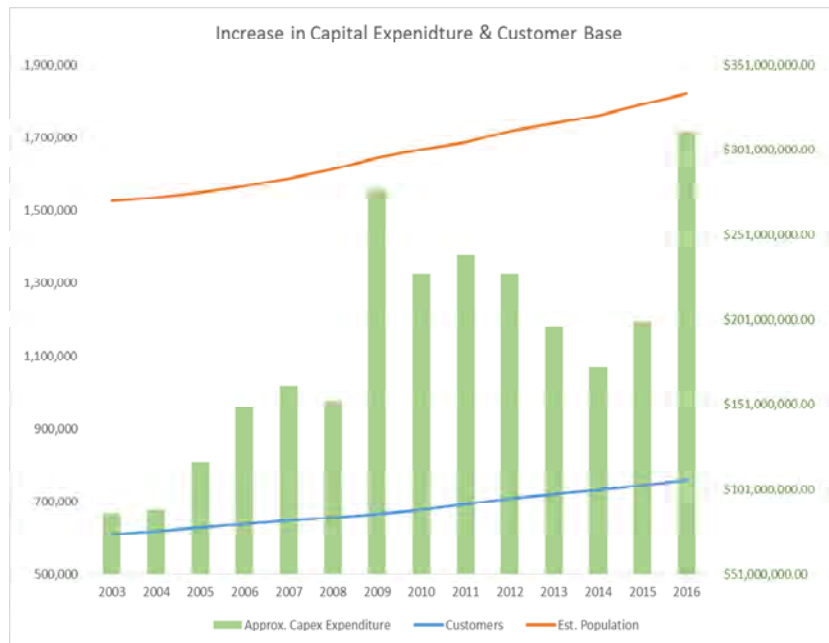


Figure 1: *Increase in expenditure & population growth*

To meet the needs of the planners and designers the integration team was introduced to represent the operations teams at Yarra Valley Water throughout the design, construction, commissioning, integration and handover phases of major capital projects.

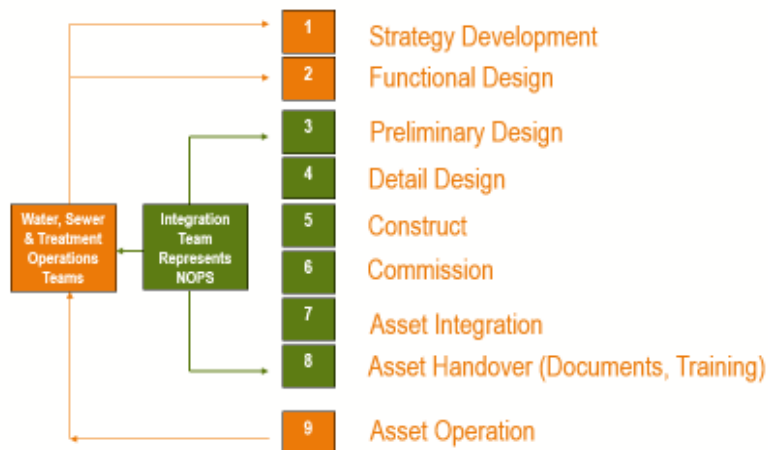


Figure 2: *Integration responsibilities across the capital delivery process*

2.1 Our Focus:

- Asset meets required system functionality, are safe, and easy to operate and maintain.
- Reduce handover times.
- Improve quality of accepted assets, including associated documentation and feedback into the update of asset standards to prevent mistakes from being repeated.

2.2 The Role of the Asset Integration Team:

The Asset Integration Team is working with the business to continually improve the way we deliver our service. To us this means continually working with the operational teams to ensure we remain up to date on operational issues and preferences, and with design and construction teams to ensure we are delivering the required information in a consistent and time appropriate fashion.

2.3 The Asset Integration Team plays a key role in:

- Improvement of operability of new and upgraded assets.
- Standardisation and optimisation of assets.
- Personal skill development (wide range of projects).
- Consistency of advice from one representative.
- Increasing the professionalism and standards required from the construction part of the business.
- Design reviews with a focus on ensuring new assets will be safe and easy to operate and maintain.
- Support during construction, commissioning and acceptance testing.
- Acceptance of commissioned asset, and integration into existing networks.
- Acceptance of required documentation e.g. manuals, drawings, procedures, etc.

2.4 Asset Types We Cover:

- Critical water and sewer mains as well as all assets that have Mechanical and Electrical components: Sewerage Treatment Plants
- Recycled Water Treatment Plants
- Sewer Flow Control Facilities
- Reservoirs
- Water mains DN300 and above
- Sewer Mains DN300 and above
- Reservoirs
- Pressure reducing station
- Monitoring Station
- Door control facilities
- Pump Station Water & Sewer
- Pressure reducing station

The Asset Integration Team supports project teams across an average of 90 projects at various stages of the delivery process as shown in the table below.

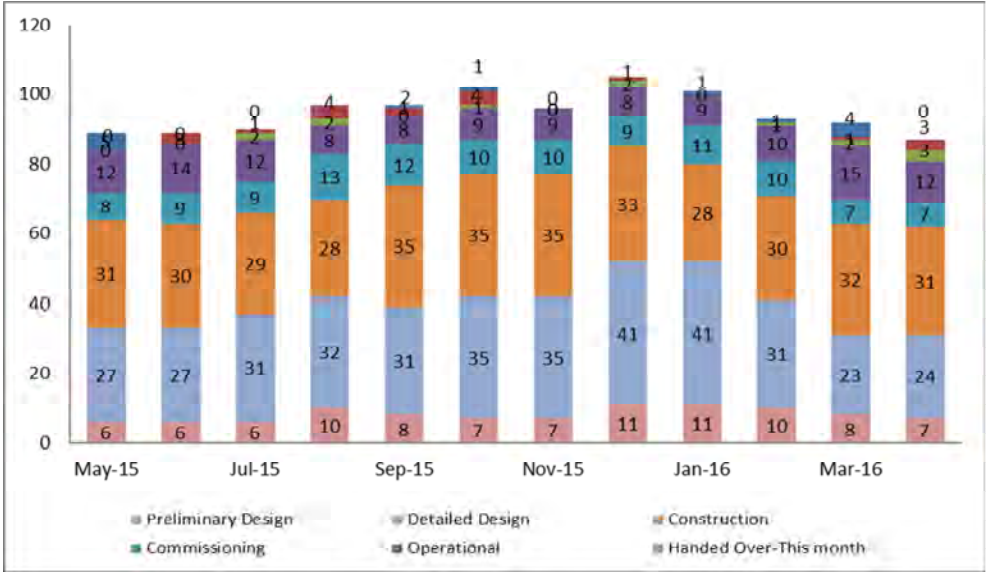


Figure 3: Asset Integration Team – Projects Status April 2016

2.5 Median Time between Commissioning & Handover

Since the team was introduced in 2007/08 and subsequently expanded to include all new major water and sewer assets, and more recently Treatment Plant projects, median commissioning times have reduced from 8 months to 4 months.

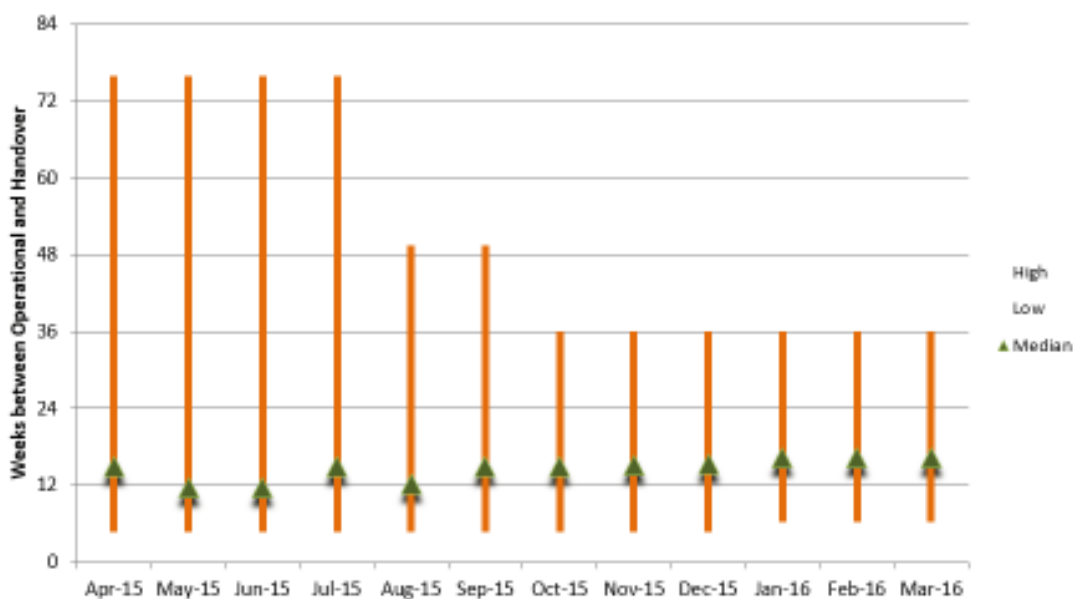


Figure 4: *Median handover time*

3.0 WHAT IT MEANS IN PRACTICE – WALLAN SEWAGE TREATMENT PLANT

In 2015 the Integration Team was expanded to include major treatment plant projects. This coincided with the construction of the Wallan STP, a new 4ML/day SBR plant.

Wallan is one of 10 Sewage Treatment Plants operated by YVW so it was recognised that it was very important to incorporate lessons learnt from the past (at other plants) into the design and construction of the new plant.

3.1 Design

Treatment Plants can be hazardous places. In the past 5 years Yarra Valley Water has had three lost time injuries at its Treatment Plants. All injuries have been due to slips, trips, falls and strains which have occurred while operators were carrying out what would have been considered low risk routine tasks. Contractors have also been involved in similar incidents while working at YVW Treatment Plants.

A dedicated operations resource on the project team from an early stage has meant that designs were reviewed through the lenses of ease and safety of operations and maintenance. Importantly suggestions and comments were incorporated into the design. Operational experience also helped determine which equipment should be installed. Without a dedicated resource to provide this input, day to day issues at the Treatment Plants will always take priority and design reviews are either delayed or not given sufficient time to ensure all of the operational input is captured.

Particular attention was given to the following:

Valves

Each valve at Wallan STP was assessed with ease of operability and ease of maintenance in mind. Accessibility, orientation and frequency of use of each valve were considered. All valves >300mm were either actuated or if rarely used, were designed so they could be easily operated with a portable actuator.

Walkways

Walkways were designed to be clear of obstructions. Access to all equipment at Wallan STP has been considered and all known tripping hazards eliminated. For example, instruments, lights, cable trays, etc. have all been located to allow clear access to equipment. Davit arm bases were also moved from walkways to a new bracket on the other side of the handrail to eliminate a tripping hazard.

Bins

As well as being quite unhygienic and odorous, screenings bins are a known manual handling issue. The decision was made during the design review phase to move away from traditional 1100L bins which required frequent changing, and use auger skips which eliminates these issues.

Decanters

A wide variety of decanters have previously been used at YVW with mixed success. The design for the decanters at Wallan was changed to incorporate the best features of the other plants. All moving parts are accessible from the walkways so entry to the tanks is not required and maintenance crews do not have to hang over handrails when working on the decanters and motors.

Chemical Storage Area

YVW has had several near misses in the past due to chemical spills and leaks. Causes of these incidents were fed into the design for Wallan STP. A roof over the entire storage area was added for UV protection, flanged fittings used rather than threaded fittings, secondary containment of all dosing pipework added, chemical injection points were refined. Particular attention was given to chemical segregation, pipe labelling and ensuring all dosing pipework does not create a tripping hazard within the chemical storage area.

Tertiary Filters

YVW most recently built new tertiary filters at our Craigieburn STP. While the filters function well, maintenance is quite difficult because the filters are very compact. There is no clear access to valves, instruments, etc. These findings were fed into the design of the new Wallan STP. Operator preferences with electric valves (vs. pneumatic valves) were also considered.

Construction

Wallan STP is now in the final stages of construction. A regular on-site presence during construction by the Asset Integration Team resource has been beneficial. Anything that was identified as being an obvious issue was raised immediately and questions around things such as the locations of instruments, cable trays, GPO's, lighting, switches, etc. from the contractor were able to be answered immediately – avoiding guesswork by the contractor and potential delays to the construction program.

requirements so any unexpected issues that have come up have been dealt with promptly.

Commissioning

Commissioning is now underway at Wallan STP. The Asset Integration Team has prepared comprehensive commissioning checklists for all equipment in conjunction with the contractor's commissioning plan. FAT and SAT PLC testing are completed by the Asset Integration Team. SCADA alarms have been configured with operations in mind.

Having a dedicated Asset Integration Team resource means the new Treatment Plant can be commissioned to the standard required by Treatment Plant Operations and appropriate resources committed to the commissioning phase without being distracted by the normal day to day issues.

Handover

Again the handover of the STP to the Treatment Plant Operations Team will occur with their needs being the first priority. The Asset Integration Team is responsible for ensuring as-constructed drawings are available, ORM's are available, preventative maintenance has been scheduled, IT systems have been updated, safe work procedures are in place, appropriate signage is in place and operations and maintenance staff have had the appropriate training.

Having a dedicated resource for these tasks just ensures the job is done properly, by somebody with the required operational experience but without distraction by typical day to day Treatment Plant "spot fires".

4.0 CONCLUSIONS

The introduction of the Asset Integration Team has realised the intended improvements in asset quality, safety, functionality and maintainability. The value of the Asset Integration Team has been acknowledged by the key internal stakeholders across the capital delivery process through improved quality of design and constructed assets, reduction in defects at end of commissioning and significant reduction in time to hand over of assets.

Yarra Valley Water see the current Asset Delivery Model with the inclusion of the Asset Integration Team as the optimal structure to ensure we continue to produce higher quality new assets which function effectively and meet or exceed our customers' needs.

5.0 ACKNOWLEDGEMENTS

James Goode, Integration Team Manager, Yarra Valley Water
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Yarra Valley Water

6.0 REFERENCES

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