Paper #2112

Alliance contracting – a business model to support sustainability and facilitate innovation and action on climate change?

ABSTRACT

Alliance contracting involves the creation of a contractual, commercial framework that optimizes delivery of complex projects with risks that are hard to define, such as the design and construction of major infrastructure. It embeds the concept of partnering, developed by Charles Cowan, in a contractual context. In contrast to more conventional, adversarial processes, risk is shared by all participants and value-based solutions are sought. It is specifically designed to simulate innovative thinking in collaborative, integrated networks of government and business groups undertaking projects with critical time constraints and uncertain and changing scope. Community, stakeholder and environmental concerns are comparatively easily incorporated into projects via this business framework. It has also been demonstrated to be a cost effective way of achieving project goals.

In Australia, the alliancing model has been increasingly implemented since the early 1990s in an attempt to avoid the costly disputes and litigation that previously plagued the detrimentally adversarial engineering and construction industry. It puts into practice a more cooperative mode of project delivery that, almost radically, underscores the importance of mutual trust and respect between project partners. Experience suggests that alliancing may be also particularly suited to promoting innovation and achievement of positive outcomes in relation to climate change and other sustainability issues by virtue of its emphasis on collaboration, relationship building, integration, innovation and inclusion of community and environmental concerns. This approach not only provides scope and legitimisation for the inclusion of sustainability issues as a fundamental requirement, but puts the necessary business culture in place to nurture it.

Alliance contracting has the potential to improve the development of infrastructure that may be in place for decades in the uncertain context of climate change. Those responsible for designing and constructing major infrastructure projects such as roads must consider the emissions associated with their construction, utilisation and decommissioning, as well as taking into account the impact climate change may have on infrastructure over the long term. This is a formidable task, requiring attention to resilience and adaptability, with new design parameters and drivers that may change radically over time in ways that are not easily anticipated.

This paper examines the theoretical and practical alignment between alliance contracting and sustainability, focusing on climate change. The Access Alliance, formed in December 2007 to construct a significant project to upgrade sections of a major highway in rural Western Australia, is used as a case study. The Access Alliance includes team members from consultants and designers Maunsell, (now part of AECOM), a contractor and representatives from the Owner Participant, Main Roads Western Australia, a government agency.

Margaret Gollagher*
Lecturer, School of Sustainability,
Institute for Sustainability and Technology Policy (ISTP)
Faculty of Sustainability, Environment and Life Sciences
Murdoch University
South Street, Murdoch
Perth, WA 6150
Phone +61 8 9360 6293
Email: M.Gollagher@murdoch.edu.au

Nicola Young
Senior Environmental Consultant
AECOM
3 Forrest Place
Perth, WA 6000
Australia
Telephone: +61 8 6430 2539
Email: nicola.young@aecom.com

Alliance contracting – a business model to support sustainability and facilitate innovation and action on climate change?

Introduction

Since the early 1990s, alliance contracting has been increasingly employed In Australia, in an attempt to overcome the negative impacts of the conventional, more adversarial approach to construction project delivery. Alliancing embodies a cooperative mode of project delivery that relies on the development of trust and collaborative relationships between project partners. It is specifically designed to simulate innovative thinking in collaborative groups undertaking projects with critical time constraints and uncertain and changing scope. By supporting innovation and providing legal and contractual framework for project goals that may extend far beyond cost and time, alliancing has the potential to improve the incorporation of sustainability principles in major infrastructure projects.

This paper considers alliance contracting's capacity to deliver sustainability outcomes such as are needed to address climate change in civil construction projects. The Access Alliance, comprising the consulting firm AECOM, constructor Brierty Ltd and Main Roads Western Australia is presented as a case study.

The need for inter-organizational collaboration for sustainability

In Australia, large-scale infrastructure intended to benefit the community is usually developed and built by a combination of private and public sector groups. These groups must act together to address sustainability, which is increasingly called for as a core element of such projects. The problem is that sustainability issues tend to be heterogeneous and contestable. The multifaceted and complex determinants of sustainability are usually in 'a state of flux and involve many issues, scales, interrelations, feedbacks, synergies, and often, unknown consequences' (Edum-Fotwe at al., 2009, 315). Furthermore, as Mike Kapitola, Project Manager at Main Roads, notes in relation to infrastructure development:

> It is important that sustainability is about the whole system and not optimising any one element. There is a risk in that sometimes the focus is on one element of sustainability, which is not the point (pers. comm. 2009).

For example, in order to improve sustainability adequate attention must be paid to social issues, which have historically been less appreciated and acted upon than environmental issues in construction projects (Edum-Fotwe et al., 2009, 313). Major construction projects directly influence sustainability in social contexts – they are not simply neutral physical intrusions (Edum-Fotwe at al., 2009, 315). Therefore, in order to improve the sustainability of urban and other environments

through appropriate infrastructure development, the needs and knowledge of a range of stakeholders must be folded into the process.

Infrastructure providers determined to promote sustainability must find a practical way to navigate this complex and uncertain territory to achieve the best outcome possible. The complexity of sustainability issues challenges the veracity of internally focused organizational strategies to promote sustainability (Sinding, 2000), particularly when organizations act in combination to undertake large projects. Inter-organizational approaches are sought that embed sustainability at the core of project planning and delivery.

Furthermore, action to promote sustainability is required urgently. In the case of climate change, possibly the most pressing and potentially overwhelming harbinger of unsustainability in the twenty first century, rapid and extensive responses are imperative. This threat will require unprecedented action if we are to both mitigate its effects and adapt to those that are unavoidable. Those responsible for designing and constructing major infrastructure projects such as roads must consider the emissions associated with their construction, utilization and decommissioning, as well as taking into account the impact climate change may have on infrastructure over the long term. This is a formidable task, requiring attention to resilience and adaptability, with new design parameters and drivers that must be developed urgently and may change radically over time in ways that are not easily anticipated. At present, this task is further complicated by turmoil within the global economy.

Even without pressure to integrate sustainability in infrastructure planning and development, infrastructure projects around the world have become increasingly complex and uncertain in character. They have therefore become far more dynamic, requiring approaches that can deal adequately with change. Sakal argues that conventional contracts are fundamentally ill-equipped to meet this challenge, resulting instead in 'detrimental adversarial relations as individuals focus on protecting profit and not collaborating to maximize project performance' (2005, 67). He notes that projects underpinned by conventional forms of contracting treat change as an anomaly, rather than embracing it, and assign liability when it does occur (2005, 67). Rubin et al. argue that conventional forms of contract are so inadequate for the task that in some instances they actually discourage responsible bidders (1999, cited in Sakal, 68). Sakal contends that conventional forms of contracting in civil engineering are destined to become obsolete. He argues that those businesses who embrace alliancing will secure an advantage over 'slower reacting, less progressive competitors' (1999, 77).

One emergent concept that offers an innovative inter-organizational approach to achieve sustainability outcomes in infrastructure development is alliance contracting

or 'alliancing'. This form of contracting has been described as a way to 'establish inter-organizational relations and engage in collaborative behaviour for a specific purpose' (Love and Gunasekaran, [1999] cited in Yeung et al., 2007, 223). Its governance structure has the capacity to incorporate the collaborative, deliberative processes that are posited to be essential to support sustainability in a range of cultural contexts (Barns, 1988).

Mike Kapitola notes that for infrastructure providers aiming to enhance sustainability outcomes, a key focal point is governance. Within government, research indicates that alliancing 'could be used to foster greater collaboration between different government agencies when providing infrastructure services to the community' thereby supporting 'whole-of-government' approaches that are seen to be essential to sustainability (Zeibots et al., 2008). Alliancing's adaptive capacity is also useful for projects orchestrated between government and non-government organisations. Kapitola's practical experience with alliancing has lead him to support it as a governance model

> that seeks a collaborative approach. It is not a traditional model of compliance (or even cooperation) that has usually focused on the elements of cost, time and safety – it still includes these elements but under a broader framework that also seeks quality, environment and social elements. The pattern over time has been a movement from a focus on a few elements like cost and time to take in the wider set under a sustainability definition (pers. comm., 2009).

Alliancing enables organizations to act in combination to complete complex and uncertain construction tasks comparatively rapidly and cost effectively. In contrast to conventional, highly competitive contracting arrangements, alliancing can add value to each partner organization by virtue of improvements such as in social capital and knowledge, while at the same time achieving societal goals (Nicholson, [1996], cited in Yeung et al., 2007, 221). It is argued that alliance contracting has an adaptive capacity (Zeibots et al., 2008) that is suitable for complex projects with characteristics including:

- hard to define risks
- uncertain or changing scope
- a need to encourage innovation for value-based achievements
- the need to engage with community, stakeholder and environmental concerns (Morwood et al., 2008, 14; Yeung et al., 2007; Walker et al., 2002).

This potential exists by virtue of alliancing's unique processes, innovative legal and contractual bonds and emphasis on relationship development, as outlined in the next section.

Alliances - what are they?

Alliancing is a complex, and as yet immature concept, that is therefore difficult to define in a narrow sense (Yeung et al., 2007, 219; Walker et al., 2002, 83). Nonetheless, a number of key shared characteristics have been identified by researchers examining case studies around the world. Based on an extensive literature review, Yeung et al. (2007) suggest that these characteristics can be grouped into two categories – hard (contractual) elements and soft (relationship-based) elements. These authors also note that the general prerequisites and goals of the alliance are vital determinants of its nature and outcomes (Yeung et al., 2007, 220). Furthermore, they note a recurring contention amongst a number of theorists and practitioners that 'sustainable development ought to be viewed as a desirable goal and outcome of alliancing' (Yeung et al., 2007, 221).

The hard elements of alliancing that Yeung et al. refer to are contractual and legal, while the soft elements relate essentially to relationships between people. Formal contractual arrangements and pain/gain share agreements form alliances' hard framework. Soft elements include trust, common goals, equity, long-term commitment, cooperation and communication and agreed problem resolution methods. Variants of alliancing are created through different combinations of these hard and soft elements (Yeung et al., 2007, 219). Three constants are the mutual establishment of objectives, a commitment to resolving problems and avoiding disputes, and achieving continuous improvement (Walker et al., 2002).

Alliancing has been used in Australia since the early 1990s, although the use of this model of relationship-based contracting has grown exponentially over the last six to seven years. The Commissioner of Main Roads Western Australia, Menno Henneveld, reports that 217 project alliances worth a total of AU $65 billion have occurred in Australasia in the past 10 years (pers. comm., 2009).

The Victorian Government produced a guide for public sector project alliances in 2006. It defined a project alliance as 'a commercial/legal framework between a department, agency or government-backed enterprise or a private client as 'Owner Participants' (OP) and one or more private sector parties as 'service providers' or 'Non-Owner Participants' (NOPs) for delivering one or more capital works projects' (Department of Treasury and Finance, 2006, 2). The key characteristics of an alliance were listed as:

- collective sharing of project risks
- no fault, no blame and no dispute between the alliance participants (except in very limited cases of default)

- payment of NOPs for their services under a three-limb compensation model comprising reimbursement of
  - NOPs' direct project costs on 100 per cent open book basis
  - a fee to cover corporate overheads and normal profit
  - a gain share/pain share regime where the rewards of outstanding performance and the pain of poor performance are shared equitably among all alliance participants
- unanimous principle-based decision-making on all key project issues
- an integrated project team selected on the basis of best person for each position (Department of Treasury and Finance, 2006, 2).

The emphasis on the legal contractual expression of the aims, risks and rewards of collaboration in alliancing distinguishes it from the partnering concept developed in America by Charles Cowan, despite their shared focus on collaboration (Walker et al., 2002; Yeung et al., 2008). Both concepts could be considered as part of a continuum of partnering spanning pseudo-partnering, where rhetoric abounds but action may be limited; project partnering and alliancing, where collaborators come together to complete a specific task; and finally strategic partnering and alliancing which build relationships beyond the parameters of a particular project (Walker et al., 2002, 85).

In partnering, a charter is signed that provides a platform for collaboration, but there is no contractual obligation to collaborate. Partnering is not a delivery system. Alliancing however, is 'both a relationship management system and a delivery system' (Yeung et al., 2007, 223). In alliancing, effective collaboration is supported contractually by ensuring that participants share risks equitably and receive commercial benefits from successful project delivery according to project goals and indicators determined by mutual agreement. Financial rewards for non-cost related outcomes, such as measures to promote sustainability for example, can be supported contractually. Effective collaboration is incentivized by the gain and risk sharing mechanism. For instance, if one of the alliance members does not deliver promised results, all participants face losing rewards as a result (Yeung et al., 2007, 223; Morwood et al., 2008; Walker et al., 2002). Conversely, gains in excess of those anticipated at the commencement of the project may be shared between alliance members. These risk and reward provisions do not necessarily guarantee effective collaboration between alliance partners, but they encourage it (Walker et al., 2002, 88).

Partnering and alliancing approaches replace the competitive approach to contracting with increasingly integrated versions of commitment, ranging from cooperation to collaboration to coalescence (Walker et al., 2002, 85). Project alliances like the Access Alliance, the case study presented in this paper, fall into

the latter category - the alliance project participants coalesce to become a virtual company in order to complete a particular project.

Alliances may be 'pure', as described above, or 'hybrid' (Ross, 2007). Hybrid alliances may include requests for cost estimates from non-owner participants to be provided as part of the tendering process. Participants may be selected on the basis of more conventionally marketed forms of tendering, in contrast to the preference in pure alliancing to select participants through dialogue in order to look beyond marketing. The right to attribute some blame may be retained in hybrid alliances. Hybrid teams may not be fully integrated, leaving the NOPs with distinct responsibilities in comparison to the OP, who may have a casting vote in key decisions. The gain/pain share model may be weighted in favour of the OP (Ross, 2007, 26). It is argued that hybrid alliances may be more suitable in particular circumstances, but are unlikely to 'drive and support peak performance' as effectively as pure alliances (Ross, 2007, 23).

Alliancing as a radical approach

In many respects, alliancing is a radicalizing concept. Alliancing's focus on elements such as collaboration as the key to high performance offers a radical challenge to the economic ideology of competitive individualism as the best way to ensure optimum performance. As Sakal notes, in alliancing, decisions should be made ' "best for project" and not "best for individual" since the alliance either wins or loses as a group' (2005, 67). The coalescence of collaborating parties helps to remove barriers and therefore reduce transaction costs that occur between actors who do not have an established mutually beneficial relationship. This resonates with proposed reasons for the existence of corporations as islands in the competitive economic field – theorists such as Coase argue that firms exist to reduce transaction costs (Coase, 1988, 36). It could be argued that the virtual corporations created through alliance contracts are simply following the same logic.

Zeibots et al. (2008) researched the Roe 7 Alliance in Western Australia in which Main Roads was the OP. They concluded that in alliances, participants operate at a comparative distance from their parent organizations, enabling them to try new ideas more easily (Zeibots et al., 2008, 13). They argue that the most important consequence of this distance is that closer relationships between professionals working on the project and the community can be developed (Ziebots et al., 2008, 13).

Alliancing's focus on emotions and relationships rather than pure economic rationality is also radicalizing. Mike Kapitola from Main Roads describes the importance of team building in creating a successful alliance:

> This is also about our capability, built on team development when a new alliance team is formed. The other key component is developing shared

> and agreed project objectives (what we do) and establishing a project culture and behaviours (how we perform) (pers. comm., 2009).

The cohesion and collaboration sought in alliances is built on trust, which is therefore seen as an essential element of alliancing (Yeung et al., 2008, 225). As Yeung et al. point out, 'trust is an intensely emotional and human phenomenon' (2008, 225) and attention to emotions is a radical approach in a market place dominated by the ideology of competitive, rational individualism. Zeibots et al. note that the focus on objectivity that characterizes conventional contracting frameworks for infrastructure delivery overlooks emotions as 'important and powerful motivations that can lead to actions that enhance outcomes' (2008, 16). Alliancing's successes undermine the claim that competitive individualism is the best guarantor of efficiency and performance.

The quality of relationships formed in an alliance will determine its capacity to achieve step changes in behaviour from project collaborators (Sakal, 2005, 74). The extent to which particular alliances succeed in this respect may vary, but the logic is clear. In fact, given the importance of relationships and effective dialogue within alliances, psychologists or specialist facilitators can play an essential role throughout projects (Salicru, 2008, 30). Relationship management and culture development are typically included in alliances' performance plans (Morwood et al., 2008, 116). Once a virtual organization is formed, team members must quickly establish relationships and develop the alliance's culture. Here, psychologists may be able to assist 'in the areas of facilitation, group dynamics, team development, principles of collaboration and high performance, and performance coaching' (Salicru, 2008, 31). Furthermore, since alliances may exist for a number of years in order to complete large infrastructure projects, ongoing opportunities for deliberation and engagement processes are likely to be required to assist contractors who are active at different times during the various stages of a project (Salicru, 2008, 31).

The success of alliances is dependent to a large extent on the speed and extent to which coalescing partners can form productive relationships. This capacity may be partly dependent on previous experience with alliancing – organizations that have already participated in alliances may be better prepared than newcomers to step seamlessly into the newly formed arrangement. Walker et al. observe that

> alliancing requires a highly sophisticated and involved client to drive and benefit from the process. Novice or unprepared team partners might find this approach too challenging to fully reap the benefits that can be gained including the vital one of project success in terms of the quality of inter-team relationships (2002, 91).

Risks and Rewards

In a radical departure from conventional tendering practices and project governance processes, reward and risk allocation mechanisms are devised jointly by members of pure alliances. These parameters are determined *after* alliance partners have been selected. This is the first step in establishing relationships and dialogue within the alliance that will nurture innovation and optimum performance. Walker et al. note that this alliancing practice designed to ensure that 'the best-qualified people (work) together in the best interests of the project, (so that) the best and most effective solutions…emerge' indicates a 'substantially, if not totally different mindset' to that underpinning conventional project contracts (2002, 88).

Some suggest that alliancing may have higher start-up costs for the OP than other forms of contract due to more involved selection processes (Morwood et al., 2008, 24). In contrast, some potential alliance partners have observed that the tendering process can be less costly than conventional processes. For example, a tenderer who unsuccessfully bid for a role in the alliance created to undertake the Australian Natural Museum Project reported a lower cost for alliance tendering than conventional projects, because detailed cost estimate or design details were not required (Walker at al., 2002, 88). Furthermore, experience suggests that other costs, such as that of litigation, are minimized due to alliancing's collaborative, 'no blame' approach. In Australia, alliance contracting has proven to be a highly cost effective way of delivering projects, and therefore has been able to attract resources even in highly competitive market circumstances (Morwood et al., 2008, 14).

Alliance contracting may be chosen partly because it is seen to offer Value for Money (VFM). For example, the National Museum Project of Australia, an extremely complex project of national cultural significance, used alliancing in order to achieve high VFM, as well as rapid delivery, high construction quality and significantly innovative design (Walker et al., 2002, 86). The alliance met the VFM and other objectives within a time frame that was considered too tight to be achieved by conventional contracting arrangements (Walker et al., 2002, 87). While more evidence is needed before the claim that alliancing provides VFM can be accepted as a general principle, some conclusions can be drawn at this stage. For instance, it appears that alliancing is most likely to provide value for money in complex projects with high levels of risks and opportunities, where cost certainty is a priority and where time constraints exist (Currie and Brown, 1999).

This paper argues that alliance contracting is a suitable vehicle for promoting sustainability in infrastructure development, however sustainability is not inevitably achieved through alliance contracting. One of the earliest attempts at alliance contracting, the Andrew Field project undertaken by BP in the North Sea in the early 1990s, is a case in point (Sakal, 2005, 68). At this time, it was uneconomical

to tap into oil reserves in the area. BP found that simply employing the latest technology could not secure the efficiencies required to access the oil fields economically. High project costs remained a barrier to implementation.

The company determined that a step change in behaviour was necessary to augment the minimal efficiencies provided by technological improvement. They devised an alliance contracting system and were rewarded by achieving cost reductions that surpassed the 'wildest dreams' of the Project Manager (Sakal, 2005, 69). The project was therefore considered to be a resounding success. However as a project to access oil fields, it is unlikely to be seen as making a significant positive contribution to sustainability. Nonetheless, alliancing has the capacity to embed sustainability principles in construction projects, if this is an objective of the alliance and significant attention and energy is directed towards it.

Alliancing in Australia

Australia in particular has embraced alliance contracting as a means to approach large infrastructure projects (Sakal, 2005, 70). In Australia, alliancing was initially suggested in the 1980s as a method to overcome the problems associated with the typically adversarial approach to contracting within the engineering and construction industry that existed at that time. The lack of collaboration and communication that characterized the industry then resulted in excessive disputation and litigation, with corresponding delays and blowouts in cost. The Australian Federation of Construction Contractors published a report in 1988 outlining their analysis of the disputes and litigation plaguing the industry. This was followed in 1989 by the recommendations of the National Public Works Council and the National Building and Construction Joint Working Party for improving the state of play. These two events catalyzed the introduction of alliancing in Australia (Morwood et al., 2008, 17).

The first foray into alliance contracting in Australia was the AU $364 million Wandoo B Offshore Oil Platform, developed by OP Ampolex Limited. This project began in 1994 and was completed in 1997 (Morwood et al., 2008, 19). Sydney Water Corporation then initiated the AU $465 million Northside Storage Tunnel Alliance in 1997. This was the first public sector driven alliancing project in Australia (Morwood et al., 2008, 20). It aimed to provide water infrastructure that would ensure that wet weather sewerage overflows into Sydney Harbour would not interfere with the events to be held there as part of the 2000 Sydney Olympics. The time frame for project completion was ambitious and it was essential that target outcomes were achieved in time for the opening of the Games. The project objectives were achieved as planned, and with a cost increase of only 3.3% above target. Sydney Water noted the project's success in achieving 'exceptional results in its delivery of community relations, environmental management and safety

systems' despite 'significant technical, environmental and social problems and delays' (cited in Morwood et al., 2008, 20).

Alliancing has continued to gain popularity in Australia, particularly with government bodies undertaking capital works projects. Alliance contracting is increasingly recognized as a strategy that can implement infrastructure development projects quickly and cost effectively with the potential to create enduring value for communities and the environment (Morwood et al., 2008, 14).

Access Alliance – Case Study

Access Alliance is a program alliance between the consulting firm AECOM, (known as Maunsell AECOM prior to 4th May 2009), constructor Brierty Ltd and Main Roads Western Australia (MRWA), a State Government authority. AECOM is a Fortune 500 company that provides consulting environmental, planning, design, engineering and advisory services. Brierty is a Western Australian civil construction company with an annual turnover of around AU $200 million.

The Access Alliance was formed in December 2007 to upgrade sections of an existing road - the Great Northern Highway - just north of Perth, Western Australia. The project is currently underway and is due for completion in December 2009. It is funded by the Australian Commonwealth Government and the Western Australian State Government at approximately $100 million. Works include reconstruction and widening of sections of the Highway, realignment of substandard sections, construction of new passing lanes, intersection upgrades and improvements to roadside amenities.

The Access Alliance's OP, Main Roads Western Australia is responsible for 18,000 kilometers of roads, carrying 60% of the State's road traffic. The assets the organization is responsible for are worth more than AU $36 billion (Main Roads, 2008, 4). In terms of infrastructure development, the organization 'relies heavily on industry to provide resources and capability to deliver road projects' (Main Roads, 2008, 2). This means project delivery can be challenging. In addition, as a government organization, MRWA faces particular time and funding challenges, with added political pressure if projects are not delivered on time and on budget.

Main Roads is developing an internal culture that lends itself to alliancing and has created a Sustainability Policy with the aim of 'incorporating sustainability into everything (they) do' (Main Roads, 2008c). Within the organization, considerable effort is being directed to catalysing forms of cultural change that the Commissioner, Menno Henneveld, sees as imperative to support the permeation of sustainability (Henneveld, pers. comm., 2008). Significant change has occurred within the organization over the last few years, and is continuing. In dealing with construction and service partners, Main Roads now states its intention to include sustainability formally in Integrated Service Agreements and core processes

including project and contract management (2008, 41). Louis Bettini, the Sustainability Officer at MRWA, notes that a growing recognition of the importance of sustainability to project outcomes has lead to the incorporation of sustainability in major project tender document templates since December 2007 (pers. comm., 2009).

Main Roads has a stated commitment to values-driven action, and the provision of space for employees to pursue innovation in the absence of a culture of blame. It endorses the creation of opportunities to learn and share knowledge and experience and promotes the development of strong, collaborative relationships (Main Roads, n.d. a, 2). Main Roads aims to 'develop and nurture our existing and new relationships creating collaborative and trusting business relationships' while engaging, ensuring and valuing 'the involvement of the community and our partners in order to achieve ... common goals which connect us all' (n.d. b, 2). This approach is judged to facilitate the delivery of sustainability outcomes (n.d. b, 2). The need to engage the community appropriately during project development and delivery of services is also acknowledged (n.d. c, 3). These cultural shifts being encouraged within the organization are also increasingly characterising its interaction with the community, stakeholders and business partners, as demonstrated by the alliances in which it has participated.

Alliance contracting has been successfully utilised in a number of Main Roads' major infrastructure development projects. Alliancing principles have also been applied to minor works of AU$3 million and below (Henneveld, pers. comm., 2009). Alliancing has been credited with achieving desired outcomes in a manner that would have been difficult with more conventional contracting mechanisms (Main Roads, 2008, 24). For example, in the Millstream Link Alliance, formed to complete a road project in the State's North West, a transfer of skills has been observed between Main Roads and the alliance partners, which Main Roads considers

> greatly enhanced the skills and knowledge of all involved, making them better prepared for future projects while ultimately delivering efficiencies that will benefit all parties and the community. The process has reinforced Main Roads' belief that management and expansion of the State road asset is done most effectively in co-operation with our industry partners (Main Roads, 2008, 24).

Furthermore, the project was completed well ahead of time, an outcome that was deemed to be impossible under conventional contracting (Main Roads, 2008, 24).

Main Roads has delivered community legacy outcomes through alliance projects that the Commissioner considers would be very rare on "normal" projects (Henneveld, pers. comm., 2009). For instance, the A-Line East project built a desalination plant in the Western Australian wheat belt town of Merredin to supply

water during construction. The plant was left to the local community once the project was completed. The Team Savannah (an Early Contractor Involvement model using alliancing principles) saved and transferred an iconic 750 year old boab tree from the north west of the State to Kings Park in Perth, to be enjoyed by the community. In addition, a memorandum of understanding (MOU) was signed between Team Savannah and the Gija people, the traditional owners of the land. The MOU covered issues such as Aboriginal heritage, communication, local industry involvement, traineeships, camp management and community access (Main Roads Western Australia, 2008, 28). Eight Indigenous youth were engaged on the project as part of the project's Aboriginal Trainee Employment Strategy (Henneveld, pers. comm., 2009; Main Roads Western Australia, 2008, 28).

AECOM also demonstrates commitment to sustainability and has a strong background in this area. The company's three core policy goals are:

1. Embedding sustainability into all aspects of their work with clients;
2. Building their capability to provide sustainable solutions for their clients and communities in creative and innovative ways;
3. Conducting their business in a way that is consistent with sustainability principles (Maunsell/AECOM, 2008, 1).

Access Alliance has developed a Sustainability Framework to pull together its sustainability initiatives and measures. The Alliance's Sustainability Plan sets a number of key directions for implementing sustainability on this project, with some examples being:

- Water – sustainable use of groundwater;
- Legacy – providing legacies for communities during the program delivery process;
- Habitat – reducing the ecological footprint of the works.

These three elements also reflect the three performance-payment linked Key Performance Indicators developed for sustainability in the Access Alliance:

- Water Index KPI – a measure that weights the type of water source (saline versus non-saline) and distance to haul the water to generate a score;
- Legacy KPI – a measure of the financial value of contributions made that have community legacy value that are beyond minimal project requirements;
- CEMP Compliance KPI – a measure against a checklist that reflects each site's Construction Environmental Management Plan requirements.

The Access Alliance also formulated a Carbon Response Plan, which is an eight step approach to managing carbon emissions. The steps are:

1. Identify – create a budget of emission sources, including direct energy consumption (fuel and electricity) and estimates of embodied energy in consumables and products, as well as determining what carbon sinks may be created in the project, such as re-vegetation sequestering carbon.

2. Redesign – avoid creating some emissions through redesign or use of alternate materials or energy sources. This is a highly desirable option as it means carbon emissions are not generated.

3. Reduce – make easy wins through basic energy efficiency actions.

4. Reuse – identify opportunities to reuse products, whether it is a small item like scrap paper produced in the office or a major item like a culvert.

5. Recycle – recycling means the use of finite resources is avoided, although it still usually results in some energy consumption to recreate the materials into something new.

6. Offset Emissions – offsetting is a way remaining emissions can be accounted for, with the potential result of no net emissions.

7. Report – provide information on the carbon emissions and the avoidance, reduction and offsetting options undertaken as a voluntary and where applicable, a statutory requirement.

8. Share Knowledge – sharing any knowledge gains or experiences helps make a social contribution to the wider community.

As part of the Carbon Response Plan, the Alliance is undertaking a carbon research program in conjunction with Murdoch University on the following three projects:

- carbon sequestration via biochar produced with biomass cleared during road building;
- a review of international approaches to non-urban pavement construction and identification of potential low carbon alternatives;
- an investigation into the potential for carbon savings through pavement reuse in sub-base, recognising the finite nature of gravel resources and emissions associated with extracting gravel.

The Alliance is also sponsoring part of a study, also by Murdoch, looking at the quantification of the amount of carbon sequestered in biodiverse plantings in WA to demonstrate the benefits of biodiverse tree planting options.

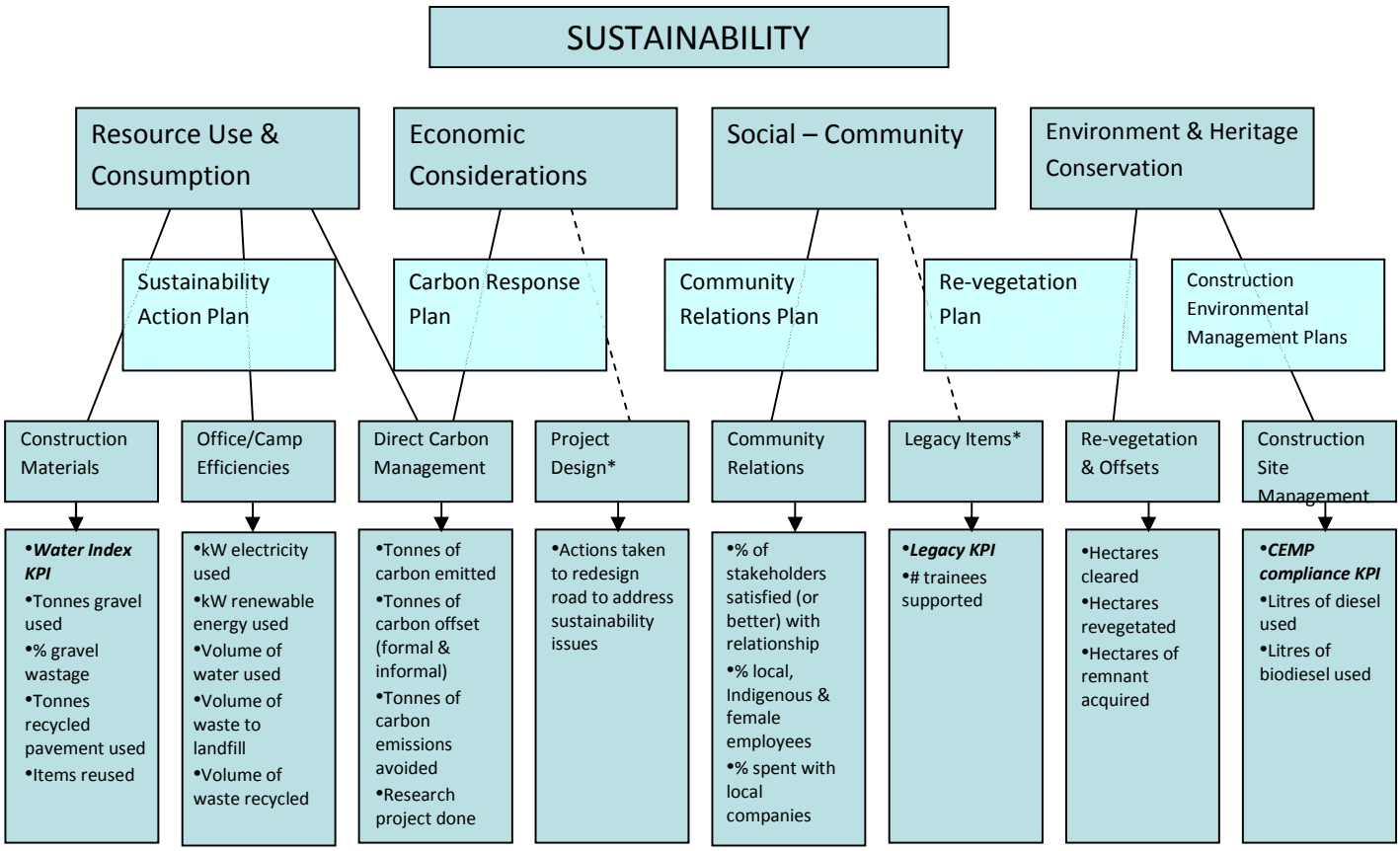

Table 1: Access Alliance's Sustainability Framework

* Driven by all elements of sustainability

Access Alliance – sustainability achievements and learning

The Alliance's construction project is still underway, therefore a complete evaluation of its achievements in relation to sustainability goals is not possible at this stage. Some progress has been made, with achievements in a number of the target sustainability areas, as illustrated by the examples listed below. However, further action is needed as the alliance's learning process continues.

The alliance focuses on the sustainability of its own processes in a number of ways. For instance, in keeping with its Carbon Response Plan, the Alliance works to reduce its Carbon Footprint by reducing electricity consumption. For instance, from June 2008, Scope 2 (indirect) emissions resulting from electricity consumption at the Alliance's office in Welshpool, Perth, were eliminated by paying for electricity from accredited renewable sources. Energy efficiency practices have also been implemented in the workplace, and while it is difficult to attribute to any savings to efficiency initiatives alone given fluctuations in staffing levels, a decrease in electricity consumption was recorded. Staff members were also encouraged to improve their energy efficiency at home.

Habitat issues have been approached innovatively. For example, a package of vegetation offsets approved by the Western Australian Department of Environment and Conservation, includes a new model of offsets for WA – the facilitation of voluntary conservation covenants over land that remains in private ownership. This model is seen as a win-win tool as it offers a lower financial cost to Main Roads in both direct purchase costs and ongoing management costs while increasing the reach of conservation into the community. It may also open up a larger pool of potential offset blocks by including landowners who do not want to sell, particularly as easy-to-purchase blocks are taken in relation to other developments.

Outreach and consultation processes have had some success. For instance, land acquisition processes with affected landowners have involved a two-way flow of information which has influenced the placement of boundaries. The Environmental Working Group was established in January 2008 and has met several times, with additional meetings being held with individual members of the group. Access to the Project View software has been freely available on a password-basis so stakeholders can see designs and information layers. In addition, the Community Relations Manager has kept other stakeholders, particularly in the transport industry, informed through newsletters and email updates. Meetings with the Shire councils and landowners have occurred and are planned for the future.

Innovation in water use in construction has also been achieved by the Access Alliance. This innovation was driven by the lack of freshwater sources (and relatively plentiful saline water) for construction located within a reasonable haul distance that did not compete with local community demand. The Alliance researched the use of saline water in road construction in WA, Australia and overseas to assess the risks associated with use of saline water in all pavement layers for compaction up to and including the base coarse layer. A trial section was constructed and preliminary inspections have shown there to be no immediate quality issues. The outcome is an agreement to allow the use of saline water for full depth pavement construction on one of the program's design packages with the possibility of using saline water on other construction packages in subsequent construction seasons. The use of saline water for full depth pavement construction has a triple-bottom line outcome – economic via the lower cost of saline versus non-saline water, environmental as reduced use of non-saline water in a region where water is a scarce resource, and social as less competition with local communities for the more precious water.

The team managed to reduce pavement depth by matching the pavement design specifications against the conditions of the sub-grade in one section of the road under construction. This flexible approach generated multiple benefits. As better material was targeted to build the sub-base and base coarse layers, a reduced

thickness of pavement in a single layer was successfully applied for a 3km stretch. The initial pavement design was to be 350mm. The reduced design was 200mm – a difference of 150mm with possible savings in materials and associated cost, although cost savings generated by reduced use of materials are partly offset by the increased costs of the higher quality sub-grade. The actual savings are estimated to range between $70-90,000 per kilometre, even allowing for an additional cost associated with a higher quality sub grade.

The Legacy KPI records the financial value of legacy items generated in the program. This measure has meant a focus from alliance staff on legacy opportunities. For example, a herbicide trailer purchased by the alliance will be made available to be used by community groups for their own environmental management needs during and after the program. Not all legacy initiatives have run smoothly however. Infrastructure at the Moora Camp may not be left for the local community as originally planned due to a change of position by the Shire regarding taking on the infrastructure on conclusion of the Alliance. This will mean that the Legacy KPI as it currently stands will have to be revised.

Although the Access Alliance is achieving success in reaching a number of its environmental and social goals, there is further scope to embed sustainability earlier and more deeply at the core of the alliance's process. Sustainability may not have been introduced early enough in the design and construction processes to enable participants to rethink their tasks beyond business as usual. The lack of a sustainability champion in the early stages may have contributed to this problem, amplified by significant program scope changes and associated time pressures. A greater lead time may have improved the early integration of sustainability.

Such adjustments and learnings are to be expected in alliance contracting since, as Yeung et al. (2008) note, alliancing is not yet a mature concept, and practitioners continue to contribute to the evolution of the process. Furthermore, the alliance was drawn together relatively quickly, with little time available to more extensive planning for sustainability. Nonetheless, Alliance members who are learning by doing have a unique opportunity to contribute to synergistic processes of learning and innovation through the forms of collaboration specifically nurtured within alliances.

Prioritising sustainability innovations – SMART

When sufficient time is dedicated to process planning at the commencement of an alliancing project, innovative measures may be developed. The Sustainability Measurement Assessment and Recording Tool (SMART) developed by Team Savannah, another major road construction project team AECOM was involved in. This tool is used to prioritise and filter innovation opportunities against a set of

sustainability criteria. Jamie Shaw, who works in alliances as Principal Environmental Scientist at AECOM, describes the intention and evolution of SMART:

> Our focus on innovation meant that we had to have a formal mechanism to embed sustainability into our thinking, which ultimately led to the development of the Sustainability Measurement and Reporting Tool (SMART) (pers. comm., 2009).

SMART is a simple, easy to use database program that can be tailored to suit specific projects by the use of weighting factors for goals and objectives. Project partners have found this tool to be highly effective in enabling the assessment of ideas and to support decision makers in the alliance in addressing environmental, social and economic factors.

Objectives can be developed for each sustainability goal. In some projects AECOM has been involved in, these goals are then weighted by the project team to reflect stated objectives. To ensure the integrity of the process, the entire project team can be surveyed and asked to weight the objectives based on their understanding of the project. This ensures that the final weightings are not biased towards the areas of interest of members of the Sustainability Team. The average weighting for each goal is placed in the SMART database and the program and further refined to enable the easy assessment of ideas.

AECOM's refined and well-tested Multi Criteria Analysis (MCA) Tool can be used to assess complex sustainability options. The AECOM MCA Tool is a Microsoft Excel-based application, which can be used with a group while they are working through a decision. It has been successfully used on transport planning studies to identify preferred options. The tool provides a convenient basis to capture information and issues as they arise, and helps to show the relative merits of each option.

The score is then benchmarked against a business as usual case (identified in SMART) with a better than business as usual score being more sustainable and more likely to proceed (see Table 2). If the benefit of the idea is clearly established it can be adopted immediately and incorporated into current planning or project delivery. If more information is required or the idea has wider implications for other aspects of the project, another multi criteria assessment may be undertaken prior to submitting the recommendation to management for endorsement. If the idea's score is low it may be "parked" where it will remain on the register but will not proceed immediately.

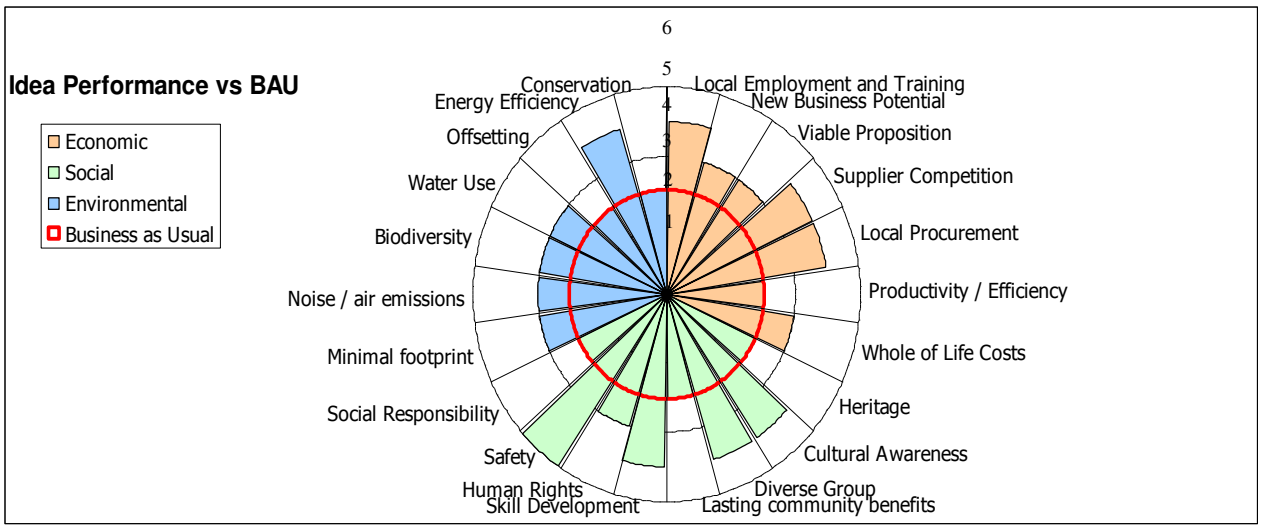

Table 2: Team Savannah: spider graph comparison of sustainability ideas using MCA and SMART

The development of SMART took time away from the practical implementation of sustainability in the Team Savannah Alliance, however this was seen as a necessary and unavoidable step, particularly since sustainability is a relatively new focus in construction projects. Jamie Shaw explains:

> We took a long time to get to SMART. As a result, we lost a couple of months of planning opportunity to investigate, develop and implement sustainability initiatives. This was largely outside our control because we were pioneering the application of sustainability to road construction projects at the time and had to start from scratch (pers. comm., 2009).

Integrating Sustainability

Main Road's experience of the Access Alliance's pure alliance structure is that it is a better format than other structures, including hybrid alliances, for achieving sustainable outcomes. Main Roads finds that the organizational culture employed in the Access Alliance provides flexibility for ideas and innovations to be developed more freely, due to changed priorities for outcomes. Alliancing accommodates learning-by-doing, which is a vital attribute for sustainability 'where the intricacies of a problem may not be fully understood until the responsible agents are trying to implement a solution' (Ziebots et al, 2008, 8). Jamie Shaw from AECOM describes alliancing's capacity to facilitate the development of innovative solutions and strategies:

> Because a relationship-based contract rewards cooperation, rather than cost minimization, it makes introducing new concepts and strategies much easier. In my experience, it is often difficult encouraging clients to

> implement strategies that may have an add-on cost but whose non-tangible benefits are difficult to quantify. Partnership contracts spread the risk and the cost. They also seem to foster an attitude that is more focused on high profile positive outcomes.

By more clearly positioning sustainability as the fundamental of the overarching business model as a key focus of the project, sustainability outcomes could be further enhanced. This is highly feasible in cases such as this where the OP is a government body with mandated broader responsibilities than economic performance alone. Shaw argues that sustainability

> needs to be embedded in the contract model. Responsible owner participants will need to start incentivising it in some way, setting goals, objectives and targets for NOPs to achieve. Over time, benchmarks should be collected and reported so that performance can be monitored and reported on (pers. comm., 2009).

The practice of infusing sustainability through an alliance is an emerging one, which may rely on champions to highlight its benefits. Shaw recounts how the theme of sustainability was introduced into the Team Savannah Alliance:

> The original tender request for the project did not make any mention of sustainability. I managed to convince everyone that when they said value for money, that was actually what they were talking about. We started thinking in terms of net benefits, rather than simple cost reduction, and 'value for money' soon grew to include community and environmental benefits as well (pers. comm., 2009).

Louis Bettini from MRWA describes the view within the organisation that in future, clients such as Main Roads may increasingly

> take an approach that will look to specify initiatives that will be measurable against a given key performance indicator that lead to sustainable outcomes. At the same time a framework may be defined for the overall sustainability objectives that will enable innovation to occur and offer respondents an opportunity to gain a competitive advantage. Clients will be looking for measurable, tangible outcomes (pers. comm., 2009).

Shaw also notes MRWA's strong and rapid shift to incorporating sustainability in tender and contract requirements:

> It didn't rate a mention in late 2007 for the Kimberley Project. Now it is a central theme in all alliance style tender requests from MRWA. I think in the future it will continue to be a significant component of the tender requirements, but I also think that it will become more incentivised to

> ensure that what tenderers say they will do, they actually do (pers. comm., 2009).

In order to support the filtration of sustainability principles, Main Roads personnel have stated their preference to see sustainability incorporated within any project at the earliest possible time in order for the ideas developed by alliance members to be translated into project outcomes. Similarly, Shaw endorses early contractor involvement which

> provides a planning period where designers, environmental consultants, social planners and constructors can get together and develop solutions to project issues. This means that you get an extended period where new concepts can be introduced, tested, digested and accepted (pers. comm., 2009).

A need for greater emphasis within the Access Alliance on the implementation of processes to enhance collaboration to achieve innovation and assess opportunities was also noted by alliance participants. For instance at present, the Access Alliance does not have a forum to collate, discuss and promote sustainability initiatives. Such a forum would help to ensure that sustainability is sufficiently addressed and would increase the chances of identifying innovative sustainability initiatives.

Some of Access Alliance's sustainability initiatives have stalled because of organizational difficulties associated with dealing with many parties. The proposed use of biodiesel, or at least a trial of its use, was hampered by the difficulties of coordinating its development and implementation between 24 subcontractors. It is necessary for all owners to agree in order to select one type of refuelling truck and tank. This initiative remains in the pipeline. It has been complicated further by perceptions regarding the warranty implications of using biodiesel – this is currently being clarified and it is hoped that communication of the accurate warranty implications will resolve the majority of concerns. Another example is the basic recycling set up at the Moora Camp may be jeopardised by the Shire of Moora's comparatively limited services and reliance on volunteers.

Alliance participants note that there is a dearth of baseline information regarding construction relevant to sustainability in Western Australia exists. It is therefore argued that the collection of baseline data is a valuable exercise in itself, and that it is important to share the results gathered on this program through the collaborative processes of the alliance and beyond. AECOM consultants recommend improved sharing and learning from other Main Roads' alliances to avoid 'reinventing the wheel'.

Conclusion

Conceptually, the practice of alliance contracting is suited to promoting innovation and achievement of positive outcomes in relation to climate change and other sustainability issues by virtue of its emphasis on adaptive leadership, collaboration, relationship building, integration, innovation and inclusion of community and environmental concerns. Pure alliancing in particular provides scope and legitimization for the inclusion of sustainability issues as a fundamental requirement of contracts, and fosters a business culture that can support sustainability outcomes. It can enable inter-organizational management for sustainability to be positioned within a legal and contractual framework, providing powerful incentives to attend to sustainability as part of core business.

Significant sustainability outcomes have been attained through alliances instigated in Western Australia by Main Roads Western Australia. The Access Alliance, a program alliance between AECOM, Brierty Ltd and Main Roads formed to upgrade sections of an existing road, was examined as a case study. Although the project is not yet completed, the alliance has demonstrated an ability to use the unique framework of the alliance to engage with sustainability issues, as illustrated by examples in this paper. Areas that could be improved have also been noted. There is general support for the view that the alliance methodology that teams have experienced in the Access Alliance and other alliances in Western Australia has the capacity to embed sustainability at the core of infrastructure development.

References

Access Alliance. 2008. *Great Northern Highway Upgrade: Muchea to Wubin.* Online: http://www.accessalliance.com.au/default.aspx (Accessed 5 May 2009).

Barns, I. 1999. 'Environment, Democracy and Community.' *1999 Science and Society Conference Proceedings.* Online: http://wwwistp.murdoch.edu.au/istp/RESEARCH/E-PUBLIC/AMHOPE/barns.htm (Accessed 15th July 1999).

Coase, R. 1988. *The Firm, the Market and the Law*. University of Chicago Press: Chicago and London.

Department of Treasury and Finance. 2006. *Project Alliancing Practitioners' Guide.* Department of Treasury and Finance, State of Victoria: Melbourne.

Edum-Fotwe, F. and Price, A. 2009. 'A Social Ontology for Appraising Sustainability of Construction Projects and Developments.' *International Journal of Project Management.* Vol. 27, pp. 313-322.

Main Roads. n.d. a. *A Strategy for Inspiring Leadership – Inspiring Others to Create Change.* Online: http://www.mainroads.wa.gov.au/AboutMainRoads/OurRoleRegions/AboutUs/Pages/StrategicPlan.aspx (Accessed 1 May 2009)

Main Roads. n.d. b. *Enhancing Relationships Strategy.* Online: http://www.mainroads.wa.gov.au/AboutMainRoads/OurRoleRegions/AboutUs/Pages/StrategicPlan.aspx (Accessed 1 May 2009).

Main Roads. n.d. c. *A Strategy for Providing the Right Roads for Western Australia: Developing Tomorrow's Transport Solutions Today.* Online: http://www.mainroads.wa.gov.au/AboutMainRoads/OurRoleRegions/AboutUs/Pages/StrategicPlan.aspx (Accessed 1 May 2009).

Main Roads Western Australia. 2008. Annual Report. Government of Western Australia: Perth.

Morwood, R., Scott, D. and Pitcher, I. 2008. Alliancing, a Participant's Guide: Real Life Experiences for Constructors, Designers, Facilitators and Clients.

Ross, J. 2007. 'Alliancing: Fad or Fixture?' *The Leighton Magazine.* June 2007, pp. 21- 31.

Sakal, M. 2005. *Project Alliancing: A Relational Contracting Mechanism for Dynamic Projects.* Lean Construction Journal. Vol. 2, no. 1, pp 67-79.

Salicru, S. 2008. *Alliances: Opportunities for Psychologists.* InPsych, October 2008, pp. 30-31.

Sinding, K. 2000. *Environmental Management Beyond the Boundaries of the Firm: Definitions and Constraints.* Business Strategy and the Environment. Vol.9, no. 2, pp. 79-91.

Walker, D. Hampson, K and Peters, R. 2002. *Project Alliancing vs Project Partnering: A Case Study of the Australian National Museum Project.* Supply Chain Management. Vol. 7, no. 2, pp. 83-91.

Yeung, F., Chan, A. and D. Chan. 2006. *The Definition of Alliancing in Construction as a Wittgenstein Family-resemblance Concept.* International Journal of Project Management. Vol. 25, pp. 219-231.

Zeibots, M. E., Partridge, E. and Scheurer, J. 2008, *Governance for Sustainability: Lessons Learnt about Community Engagement and Adaptive Leadership from the Roe 7 Alliance.* Prepared for Main Roads Western Australia. Institute for Sustainability and Technology Policy, Murdoch University.