

**Department of  
Main Roads**

**Port of Brisbane  
Motorway Alliance**

**Alliance Learning  
Experience**

**PART A – EXECUTIVE  
SUMMARY**

**SEPTEMBER 2003**

## DOCUMENT CONTROL SHEET

This Alliance Learning Experience Report for the Port of Brisbane Motorway Alliance is an initiative of the Alliance Leadership Team (ALT).

Its purpose is to document the outcomes of the Alliance process, in particular to:

1. provide evidence of 'value for money' with respect to the Alliance Works;
2. provide evidence of compliance with QML's 'fit for purpose' functional and whole of life requirements;
3. highlight the fundamental benefits of the choice of alliance delivery method; and
4. record the learning experience for the future.

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If you have any comment in regard to improving this document, forward a copy of your suggestions to the contact above.

Issue No	Issue Date	Nature of Amendment
Draft 1	December 2002	Draft for review - Issued by G Watson
Draft 2	February 2003	Draft for further review – issued by M Eddie
Draft 3	April 2003	Issued for final contribution from selected personnel.
Draft 4	May 2003	Draft for final Agreement
Draft 5	3 June 2003	Further amendments.
Draft 6	20 June 2003	Issued to Executive Director, (Project Management Services) for distribution by Queensland Department of Main Roads.
Draft 7	6 August 2003	Includes lane kilometre benchmarks
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Part A of the document is an Executive Summary which is intended to communicate the key elements of the main report which is called Part B, Part C being the Appendices in support of the report.

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## EXECUTIVE SUMMARY

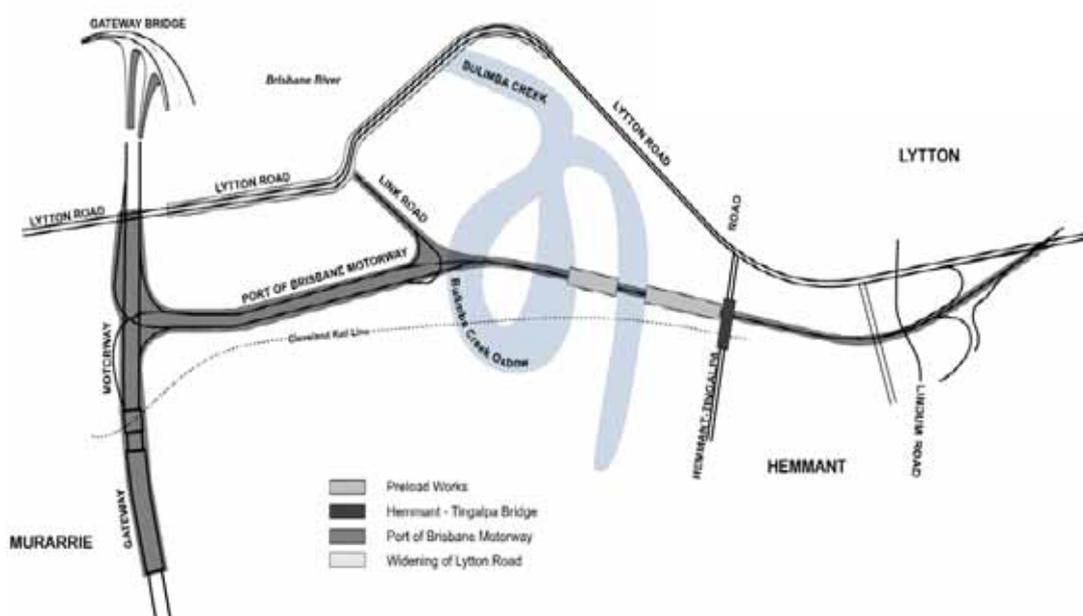
### INTRODUCTION

The Port of Brisbane Motorway (POBM) Stage 1 project has been a success for the State of Queensland with respect to the achievement of overall project time and cost objectives.

Stage 1 was developed under a simulated Public Private Partnership (PPP) model between Queensland Motorways Limited (QML) and the Department of Main Roads (DMR). Main Roads Project Management Services Division (PMS) was appointed by QML as Project Manager for the delivery of Stage 1.

The Stage 1 project was divided into four separate works packages as shown in **Figure 1** below.

**Figure 1**  
**POBM Stage 1 Packages**



The outcomes achieved on the POBM Alliance (Package 3) have contributed significantly to the achievement of the overall project objectives for Stage 1.

The purpose of this report is to:

1. provide evidence of “value for money” with respect to the Alliance Works;
2. provide evidence of compliance with QML’s “fit for purpose” functional and whole of life requirements;
3. highlight the fundamental benefits of the choice of alliance delivery method; and
4. record the learning experience for the future.

This report is in three parts, namely:

- PART A, which is this Executive Summary;
- PART B, which is the detailed Report; and

- PART C, which contains the Appendices and which comprises three separate volumes.

## 1. “Value for Money” and Commercial Benefits

A key focus of this report is the evidence of a “value for money” outcome in project deliverables.

The process of achieving a ‘Value for Money’ outcome commenced during the TCE Phase following the selection of the Preferred Alliance Team for QML. The TCE of \$112m was agreed to by all the parties following detailed analysis and negotiation and considered then to represent value for money.

In support of this view a risk analysis carried out by the IE after agreement to the TCE indicated that the agreed TCE amount of \$112M fell marginally below the 30% probability outcome (i.e. 70% probability that the project outturn cost will be higher) and therefore represented “value for money” for the overall cost of the Alliance Works, based on the state of knowledge of the project scope at that time.

This report further highlights that significant financial value was added to the project from the commencement of the process when agreement was reached to the TCE and subsequently throughout the delivery phase of the project. The major financial benefits to QML which were clearly outstanding are:

- The achievement of an overall cost outcome of \$8.26m lower than the TCE.
- Included within this cost outcome is approximately \$7m of additional scope.
- The two outcomes above represent a total benefit of approximately \$15m which has been delivered by the Alliance when compared to the TCE.
- A significant portion of this additional scope is the construction of the Lindum Road interchange within the existing time and cost targets (i.e. no variation to TCE or completion date) at a cost of \$5.42m. This addition to the project scope also advanced user operational benefits for the motorway (safety and travel time).
- The adjustment to the commercial framework agreed to by the Alliance which resulted in a \$1.94m saving to the client.

“Value for money” can also be measured in terms of improved functionality and aesthetic standards. With regard to functionality and aesthetics, the Alliance has achieved better “value for money” than the preliminary design on which the TCE was based. This outcome is evident by comparing, for example:

- the design standards achieved in the final design with the “fit for purpose” TCE standards; and
- the aesthetic standard of some elements of the structural design, for example the Gateway Interchange bridges, at TCE stage with that of the final design. (Further examples of the standard of urban design are described in Section 7 of this report).

Together with these significant outcomes added value is also seen in the following areas;

- Significant project savings through the use of increased design resource to consider many design options and innovation prior to deciding on the best design solution
- Benefits to management of project safety, quality and environment delivered through the achievement of triple certification.

- The highly focussed attention by a fully integrated team to project issues such as construction staging and programming, quality of workmanship and the continual design innovation in the field rather than the pursuit of variations and claims.
- The management of interface and site issues such as:
  - Preload monitoring and optimisation
  - Package 1 quality issues
  - Sewer bridge BK02
  - Late commencement of early works
  - Fire Ant management
  - On site materials management

The Alliance work has been completed with no ongoing contractual issues to resolve, as all matters have been dealt as they arose, during the course of the works. This also enables future effort to be directed at new projects without the time and resource consuming task of finalising contractual disputes which is so often the case with non-alliance forms of delivery

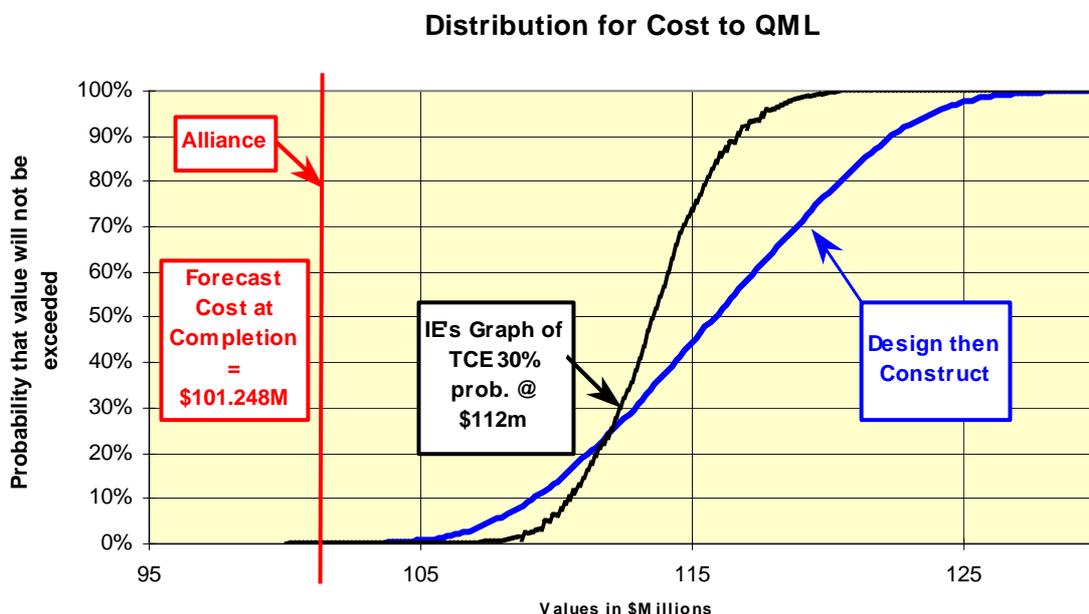
It can therefore be concluded that considering the above points the final amount paid for the project, not only improved the initial value represented by the TCE with a probability of occurrence of 30% as indicated by the risk analysis carried out by the IE ,but improved on this as a starting position and clearly represents a “best value outcome” for the POBM Alliance.

In assessing “value for money” with respect to the outcomes achieved by the POBM Alliance, it is appropriate to consider the commercial outcome that may have been achieved had a different delivery method been adopted.

Section 14 of this report includes a comparative predictive model which attempts to compare what the likely commercial outcome of this project would have been if the Design then Construct (D then C) method of delivery had been used. Whilst it needs to be acknowledged that this methodology is subjective, the assumptions on which this model is based are contained in Table 14.2 for reference and consideration

- **Figure 2** below compares the anticipated POBM Alliance commercial outcome with what may have occurred had the D then C delivery method been selected.

**Figure 2**  
**Cost to QML probability Distribution**



**Figure 2** includes the predicted cost at completion of the POBM Alliance as contained in the December 2002 cost report. To enable a direct comparison to be made with the TCE scope on which the Original budget was based, adjustments were made to:

- (i) include Limb 3 costs to QML;
- (ii) deduct the cost to QML of the Lindum Road interchange additional scope of works; and
- (iii) add peer review and project management costs.

Based on the assumptions included in the D then C financial model and the adjusted Alliance costs, the following outcomes are evident:

Adjusted Alliance Cost at Completion	-	\$101.3m
Design then Construct P <sub>50</sub>	-	\$115.8m

Based on the predictive model it can be demonstrated that the Alliance has delivered a financial outcome which is approximately \$15m better than what may have been achieved through a traditional design then construct delivery method.

**Note:** As indicated above the Cost at Completion of the Alliance works has been adjusted to reflect what the cost is based on the original Scope of Work which is then compared to the predicted cost of the original Scope of Work if delivered by a Design then Construct delivery method. Therefore the Cost at Completion given above is different from the actual Cost at Completion of the amended Alliance works of \$103.74m.

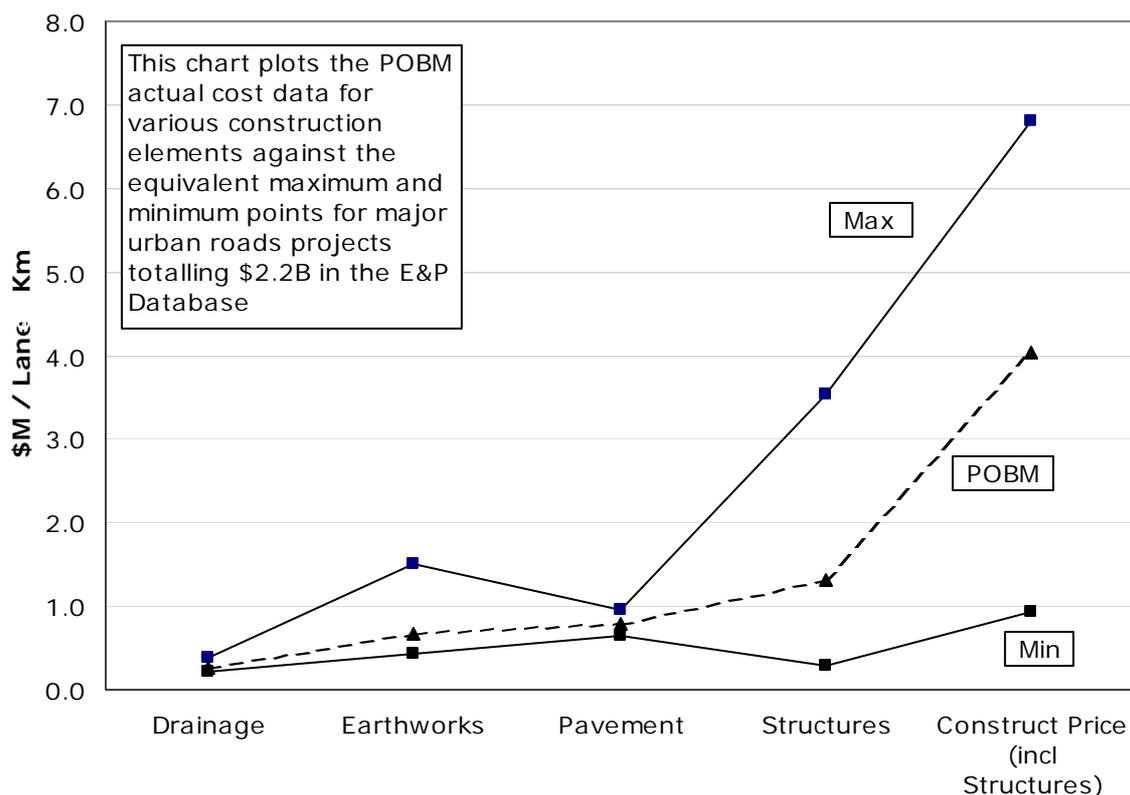
### Lane Kilometre Benchmarks

Specific cost component benchmarks was also undertaken from a lane km perspective. The results of the lane km benchmark indicate that the costs of the POBM fall within the lane km benchmarks for major urban road projects.

- Earthworks costs on a lane km basis were at the lower end of the range for major urban road projects.
- Drainage and pavement costs on a lane km basis were at the lower to mid range for major urban road projects.
- Benchmarks for structures are best done on a structure by structure basis rather than a lane km basis and are included in the benchmarks indicated previously.

The diagram below provides a graphical representation of the range of lane km cost components for major urban road projects compared with the actual outcome for the POBMA.

**Construction Element Prices (\$M June '02 / Lane Km)**



## 2. Compliance with QML Requirements

The Alliance has clearly complied with QML's requirements in regard to functionality and aesthetics, the Alliance has achieved better "value for money" than the preliminary design on which the TCE was based.

The 'fit for purpose' approach adopted by the POBMA allowed the collective knowledge and experience of design consultants, Main Roads staff representing QML, and the construction industry to be applied to achieve the project objectives including the setting of targets to minimise the cost of the project whilst at the same time achieving or surpassing the functionality specified by the Client.

The Alliance also developed and managed a comprehensive Quality Management Plan and some comment on Quality Assurance aspects are provided below.

### Quality Assurance

The Alliance met or exceeded the Schedule 4 requirements with respect to quality systems. Significant achievements included:

- Triple certification of quality, environmental and safety for the project.
- Development of integrated systems across disciplines.
- WIN system to encourage improvement.
- Statistical analysis of outcomes.

Schedule 4 included provision for the final version of the Quality Plan to be subjected to an independent peer review. The early appointment of a DMR peer reviewer to the quality area would have increased the level of confidence in the level of compliance with DMR quality specifications.

### Peer Review

The Alliance Agreement at Schedule 4 included the requirement that Peer Group confirmation of compliance with Schedule 4 must be provided in the detailed design report.

Each drawing was approved for construction by the Project Director, POBMA. The drawings were only signed after the Peer Review Coordinator (PRC) confirmed that there were no unresolved issues with regard to compliance with the requirements of the PAA.

The Peer Review Process adopted in design development and detailed design was very effective in allowing issues to be clearly defined by the peer reviewers and tracking the response and closure of these issues which ensured compliance with the clients requirements.

## 3. Fundamental Benefits of Choice of Alliance Delivery Method

In addition to the excellent commercial outcome and clear demonstration of 'value for money', the other fundamental benefits arising out of the choice of the Alliance delivery method for the POBMA are summarised below. Details and supporting information relevant to each of these benefits is contained in the body of this report.

## **Programme Performance**

The Port of Brisbane Motorway will be opened to traffic approximately 14 months after the signing of the Project Alliance Agreement (PAA) and more than 3 months earlier than the Target Completion Date. This was 6 months ahead of stakeholder expectations. This outstanding outcome has been achieved notwithstanding delay in project approval and the decision to increase the scope of the Alliance Works by the addition of the Lindum Road interchange.

## **Management of Risk without Traditional Contractual Conflict**

The mitigation of delay and cost effects from late project approval and those experienced at the interfaces with other packages provides solid vindication that managing and sharing risk proactively in this case enabled the parties with the most control over the risk to manage the risk. It has been shown that this philosophy also extends to areas of unforeseen project risk.

This alliance has managed these risks without variation to TCE or completion date providing value well in excess of traditional delivery.

## **Integration of Planning, Design and Construction Process**

The use of the Alliance Delivery Method permitted the complete integration of design, planning and construction resources. This also included client/QML resources. This integration was pivotal in bringing about the many innovations, and 'best for project' outcomes that are referred to in the report.

Through the process of defining "fit for purpose" stemming from proactive challenges to required functionality and high original cost estimates, the final design solution surpassed the original brief by providing, on the whole better functionality than had been originally envisaged.

It is difficult to apportion the precise value on this integration of resources, however it is clear from the many innovative initiatives adopted to ensure, program performance, risk mitigation and opportunity capture, that this value was significant.

## **Opportunity for Added Value and Innovation**

As indicated in the explanation of the commercial benefits of this Executive Summary, the additional value which was created by the Alliance team was in the order of \$15m when compared to the TCE. In addition to this added value, what would have been numerous variations in a traditional Design then Construct approach were managed and absorbed without any increase to the TCE.

A significant element of this benefit was achieved through the integrated design and construction team seeking to find innovative solutions to problems encountered or opportunities as they were identified such as;

- The adjustment to the commercial framework agreed to by the Alliance which resulted in a win:win financial outcome and the inclusion of the Lindum Road interchange in the project scope shows unequivocally the opportunities which added value in this Alliance.
- The outstanding outcome with the Oxbow Rehabilitation shows value added on a higher plane than specific project focussed deliverables.

#### **4. Key Alliance Learning**

The following is a brief summary of the key learning experienced on the POBMA , further details are contained in the body of this report.

##### **Formation of Alliance**

*When considering future projects for Alliance delivery the scope of the work, including any minimum functional and performance standards should be clearly specified. Budget funding should be supported by expertly prepared estimates (now provided for in DMR's Project Cost Estimating Manual) and based on the anticipated construction methodology and program.*

*The DMR should consider the development of a set of guidelines by which functional and performance specifications for future Alliances should be expressed.*

##### **Design and Construction Program**

*The excellent outcome in regard to program performance indicates that Alliance Contracting is an appropriate delivery strategy for projects that are constrained by tight time frames and where potential delays to project approvals and funding are likely.*

##### **Design Approach**

*Design costs for alliances are higher than for other forms of delivery. However the additional design input, by comparison with other forms of delivery, is reflected in a more economical design at an overall lower cost.*

*The structured design development process that included peer review by DMR/QML representatives at concept design and detailed design was a very effective method for ensuring that the works were 'fit for purpose' and meeting the intent of the PAA and assisted in allowing the design to work towards 'value for money' outcomes. It is recommended that the process be considered on all similar projects.*

##### **Cost Control**

*The use of accurate and predictive Cost @ Completion reporting greatly assisted the Alliance parties in their decision making, particularly in regard to amendments to the commercial framework and the inclusion of additional scope with no adjustment to the TCE. It is recommended for your future Alliances that this use of @ Risk and Cost @ Completion reporting be pursued from the onset of the design and construction activities.*

##### **Management of Risk**

*The opportunity to manage risk and resolve issues, as well as vary the scope of works in a cooperative non-adversarial environment in which all parties are seeking "win:win" outcomes is a major advantage of the alliance form of project delivery.*

##### **Construction Activities**

*The culture driven through the Alliance process provided a sharp focus to Safety and Health. The safety record on the project was very good when compared to industry standards.*

*In addition to the focus on Safety and Health the Alliance produced excellent results in the areas of Community relations ,Environmental Management, Traffic Management and in particular the achievement of completion well ahead of that which could have been achieved using a more traditional delivery method*

*Alliances provide the opportunity to achieve savings which are the direct result of the integrated alliance team environment, streamlined administrative and approvals processes and the opportunity to apply new and innovative ideas.*

### **Quality Assurance**

*Whereas the outcome of the quality assurance process was very good, independent or Joint Audits conducted early in the project would improve stakeholder confidence with respect to quality outcomes.*

### **Working Relationships**

*Strong leadership including that of the Client is integral in maintaining balance in decision-making processes and the achievement of "breakthrough" outcomes. Communication of the benefits of these outcomes is an integral role for all.*

### **Key Performance Indicators**

*The KPI process, including the methodology for evaluation and review, should be developed and agreed as early as possible in the development of the alliance.*

*To ensure transparency and probity, consideration to be given to 'external' evaluation of KPI performance at defined intervals by recognised experts who are independent of the Alliance Participants.*