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Leveraging Contracting Models that will Maximise Value for Money

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INTRODUCTION

Queensland Department of Main Roads has been involved in delivering projects through alliances since 1999, with last year (2002) seeing the completion of two significant alliance projects, the Georgina River Bridge and the Port of Brisbane Motorway. Currently, the department is involved in an alliance to develop the design for the Tugun Bypass.

Value for money

The Queensland State Purchasing Policy requires agencies to use their purchasing activities to advance government priorities while achieving value for money with probity and accountability. The concept of value for money is not restricted to price alone, and includes consideration of:

- *contribution to the advancement of government priorities*
- *non-cost factors such as fitness for purpose, quality, service and support*
- *cost-related factors including whole-of-life costs and transactions costs associated with acquisition, use, holding maintenance and disposal.*

Why alliancing

In adopting alliancing for the delivery of infrastructure projects, Main Roads is looking for a contract model which will deliver value for money (as defined above) within an increasingly complex delivery environment, and provide a means to combine the design and construction functions to achieve a successful project.

Main Roads' decision to adopt alliancing has been influenced by a number of factors including:

- cost and time overruns
- poor quality and rework
- poor stakeholder, community relations
- dissatisfied clients, designers, contractors.

Delivery under an alliance allows the participants to:

- assume collective responsibility for delivering the project
- take collective ownership of all risks associated with the delivery of the project
- share in the pain or gain, depending on how actual project outcomes compare with the pre-agreed targets which they have jointly committed to achieve.

Our paper to last year's Alliancing Conference identified the following as key issues faced by government when establishing alliances with the private sector:

- Need for robust selection process that satisfies probity and transparency requirements
- Desire to establish a fair target cost estimate
- Need to achieve value-for-money outcomes and wider community and stakeholder outcomes.

This paper will review the Port of Brisbane Motorway and Georgina River Bridge alliances in terms of value for money, and will focus on:

- the circumstances that gave rise to the use of an alliance
- how the alliance process can deliver Value for Money, and
- what we have learned.

THE GEORGINA RIVER BRIDGE AND APROACHES STAGE 2 CONSTRUCTION ALLIANCE (GEORGINA ALLIANCE)

The bridge across the Georgina River at Camooweal is situated in northwest Queensland, a short distance from the Northern Territory Border. As such it, together with its approach roads, is a significant link in Australia's national highway system. Much of this infrastructure was constructed during the Second World War and, by today's safety and accessibility standards, is narrow and flood-prone (average of 10 days outage per year). The project to construct a new bridge across the Georgina River and associated roadworks was part of the federally funded upgrade of the Barkly Highway section of the national highway.

In planning the project, Main Roads had consulted extensively with the local community, in particular the local Aboriginal people. This resulted in the establishment of an agreement between Main Roads and the Dugalunji Aboriginal Corporation (Dugalunji Agreement), the terms of which provided for employment and appropriate training for the local Aboriginal people and the opportunity for them and others in the local area to tender for the supply of products and services that may be required for the project.

Project objectives

To upgrade a significant link in the national highway to provide:

- improved flood immunity
- improved safety for heavy freight vehicles (particularly type 2 road trains) and tourists (caravans)
- training and employment opportunities for Indigenous people as provided in the Dugalunji Agreement.

Project scope/functionality

- Major crossing of the Georgina River (417 metre bridge and 5.1 km road works)
- Two lane, nine metre seal width, suitable for type 2 road trains
- 110 km/hr design speed
- Fenced road reserve
- Trafficability in wet seasons (1 in 50 year flood immunity)
- Whole-of-life asset performance.

Issues (complexities)

Cultural heritage

- Most sites in NW Queensland are undisturbed. 17,000 artifacts identified in this site, necessitating a comprehensive cultural heritage plan, together with a high level of monitoring.
- Georgina River has particular significance to the traditional owners. This influenced the bridge design and the type of materials that could be brought on to site.

Timeframe

- Need to complete construction prior to onset of 2002/03 wet season

Remoteness of location

- Logistics problems related to delivery of materials, supplies
- Site conditions/facilities
- Availability of skilled workforce
- Maintaining productivity at industry levels

Dugalunji Agreement

- Meeting the agreement's procurement, employment and training requirements.

Availability of local materials

- Natural gravels were available from local sites, however processing was required to make them suitable for heavy loadings of a national highway.

Delivery strategy

The project was delivered in two stages:

- Stage 1 Bridge foundations
- Stage 2 Superstructure and approaches.

Stage 1 involved:

- intense monitoring, with the topsoil layers of the pad footing excavations being done by hand so that the soils could be sifted for artifacts
- understanding and sharing cultural issues
- focusing on building relationships
- reaching mutual understandings and respect, thereby smoothing the way to achieving project objectives.

Adoption of an alliance for Stage 2

- Recognition of the complexity of project delivery at this remote site and, in particular, recognition of the dependence on quite disparate parties coming together to produce best quality infrastucture
- Alignment of interests, robust relationships and flexibility
- Creation and maintenance of relationships sufficiently robust to handle change and flexible enough to deal with matters on a day-to-day basis.

The learnings from Stage 1 indicated that successful delivery of Stage 2 in the environment described above would be almost impossible under a traditional contract arrangement.

Alliance partners

Accordingly, an alliance was formed between the Department of Main Roads and Barclay Mowlem, with sub-alliance arrangements between Barclay-Mowlem and RoadTek, and between RoadTek and Dugalunji Aboriginal Corporation (DAC).

Alliance objectives

- Meet performance and functional needs of all stakeholders, including compliance with all relevant legislation.
- Achieve certain minimum criteria in the following key performance areas:

Key performance area	Minimum criteria
Cost	Deliver within the approved capital budget (i.e. strive to achieve an actual cost of less than or equal to the agreed Target Cost)
Risk	Manage all risks to ensure optimal outcome
Quality	Ensure specified quality requirements not compromised
Time	Complete project prior to onset of the 2002 Wet Season
Environment	Meet/exceed environmental requirements set out in the Environmental Management Plan and demonstrate genuine sensitivity to the environment, especially cultural heritage issues
Community	Satisfy the reasonable expectations of those community members affected by the project
Traffic	Minimise undue disruption of traffic through the site
Safety	Safety of the workforce and the public a high priority
Dugalunji Agreement	Deliver the project so that Main Roads can meet the agreement's requirements

Achievement of value for money

Cost

- The final outturn cost came in only marginally above the original Target Cost Estimate (Limb1) plus fee (Limb 2).
- Nett approved variations on the agreed Target Cost Estimate (TCE) were in the order of 5%.
- Variation benchmarking process developed in parallel with TCE formulation.
- TCEs usually exceed hard $ low bids by 10-20% because inherently TCEs include more risk.
- Growth on hard $ low bids typically 30-40%. The Georgina alliance showed a much smaller degree of growth.
- If greater confidence required in TCE, then use additional rigour in estimating phase.
- In the context of remoteness, available workforce skills, workforce training issues, cost performance for Alliance is BAU.

Non-cost

The KPI scores for non-cost objectives were well above the BAU figure of 50%: a sound result.

Time

- Works completed 2 weeks after the scheduled date for practical completion.
- Two significant delays caused by client: financial approvals and changes to gravel specifications.
- Alliance managed the delays associated with permits, licences and approvals.

Quality

- Challenge posed by achieving consistency in the processed natural gravels – adequate controls used. Dealt with the changes in gravel requirements and the gravel sourcing issues.
- High degree of compliance, resulting in high standard for road infrastructure in the region
- Non-cost KPIs – 60%-70% - well above BAU = 50%.

Stakeholder relationships

- Managed the DAC employment and training interface
- Level of DAC employment – approx. 50% of workforce
- Training for DAC people - training modules completed and tickets awarded
- Maintained productivity in the remote location at industry levels.

Risk management

- Cultural/environmental/workforce capability/suitability of naturally sourced road-making materials incur significant risks.
- Establishment of an alliance meant these risks were shared.
- Alliance approach allowed these risks to be managed/integrated effectively.

How did the Alliance deliver value for money

- Set the scene with an effective foundation workshop followed by ongoing team building training.
- Maintained a high level of co-operation between all parties (DMR, Barclay-Mowlem, Dugalunji, RoadTek, designers, community) to the ultimate benefit of the project and community.
- Effectively managed uncertainties associated with cultural heritage monitoring. A clear indication of success is desire by DAC to have DMR adopt alliance delivery for the remaining packages.

Improving value-for-money processes: what we have learnt

Overall, the alliance delivered infrastructure that meets service and support requirements not just at minimum cost, but is cost-effective in terms of whole-of-life and other costs, innovation and quality. In addition, it has advanced the broader government agenda in a remote area of Queensland. In other words, the alliance has allowed us to deliver value for money.

Alliance delivery strategy

- The risks were assessed, with the identification of goals and outcomes (Indigenous employment/CH/environmental in addition to the traditional measures of time/cost/quality) critical to project success. It is difficult to see how a traditional form of contract could cope with this and the project's other complexities.

Stakeholder relationships

- The alliance has shown that in a remote area, it is possible to develop a workforce capable of delivering the project in a cost-effective and timely way. The delivery strategy provided a framework which facilitated the development of an unprecedented level of trust and co-operation between the indigenous community, constructors and owner, all of whom were fully aligned on the same goals and outcomes.

- It was evident at the outset that there was not a resident workforce to undertake project. The full participation of the DAC as a sub-alliance partner resulted in the formation and training of a workforce – win:win situation. The view is that the alliance dealt well with this project requirement.
- The provision of team-building workshops, open sharing of information on site, and on-site evidence of full commitment to alliance principles contributed to successful outcome.

Management of cultural heritage

- The management of cultural heritage issues on this project has produced a model that can be modified for use on other projects. Given that there were 17,000 artifacts identified on site, there were enormous risks and sensitivities associated with their management. The inclusion of the DAC as an alliance participant ensured that decisions in this area were made on a ' best for project' basis.

Target Cost Estimate development

- TCE development needs to have a strong commercial drive. A strongly competitive, but not low-bid selection process, based on participant performance / capability / innovation / experience/cultural and environmental capability is essential.
- Owners need to develop their own fully documented TCE, with independent experts having access to all project information.
- Commercial focus may be strengthened through use of benchmark prices obtained during the selection process. Variation benchmarks need to be well set up and conscientiously used.

Client leadership

- Owner representation both on the Alliance Leadership Team (ALT) and in the alliance is an essential ingredient if the alliance is to be fully functional and driven by the alliance principles.
- Roles and responsibilities: equitable participation of partners: Main Roads' dual roles – alliance partner and client/owner – need to be clearly defined, structured and administered.
- Include designer's representatives in the alliance to facilitate design review issues and opportunities for innovation/improvement.

Alliance governance

- Strong independent auditing program set standards for quality and performance. Scarcity of locally available materials, particularly good gravel necessitated assurance of materials quality. Having good controls in place ensured good outcomes.
- As noted earlier, the performance of the non-cost KPIs was in excess of BAU. The above-average performance indicates that strategic, operational and community (social) goals have been achieved, and that the alliance met project stakeholder expectations.
- Monitoring of non-cost KPIs (CH, environment, team health) verified consistent application of alliance processes (alignment of interests and co-operative relationships) and ensured that appropriate attention and focus placed on project goals.

THE PORT OF BRISBANE MOTORWAY ALLIANCE

The Port of Brisbane and its surrounding industrial precinct has been seen significant growth since the early 1990's. In 1991, the Federal Government made a commitment to improve freight movements to and from the Port of Brisbane. The state government supported this philosophy and used it as the catalyst for a proposal to produce a high-class motorway connecting the Gateway Motorway to the port.

The motorway is being delivered in two stages. The Port of Brisbane Motorway alliance is the major package of Stage 1.

Project objectives

The completed works, in addition to meeting the future demand of the Port of Brisbane, were to:

- provide a high-class grade-separated, dual-carriageway from the Gateway Motorway to the Boat Passage (at the entrance to Fisherman Island)
- accommodate a wide range of freight traffic, including over-dimensional vehicles
- improve/maximise safety of road users
- reduce traffic congestion
- improve amenity, including access
- improve/maximize flood immunity
- provide a comfortable ride for vehicle users
- minimise/reduce nuisance to contiguous land owners
- minimise/reduce maintenance for the design life of the works
- minimise environmental impact.

Project functionality/scope

- Carry anticipated traffic volumes of approx. 8000 trucks per day by 2011
- 5 km of four-lane motorway and 12 major new bridges
- Multi-level interchange over the Gateway Motorway comprising two-lane on and off ramps
- At grade intersection at Lindum Road
- Full motorway formation earthworks
- 40-year heavy-duty pavements.

Issues (complexities)

Cost

- Very tight budget was set for the project. It was locked into funding arrangements set between Commonwealth and State, Port of Brisbane Authority and Queensland Motorways Ltd (QML)
- Development of TCE around a fit-for-purpose design (traditional design assumptions were challenged with first principles techniques used to set design parameters. Fit-for-purpose was not less functionality for more cost.)

Time

- Long planning lead time - the alignment for a new road corridor had been identified in 1992, with further consultation and an Impact Assessment Study produced in 1996.
- Target completion date of June 2003, and a 'stretch target' goal of Dec 2002

Community

- Early consultation problematic due to stop/start nature of planning/development stages, with perception that expectations were not being consistently managed.
- Concerns re noise (Hemmant) and road closures (loss of access) issues required careful management.

Geotechnical issues

- Construction on a floodplain with a deep soft marine soils and muds
- Interface with Public Utility Plant (PUP) providers and their services.

Environmental

- Motorway traverses Bulimba creek and adjacent wetlands (the oxbow).
- Previous land use had degraded ecological value of site.
- Local stakeholders had strong interest in project and commitment to rehabilitating the area.
- Minister had given commitment to work with stakeholders to investigate options to miminise motorway impacts and rehabilitate the area.

Delivery strategy

The decision to deliver Stage 1 works in four separate packages was seen as the optimum way to fairly allocate risks between contracting parties:

- Package 1. Preload embankment
- Package 2. Hemmant Tingalpa Overpass
- Package 3. The new motorway delivered as an alliance
- Package 4. Lytton Road upgrade.

Adoption of an alliance for Package 3

An alliance was adopted for Package 3 because this delivery mechanism provided:

- better scope and cost management (particularly the development of a pavement solution) in the tight budget environment. It provided greatest confidence of a ' best value' outcome.
- best chance of delivering the project to the specified quality standards in the optimum time, consistent with budgetary and other constraints
- better management of community and environmental risks through engagement of key stakeholders
- opportunity for breakthroughs that would be needed to meet or exceed the project goals
- opportunity for alliance participants to acquire new skills, derive greater job satisfaction and develop personal and corporate relationships that would endure beyond the project.

This project is significant because it is the first major D&C alliance for Main Roads.

Alliance partners

Accordingly, an alliance was formed between Port Motorway Ltd (an entity of QML), Leighton Contractors, Parsons Brinckerhoff (formerly PPK Environment & Infrastructure) and Coffey Geosciences.

Alliance objectives

- Meet performance and functional needs of QML and other stakeholders, including compliance with all relevant legislation
- Achieve certain minimum criteria in the following key performance areas:

Key Performance Area	Minimum Criteria
Cost	- Deliver a project that met all functional and quality requirements for a cost that was affordable (the budget was recognised as tight - Key challenge: deliver a pavement solution within the available budget that would achieve efficient and viable whole-of-life performance. Envisaged that the Alliance would be responsible for the agreed performance of the works for 2 years after project end.
Risk	Manage all project risks
Quality	Ensure the specified quality requirements were not compromised
Time	Complete no later than June 2003, with a strong preference for completion before the end of 2002.
Environment	Meet or exceed all the requirements of the Environmental Management Plan of the Planning and Preliminary Design Report, and show genuine sensitivity to the environment
Community	Satisfy or exceed reasonable expectations of those community members affected by the project
Traffic	No undue disruption of traffic through and across the site, particularly the Gateway Motorway, and maintain existing traffic flows at all times
Interfaces	Conduct operations in such a way that enables Packages 1,2 and 4 to meet their respective objectives in line with the requirements of the overall project.
Safety	Create a culture where safety of the workforce and public is paramount, with safety management systems and outcomes equal to or better than current best industry practice

Achievement of value for money

Cost

- No variation to TCE
- Underrun of 10% on TCE. Overall saving to QML of $7.9M (inclusive of Limb 2 fee and Limb 3 non-cost risk/reward)
- This saving included the provision of the Lindum Road overpass ($5.5M) which replaced a signalized intersection.

Non-Cost

Quality

- Quality KPI consisting of seven attributes (eg timeliness of the design process, lot closure time etc) scored best practice or better. A significant factor in achieving quality was the adoption of a proactive approach to field audits/inspections on the job and with suppliers to assist them stabilize their processes.
- Triple certification in Health and Safety Management System (AS4801), Quality (ISO9001) and Environmental Management (ISO14001): a rare achievement, particularly for an alliance.

Project risk management

Key risks discussed under time, environmental management and stakeholder relationships.

Time

- Construction competed in 371 days, in spite of 6-month delay in start. The 'stretch goal' of Dec. 2002 was met.

Stakeholder relationships

- Involvement of local community group to develop a visual solution for the enhancement of motorway noise barriers and prevention of graffiti
- Relocation of historic house to school grounds; now used as a library and administration centre
- Win-win solution to noise issue at school – air-conditioning.

Environmental management

- Rehabilitation and revegetation of the Oxbow
- Involvement of community environmental groups (B4C and Greening Australia) in ongoing management of the site.

How did the Alliance deliver value for money

- Utilising design innovation with bridges, sewer main & RCC piles
- Trialling new techniques - extruded barriers, spraycrete finishes
- Using peer reviewers – acknowledging their technical expertise to ensure fit for purpose design
- Having designers easily accessible, thereby enabling timely responses to constructability issues
- Using technology (hydraulic modelling) to support DMR strategy for wetlands
- Using latest GPS-based three-dimensional control of excavators, graders etc on site
- Using lightweight polystyrene blocks to provide stable foundation over floodplain areas.

Improving Value for Money processes: what we have learnt

Again, the alliance delivery method has delivered value for money. Key learnings are:

- Building sound relationships with project stakeholders provided a solid platform for the resolution of issues which, under a traditional contract, could have been insurmountable barriers to project completion.
- Preparedness to trial and implement new technology resulted in the achievement effective project outcomes in terms of cost, innovation and quality.
- Involvement of designers in all phases of the project alliance was a key factor to producing infrastructure that is fit-for-purpose and meets quality and safety requirements.

Pre-alliance planning

- A sound budget needs to be set before entering into any project. This is particularly so for alliances where budgets set expectations about TCEs. In this case, the budget was reviewed at a pre-project review, however it was not generally accepted. The consequence was the TCE process resulted in the budget being "re-set". In the end, the out-turn cost (including the alliance) for Stage 1 was very close to the Stage 1 budget set at the pre-project review.

Stakeholder relationships

- Solid relationships with local community and environmental groups were critical to project success, given that environmental issues, in particular resolution of the oxbow issue, had the potential to be 'show-stoppers'. The alliance culture of working with stakeholders allowed all parties to focus on desired outcome and work towards acceptable and innovative solutions (air-conditioning the school to resolve noise issues a value-for-money win:win outcome).
- Best for project = best for everyone. Resolution of oxbow issue within the alliance not only solved environmental problem, it also enhanced relationships between the department and environmental stakeholders.

Risk management

- Design changes intended to result in value improvements and innovation could lead to reduced standards. Owners must be informed buyers so that they can to make informed decisions. This risk was reduced by having designers and other technical experts as alliance members.
- The alliance's preparedness to trial innovative technology (light-weight fill to manage geotechnical risk, extruded barriers on bridges, spraycrete finish on underpass walls) demonstrates breakthrough behaviour that would not be possible with conventional delivery methods. The overarching philosophy was 'best for project, best for everyone'.
- Alliance culture is essential for maintaining balance between fit-for-purpose and value-for-money.
- The use of objective data from technological studies (hydraulic modelling) drove the resolution of environmental issues.

Alliance governance

- Overall process for selection of preferred alliance proponent was effective; the workshops allowed MR to assess how proponent would interact with alliance partners.
- To optimise achieving value for money, it would be worthwhile to conduct a financial audit of the proponent, rather than seeking information from offerors in initial stages of the selection process.
- The collection of statistics on and subsequent auditing of:
    - quality
    - non-cost KPIs (particularly important as measures of alliance behaviour)
    - verification of improvements
    - traffic control plans

  ensured project rigour and discipline and contributed to the achievement of key alliance objectives and a successful project outcome.

Cost

- In project development phase, the alliance applied value management and joint problem-solving techniques to develop a scope of work to achieve needed functionality for acceptable cost.
- TCE – fair price for scope of work after taking into account allowances for risk and contingency– value for money; however owners must be involved in development of estimate to avoid perception that TCE is a quasi-tender bid
- The provision of Lindum Road flyover instead of an at-grade intersection within the original TCE provided additional value to the owner.
- Exercise care in the adoption of fit-for-purpose standards, and involve peer reviewers in the development of the TCE. There is a balance between fit-for-purpose/value for money and design standards ie the drive to reduce cost must be balanced against operational suitability, durability and whole-of-life operating costs.
- Benchmark comparison:
    - Pacific Motorway $3.2 M per lane km – 15% structures, 8 lanes
    - PMA $4 M per lane km – 22% structures, 2 and 4 lanes

TUGUN DESIGN ALLIANCE – in progress

The Gold Coast Highway between Tugun and Bilinga is frequently at capacity, particularly through Tugun itself, with traffic delays of up to 40 minutes occurring regularly in peak hours and in peak holiday periods (Christmas and Easter). The percentage of B doubles on the highway at Tugun has increased since the 2002 upgrading of the Yelgun to Chinderah section of the Pacific Highway in NSW. The construction of a bypass of Tugun is a high priority of the Queensland government.

Project issues

- Political sensitivities – Queensland government commitment to commence construction in 2003
- Complex planning environment: two states/commonwealth/ two local authorities/Gold Coast Airport Authority, Main Roads considered a developer under NSW planning process
- Environmental impacts and the complex environmental approvals required
- Route selection to include provision for future rail corridor.

Project scope

- To develop a preferred bypass route and obtain necessary approvals to proceed to detailed design/construction.

Adoption of an alliance for the Tugun Bypass

- An alliance was selected over a conventional lump sum or time-based fee because project scope and risk could not be adequately defined for pricing purposes. A conventional hard $ approach would not accommodate the flexibility necessary for resolving the complexities surrounding the planning/approvals phase.

Alliance partners

Queensland Department of Main Roads and Parsons Brinckerhoff Australia Pty Ltd.

Anything different as a result of what we have learned from Georgina and POBM?

- A strong focus on getting a fit-for-purpose option that will satisfy functional requirements
- Tighter assessment of risk/opportunities and costing of options as they are developed
- Use of @Risk estimating process to develop a range of estimated out-turn costs for the bypass options.

How is the alliance performing?

- Overall, the project is meeting schedule and cost targets. This is particularly encouraging, given that the alliance has had to frequently adjust its approach to accommodate political, environmental, community and technical issues that have emerged.
- To date, the decision to adopt an alliance has been fully vindicated.

Conclusions

The delivery of the projects through alliancing described in this paper has enabled Main Roads to gain valuable experience and test if the process really provides value for money.

No longer is it sufficient to measure project success with cost, time and quality. The results detailed here for the Georgina Bridge and the Port of Brisbane Motorway projects indicate successful project delivery according to a wide range of measures of importance to government, stakeholders, road users and the community. These results have been achieved in spite of very complex, challenging project environments and are proof that alliances deliver value for money and are an effective method of project delivery under such circumstances.

The creation and maintenance of robust relations with the Indigenous peoples of north-west Queensland contributed to the protection of the site's cultural heritage, creation of employment opportunities, along with construction of the infrastructure. The learnings from this project are being embedded in improved departmental practices and, as such, represent a major contribution to the advancement of government priorities.

Similarly, a wide range of objectives have been achieved with the completion of the Port of Brisbane Motorway. Designers and constructors faced wide-ranging challenges, from geotechnical issues to wide-ranging stakeholder concerns. Again, alliancing allowed key players to focus on what was best for the project, and to find a common strategy for the resolution of those issues.

The Tugun project is presenting the department with similar yet dissimilar challenges. By focussing on the desired objectives and operating in an environment of trust and consultation, the department is confident that once again it will deliver value-for-money outcomes

Main Roads will continue to use alliancing, where appropriate, to deliver projects where it is evident that this delivery method will result in value-for-money outcomes for Queensland.