PROGRAM MANAGEMENT IN MACKAY DISTRICT

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Abstract
The use of a program management approach, on what were originally four separate projects, has enabled Mackay district to successfully manage the pre-construction activities on $140M of major projects within the City of Mackay. These projects have a series of interrelationships which have a cumulative impact on the city’s traffic and use of resources. The program management approach adopted for these projects helped address issues such as short lead times, scarce resources and environmental time constraints. Scarce resources include not just building materials, but also pre-construction resources such as design consultants, construction staff and equipment.

Introduction
Mackay is one of north Queensland’s fastest growing regional cities, surrounded by a mining resources boom and an ever growing tourist trade. The city is rapidly expanding, particularly in the northern beaches area.

The city is divided by the Pioneer River, which is crossed by three bridges, only one of which is of recent four-lane construction. The other two bridges are low level and/or approaching the end of their economic life. These critical bridges present a constraint to effective traffic movements, which in turn constrain the growth and development of the city.

There is a significant movement of road freight from inland areas to the Port of Mackay. Currently there is a gap in the east-west arterial road system which, when constructed, will provide an efficient access route for heavy vehicles.

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Four major projects are concurrently occurring in Mackay District to address the increasing traffic demands. The aerial map, Figure 1, shows the strategic locations of the four projects while Figure 2 gives project details. The four major projects are:

1. Upgrading Bucasia Road to a four-lane link to the northern beaches. A contract has been let for the project, with construction scheduled for September 2007.

2. Upgrading of the current low-level Hospital Bridge river crossing (Figure 3). A contract has been let for the project and construction is scheduled to commence in October 2007.

3. Upgrading of Forgan Bridge river crossing (Figure 4). The Early Contractor Involvement (1) form of contract is being used on the Forgan Bridge project. The contractor/designer has been engaged for Stage 1, with construction scheduled to commence towards the end of 2007.

4. Completion of an east-west arterial link – joint levee/road. A contract has been let for the project with construction scheduled for September 2007. A cross-section and aerial plan with artistic infill is shown in Figure 5.
## Mackay Major Projects Details

<table>
<thead>
<tr>
<th>Project</th>
<th>Roadworks</th>
<th>Bridgeworks</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bucasia Road</td>
<td>• Duplication between Phillip Street – Holts Road (Ch. 0.2km – 2.2km)</td>
<td>1 rail overbridge</td>
<td>$21.9M</td>
</tr>
<tr>
<td></td>
<td>• Duplication between Holts Road – Habana Road (Ch. 2.2km – 4.35km)</td>
<td>1 bridge over road</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Construction of underpass – Golflinks Road and Habana Road intersection</td>
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<tr>
<td>Hospital Bridge</td>
<td>2.6km 2-lane from Lagoon Street to Fursden Creek.</td>
<td>550m (2-lane) over river</td>
<td>$33.6M</td>
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<tr>
<td></td>
<td></td>
<td>50m (2-lane) over Lagoon Creek.</td>
<td></td>
</tr>
<tr>
<td>Forgan Bridge</td>
<td>1km of 4-lane roadway, including construction of a roundabout at Kooyong intersection</td>
<td>Duplication and replacement of Forgan Bridge (4-lane) in current location - 480m</td>
<td>$74.9M</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6-lane bridge over Barnes Creek</td>
<td></td>
</tr>
<tr>
<td>Joint levee/road</td>
<td>1.4km 2-lane from Sams Road to Kooyong intersection</td>
<td>-</td>
<td>$14.2M</td>
</tr>
</tbody>
</table>

**Figure 2. Mackay major project details**

**Figure 3. Hospital Bridge, Mackay**

**Figure 4. Forgan Bridge, Mackay**
Challenges
Each of the four projects presented their individual challenges. There was a range of environmental considerations, including issues such as migratory bird habitats which imposed a series of major time constraints on construction. The concerns of individual residents needed to be addressed, including the relocation of a Girl Guides’ hall.

There were also a range of issues which affected all four projects:

1. Impact on overall traffic flows in Mackay as the projects were all located within a 3km radius of each other
2. Limited time frame for the completion of the projects
3. Limited availability of design and construction resources given the impact of the resources, boom and general increase in infrastructure spending.

These common issues, and the interaction between the projects, flagged the need for applying the principles of program management to fully realise the benefits of the projects.

Establishing programme management
Once the need for a program management approach had been identified, Mackay district appointed a program manager, supported by four individual project managers. Project & Program Management Unit of Engineering and Technology Group provided coaching and mentoring services, ongoing support and advice on program and project management, scheduling, procurement and risk management.

Key steps in implementing the program management approach included ensuring that each individual project had a robust schedule which accurately reflected the proposed approach to its delivery. The schedules also highlighted interdependencies with other projects and factors external to the district’s control, such as environmental permits and corporate approvals for business cases. These individual schedules acted as the building blocks to the effective management of the programme.

Project team communications became more formalised and structured, which assisted in keeping shared district resources aware of the overall priorities of the projects.
and their components. Regular meetings between the program manager and the project managers provided the overview to ensure that in-house resources were optimally used, and that the projects were designed to maximise the use of common componentry and construction methods wherever possible. Other internal considerations such as material availability, interaction between the projects, and external considerations such as the impact on general traffic and oversized vehicles during construction phases, were also addressed by these meetings.

As the individual projects started to progress through their lifecycle and project specific workloads increased, the role of the program manager became more defined.

Apart from the time, cost and quality issues of the projects, the program manager needed to consider the issue of program synergy. Staging considerations were assessed to ensure that the early completion of a project would not adversely affect the programme as a whole.

An important issue in the prevailing Mackay environment was resource availability – would there be sufficient resources and raw materials available when the various projects reached the construction stage (for example aggregates, road-base, concrete precasting yards and piling rigs).

**Program management outcomes**
The use of program management on the Mackay’s major projects has had a number of significant benefits including:

- Improved use of internal resources — the co-ordination and prioritisation of the district’s resources was improved by having an overall program priority applied, rather than being impacted on by competing project demands.

- Better co-ordination and control of external preconstruction resources as resource limitations of external organisations impacted on the project. The various utility authorities, such as Mackay City Council, also had their own internal constraints. The development of a program incorporating the utility requirements allowed the various authorities to plan their works and more effectively utilise their own work crews.

- A holistic approach to risk management, taking into consideration a wider range of risks than would have been considered by examining projects in isolation.

- Earlier benefits realisation due to the programme of works being delivered sooner. This has resulted from the use of the Early Contractor Involvement form of contract, which was implemented as a result of needs identified during the program management process.

- Potential construction savings to be achieved by the use of common componentry across the bridge projects, including the use of girder and decking systems.

- Enhanced public perception of the department from a well thought out, controlled and co-ordinated programme of works being delivered. Overall traffic disruption will be considered, as well as the impacts of the staged construction of the various projects on city precincts.

**Conclusion**
The use of a program management approach to Mackay’s major projects resulted in integration of the individual schedules, more formalised communication protocols, and improved overall risk and cost controls. By managing these individual projects as a program of works, Mackay district maximised the use of its own resources and those of other key stakeholders. The program management approach also identified the opportunity to utilise innovative delivery mechanisms such as Early Contractor Involvement.

Construction advantages include identification of common componentry and construction methods, integrated traffic management approach and more control over resources.

The district benefited from the coaching and mentoring services available from the Project & Program Management Unit and the ongoing support and advice on program and project management, scheduling, procurement and risk management.

**References**