

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA  
(I.P.W.E.A.)

The Foundation for the Technical Advancement of  
Local Government Engineering in Western Australia

## HOBART INTERNATIONAL PUBLIC WORKS CONFERENCE

Fellowship Report on Practices of Interest of Value  
To Local Government Engineering Resulting  
From the Conference



Dawn in Hobart, Tasmania

*By Louka Shopov*

November 2003

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# ***Fellowship Report on Practices of Interest of Value To Local Government Engineering Resulting from the Conference***

## **Abstract**

The Institute of Public Works Engineering Australia (WA) has awarded three Fellowships to assist its members to attend the International Public Works Conference, which took place from 24<sup>th</sup> to 28<sup>th</sup> of August, 2003 in Hobart, Tasmania. About 600 delegates from local government and civil contractors and consultants from all over Australia and some from overseas got together to share their experience and promote the importance of public works engineering to society. I was delighted to be one of the recipients. This was a lifetime opportunity to participate in the premier event in IPWEA's two-year schedule.

## **Acknowledgements**

I wish to thank the Trustees for considering my application for the Fellowship, and the Management of City of Kalgoorlie-Boulder for endorsing the trip to Tasmania. I would like to assure both parties of my commitment to work harder and applying the skills and knowledge acquired from the conference.

## **1. Introduction**

The following document is prepared to highlight the benefits to the community gained, from attending technical presentations and networking during the Public Works Conference in Hobart. The financial part of the report covers the expenditure associated with the event.

## **2. The Travel**

I sat out on a train to Perth on Saturday, 23 August. It was a cold, wet morning but I was so excited to get away for a few days that the rain did not matter at all. It took seven hours to get to Perth and the Qantas Boeing 747 to Melbourne departed from Perth Domestic airport just before midnight. After two hours break at Melbourne we continue on a smaller plane to Hobart. I took a cab from the airport and half an hour later I was in Blue Hills Motel, small and tidy building with a huge Tasmanian oak at the front.

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### 3. The Conference

#### 3.1 The Venue



The conference took place in Hobart's landmark building Wrest Point Convention Centre. It is one of Australia's premier conference venues that can cater for up to 1600 delegates.



Commanding glorious views of the Derwent and Hobart surrounds, this area is excellent for exhibitions, poster displays, cocktail receptions, refreshment breaks or meals.

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### **3.2 The Delegates**

About 526 delegates attended the conference. These included professional people in local government engineering, consultants, manufacturers and suppliers from all over Australia, New Zealand, USA and South Africa. The number of local government representatives was 414. Even small Shires like Coolgardie and Christmas Island had delegates.

### **3.3 The Sponsors**

Leading Australian companies and government agencies were generous sponsors of the conference. A few names to acknowledge include: manufacturers of stormwater drainage products Rocla, Humes and Vinidex; heavy earth moving and road construction machinery producers Volvo, Komatsu and Caterpillar; asphalt and bitumen suppliers Emoleum, Boral and Shell; consultants Sinclair Knight Merz, Pit & Cherry, Meritec and Axim; Australian government agencies AAPA, ARRB, AusSpec, Hobart City Council, Intitute of Engineers Australia and Institute of Public Works Engineering Australia (IPWEA). A remarkable sponsor's exhibition was set up, with the latest technological achievements in stormwater products, asset management, construction materials and tools and machinery.

### **3.4 The Technical Presentations Attended**

It was a problem for me to choose which presentation to go to. They all sounded interesting and well worth seeing. In several occasions I had to throw a coin to decide between Asset Management and Best Practice in Environment and between Traffic and Road Safety and Waste Recycling. I would have liked to have seen all papers if I could.

On day one I enjoyed three lectures in *Innovations in Stormwater*, presented by Peter Wood (City of Burnside, SA), Colin Pitman (City of Salisbury, SA) and Martin Glover (Town of Mosman Park, WA) Peter went through several case studies stormwater solutions that improved water quality, reduced the volume of rainfall runoff and improved the aesthetics of public parks and recreation areas.

Colin enhanced Peter's idea of retaining stormwater runoff on site by creating a series of thirty-two wetlands in Salisbury. Partnership with the largest wool processor in the southern hemisphere and General Motors Holden was an important part of the project as they become recipients of the stored runoff.

Martin Glover reported on a trial of three chamber gross pollutant traps feeding into the Swan and Canning Rivers in Perth. It is an effective and inexpensive alternative to proprietary units.

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In the afternoon I went to *Water Sensitive Urban Design*, a theme of Session Two. James Renee (Blacktown City Council, NSW) presented *The Evolution in Stormwater Management-a Case Study*. James brought our attention on the major challenges for stormwater managers since the colonization of Australia. He talked about the need to change European infrastructure design to suit the climatic conditions experienced in Australia. Water quality impacts associated with urban run-off, aesthetics of the structures, constructed wetlands, "Total Catchment Management", "Water Sensitive Urban Design" and "Low impact Development" were also the key points in James's paper.

Mathew Hall (Nillumbik Shire Council, VIC) described the design and construction of a small residential development in the Shire of Nillumbik. The project incorporated best practice in environmental management, including Water Sensitive Urban Design (WSUD) practices, and the use of stormwater quality protection methods and recycled materials in construction works.

*Linking Our Ground Water to Water Sensitive Design* was the next paper, presented by Michael Foley and Tony Turner (City of Swan, WA). The authors offered several solutions to overcome the problem with maintaining water quality in Perth, affected by continuing urban subdivision and discharging fertilizer and other pollutants into the river system.

*Asset Management for Long Term Road Maintenance Contracts* by Geoff Webb (GR Webb Consulting P/L TAS) was the next presentation in session three. Geoff discussed some of the elements of the asset management systems employed in the delivery of maintenance and rehabilitation services in the management of Tasmania's southern road network.

At the end of day one, Bruce Douglas (Mornington Peninsula Shire Council, VIC) outlined the process of transition from a short-term service contract to a longer term contract and from one service provider to four in a Best Value administrative environment defined by the Victorian State Government. His paper was titled *Sustainable Infrastructure Maintenance Service*

Day Two started with Jacquie's White paper *Building the Capacity of Local Government & Industry Professionals in Best Practice Urban Stormwater Management*. Jacquie talked about the initiative of the Municipal Association of Victoria and the Stormwater Industry Association of Victoria to establish a program called Clearwater Program, which aims to develop skills and knowledge of local government and industry professionals in relation to best practice environmental management of urban stormwater.

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Then followed a wonderful presentation from Stephen Frost (Fairfield City Council, NSW) *Restoring the Waters: A Sustainable Alternative to Concrete Stormwater Channels*. Improving water quality, managing flooding, increasing biological diversity and raising public awareness of stormwater management issues were the main objectives of this paper.. It involved deconstruction of 2.7 km of concrete stormwater channel at Clear Paddock Creek in the City of Fairfield Sydney.

Ian Woodward (Pitt & Sherry, TAS) highlighted some issues with Best Practice Environmental Management, where final decisions can be costly in dollar and even environmental terms. It can also lead to decision making that is piecemeal, over zealous, non-scientific and unfair and unreasonable. "At its worst, BPEM can be an excuse for bureaucratic burn protection, with regulators shifting all the onus of proof for decision justification onto developers under the banner of the Precautionary Principle," Mr Woodward said. After lunch Greg Ryan, a young engineer from NZ, presented the results of his investigation on flood hazard in six communities within the Thames Coast river catchment. Greg constructed one-dimensional and two-dimensional hydraulic models using a software program to stimulate flood hazards. The result of his investigation was a quantification of the flood hazards, along with the production of a draft flood hazard map and a set of draft engineering options to mitigate each flood hazard. Greg's paper was a winner of the HYNDS award.

I did not gain as much from the next presentation from Justin Boocock (Brighton Council, TAS). Justin had traveled to Sydney, Melbourne, Adelaide and around Tasmania to investigate the latest innovation in stormwater treatment and the potential for its reuse. The paper won the FAMET Endowment Award in 2002, possibly for the abundance of photographs and to encourage recent graduates. Another speaker from Nillumbik Shire Council, Victoria covered issues with recycling and Waste Services. Steven White proposed series of strategies and actions, revolving around reduction, recovery, reuse and recycling to achieve waste reduction targets. "The aim is-no waste to landfill by the year 2020," said Steven. The first presenter in the afternoon session on Lessons in Procurement was Bill Lawson (Sinclair Knight Merz, Tasmania). His paper was about procurement of goods and services in local government. Competitive Procurement is a longstanding practice required under the provisions of Local Government Act. However, the rising cost of competitive procurement is a concern to all Australians.

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Last for the day, (but not least), was Alister Clark (Greening Australia, Tasmania) with *EnviroMark-A System for Identifying and Managing Significant Environments*. Greening Australia has developed an integrated environmental management system for mapping, marking and managing significant environments. The system is called Enviromark. It can help organizations to observe their responsibilities under threatened species legislation, weed management legislation and local and regional natural resources management strategies. Alister's paper outlined the issues, described how the system works and the key elements associated with its application on roadsides.

Day three of the conference started with *Automated Video Feature Recognition in Road Management* by Shao NG (University of Tasmania) The paper was an extract of Shao's doctoral research on artificial intelligence methods and their application in engineering practice. The basic tools are expert systems, neural networks and generic algorithms associated with decision making pattern recognition. Shao concentrated on current usage of these tools in asset management and highlighted exciting new applications using real time feature recognition in images.

The second presenter for the morning session was Ahmed Zeki (Coffey Geosciences, Tasmania). Zeki tried to raise awareness to the challenges and risks the ground presents for civil engineering projects.

Following that was an exciting paper about *Recent Developments in Bitumen Road Surfacing*. Speaker, Dr Nigel Preston (Shell Co. Victoria) stressed a number of new products and spoke in justification of their high price. This is what he actually said: "The sustainable technologies are available to procure highway maintenance activities to a high standard in both quality and health management arenas, but there is a cost associated with these high standards which has to be recognized particularly at the client end of the supply chain".

The last three presentations I attended were in the area of Waste and Other Water. *GIS Approach in Consequence Assessment of Flood Damage*, by Keith Stove (Hydro Tasmania); *Bio-Remediation in Wastewater Systems* from Rob Smith (BioRemedy P/L QLD) and *Engineering Solutions in Salinity*, from Don Bursill (CRC for Water Quality & Treatment SA).

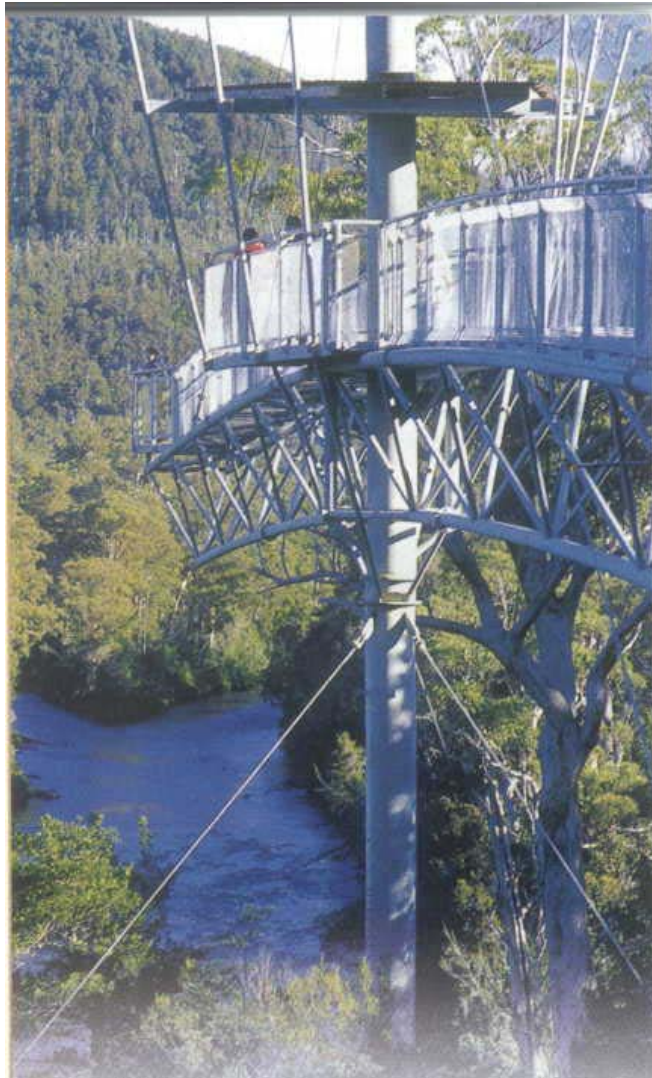
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### 3.5 The Technical Tour

I attended the Tahune Air Walk tour which was an exciting one day experience. We saw a workshop (school), where boats and small yachts are made by hand and met the young people who look after the site with great enthusiasm. I really enjoyed the walk through the forest and above the top of the trees overhanging the big river. The river had just washed away the bridge railing balustrade and surrounds including some camping furniture. The importance of the steel structure as a tourist attraction was brought to our attention by the young tour guide. I could appreciate the unique design and construction technique of the walkway. The structure contrasted with the background of the green forest. There was plenty of food and drinks during the tour, as well as remarkable service from the organizers.



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### 3.6 Social Program

The Convict Dinner on Monday was great fun, providing an excellent atmosphere for socializing and networking. Government House Reception was interesting from an historical point of view taking everyone back to the British colonial time.



Finally, the “Titanic” Dinner, which was brilliantly set up and performed, was the culmination of the social program.

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#### 4. Budget

Travel expenses:

1 Quantas Air Fare-	\$ 667.43
2 Train Kal-Perth-Kal	\$ 119.00
3 Taxi	\$ 174.00

Conference

1 Registration	\$1030.00
2.Functions	\$ 85.00

Accommodation

1 Blue Hills Motel	\$ 462.00
2 Meals	\$ 240.00
3 Books and souvenirs	\$ 125.00

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**Total** **\$2899.43**

#### 5. Conclusions

Fellowships awarded from the Foundation for the Technical Advancement of Local Government Engineering in Western Australia provide a great opportunity to local government engineers. Usually, conferences like this are attended by directors, CEOs and Councilors, and people that need the outcomes the most can't afford to register.

The major outcomes from the conference for me are:

- Networking
- New knowledge about stormwater management, assets management, partnering, waste management, caring for the environment.
- Increased confidence in communicating with other professional people and elected councillors.
- Making new friends and meeting old ones
- Exploration of new places

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Conference 2003

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# R E P O R T

**HOBART - TASMANIA  
INTERNATIONAL PUBLIC WORKS CONFERENCE  
24th - 28th AUGUST 2003**

*Back to  
engineering*

**Jadranka Kiurski  
City of Cockburn, WA**

**HOBART INTERNATIONAL  
PUBLIC WORKS CONFERENCE  
T A S M A N I A  
24-28 AUGUST 2003**

**INTRODUCTION**

I was awarded a Fellowship from the Institute of Public Works Engineering Australia to attend the Hobart International Public Works Conference in Tasmania. The following report is presented to fulfill the condition as required under the Fellowship.

**OVERVIEW**

This year the National Public Works Engineering Conference was held in Hobart Tasmania.

The Hobart conference theme “Back to Engineering” was chosen to promote the importance of public works engineering to the community.

The Conference Organising Committee chose a technical program that focuses on contemporary issues in public works engineering designed to inform and to challenge our thinking.

A wide range of topics were presented and an exhibition of plant, products and services was also held in conjunction with the Conference.

## PLENARY SESSIONS

The first session of the conference was the Plenary Session which emphasised the conference theme and set the scene for what was to follow

**“Back to Public Works Engineering Through Leadership”**, presented by Mark McCain was the keynote address for the first day.

The session discussed the issue that public works infrastructure is a world of challenges dealing with the concepts of economics, organizational values, and human behaviour. Each organization must strive to search for alternatives, meeting institutional goals for the effective and efficient delivery of services. Such basic concepts as service to others, leadership, overcoming challenges confronting the industry, meeting the demands for increased service at the lowest tax rates and reflecting the highest level of professionalism possible were examined.

The leadership issues addressed include:

- Developing the engineers of tomorrow
- Nurturing the professional growth of the existing work force.
- Identification and implementation of institutional research and development
- Creating a customer base of local government support for future capital infrastructure expansion projects.
- Assisting the national leadership in defining, presenting and implementing public work infrastructure related issues.
- Establishing a global vision for the future for community, industry and the nation.

**“Changes We Face Today”** presented by Bob Seiffert was the first plenary section on the second day.

The session provided an overview of the initiatives that have been a part of the local government landscape in the recent past; moreover, outlining the more significant techniques meeting the challenges of the next decade or so.

“Change has always existed in local government. There is nothing we can do to stop it, nor should we; therefore, we need to embrace change while striving to maintain an acceptable work life balance.”

This section highlighted leadership, vision and teamwork as the personal qualities essential to coping with change if local governments are to continue to improve performance.

### **“Community Based Outcomes from Public Private Partnership”**

presented by Peter Wight was the second keynote address on the second conference’s day.

This section outlined new funding options for delivering community-based property, leisure and social infrastructure outcomes through Public Private Partnerships.

Comment was made on the need for local government to set down clear guidelines to ensure Public Private Partnerships are delivered with precision and probity.

### **“Meeting the Public Works Challenges of September 11, 2001”**

presented by Mark McCain was first afternoon plenary section on third day. The presentation reflected on events in the City of New York on September 11, 2001, which was the worst building disaster and highest loss of life from any single building event in the history of the United States and the world. Mr Mc Cain focused on the incident, the response, recovery and the emergency leadership and management lessons learned through:

- Command and leadership structures used to manage the incident,
- Expectations of the public works/utility industry in meeting unknown challenges during the crisis and consequent phases of the incident,
- Managing the disposal of 1.7 million tons of debris from a 22 acre site,
- Defining the economic impact upon the industry and the nation,

- Dealing with the psychological aspects of serving the public during and after an incident dealing with over two-thousand nine-hundred deaths,
- Operating with the world's largest crime scene, and
- Other valuable lessons that will help public works prepare for unknown terrorism events through basic emergency management practice.

**“The Role of the Public Works Professional in Australia’s Emergency Management”** presented by David Templeman was the last plenary section and addressed the emergency management arrangement in Australia, covering the role of the Commonwealth, the States/Territories and local government.

Key issues in emergency management include: dealing with exotic animal disease, nuclear waste transport, transport safety, protection of critical infrastructure, development of mitigation strategies, information management strategies, education and training and Commonwealth/state roles.

## **REVIEW PANEL & DELEGATE’S FORUM**

The session took the form of an interview facilitated by Peter Drummy and Neville McPherson several keynote speakers discussed the importance of asset management and whether asset management plans be compulsory.

The panel debates discussing future direction in asset management provided many collective ideas and arguments particularly on the topic of who should be running asset management for an organisation

## **TECHNICAL PROGRAM**

The following is a brief summary of the technical presentations that I attended at the conference:

### **Innovations in Stormwater**

#### **Urban Stormwater – Managing a Resource Replaces Controlling Problem**

*Peter Wood City of Burnside South Australia*

Mr Wood's address detailed how the City of Burnside has dealt with the large increase in stormwater runoff resulting from urbanisation.

The City of Burnside developed a Sustainability Action Plan that contains a comprehensive suite of principles and policies designed to utilise stormwater, groundwater and wastewater resources and reduce dependence on external water sources.

The objectives of the policy are to:

- Retain and/or restore open watercourses,
- Maintain and/or restore the environmental values associated with open watercourses,
- Rehabilitate piped watercourse as natural creeks with increased environmental values.

Stormwater management examples such as: combined underground drains and watercourse, sustainable gardens, flow separation devices, and bioretention basins were presented as successful projects in the City of Burnside.

## Re-Use of Stormwater & Wastewater in the Urban Environment

*Colin Pitman, City of Salisbury, South Australia*

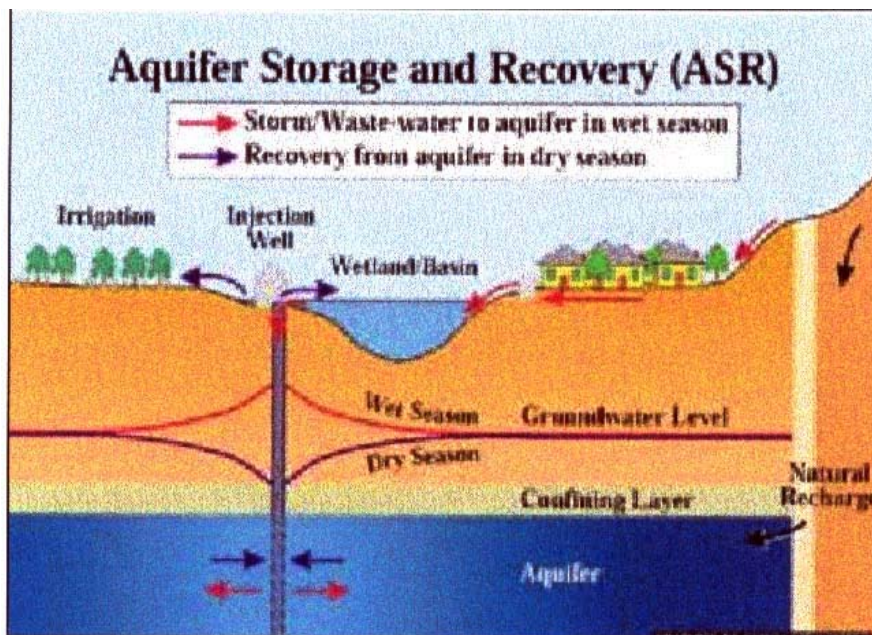
In this session Colin described how the City of Salisbury has been proactive in the storage, cleaning and re-use of stormwater and sewerage water.

This involved the collection and cleaning of stormwater through a series of thirty-two wetlands, the storage of stormwater in natural aquifers, and its subsequent supply to key consumers throughout the City.

The Parafield Stormwater Harvesting Facility is the latest wetland project to ‘come on-stream’ in Salisbury, to the benefit of local industry, the community and environment.

As the first project of its kind in the world, it is a showcase development in converting stormwater from an urban nuisance and pollutant threat into a valuable resource for industry and community.

Established on the eastern edge of Parafield Airport the project diverts stormwater from the local catchment into a series of uniquely designed capture, holding and cleansing basins. Water flows continuously through a densely -planted reed bed, where it is biologically filtered to remove almost 90 per cent of nutrient and pollutant loads before being supplied directly to local industry.



## **Mosman Bay Gross Pollutant Trap Trial**

*Martyn Glover Town of Mosman Park, Western Australia*

In 2001, the Town of Mosman Park, in partnership with the City of Canning, was the successful recipient of a Federal Natural Heritage Trust grant to conduct a trial of Chamber Pollutant Traps feeding into the Swan and Canning Rivers.

Mr Glover demonstrated how the trial has been designed, the result of the trial and proposed future trials including the impact of road sweeping and “at-source” treatment.

The system includes a standard Mosman Park trapped gully / soakwell as the primary chamber and provision of geotextile socks on all of the downstream outlets which ensured an accurate measurement of all non-solution pollutants passing through the system.

## **Water Sensitive Urban Design**

### **The Evolution of Stormwater Management – a Case Study**

*James Rennie Blacktown City Council New South Wales*

The section examined how community expectations and practitioner knowledge have altered water cycle management in the Blacktown Local Government Area. From this review it is clear that water management has almost gone full circle, with many components of “Water Sensitive Urban Design” not too far removed from the practices of early settlers of Sydney. These components include a decentralised water supply, swales for conveyance, maintaining natural channels and an understanding of the effects of polluting water.

Blacktown stormwater managers face a new challenge, a total rethink on how water is dealt with, a move away from traditional rapid conveyance of water and reliance on a reticulated supply.

Moreover “Water Sensitive Urban Design” has moved the focus onto designing living spaces around water management, treating water as a resource not a waste product.

## **The Practical Application of Water Sensitive Urban Design in Residential Subdivision**

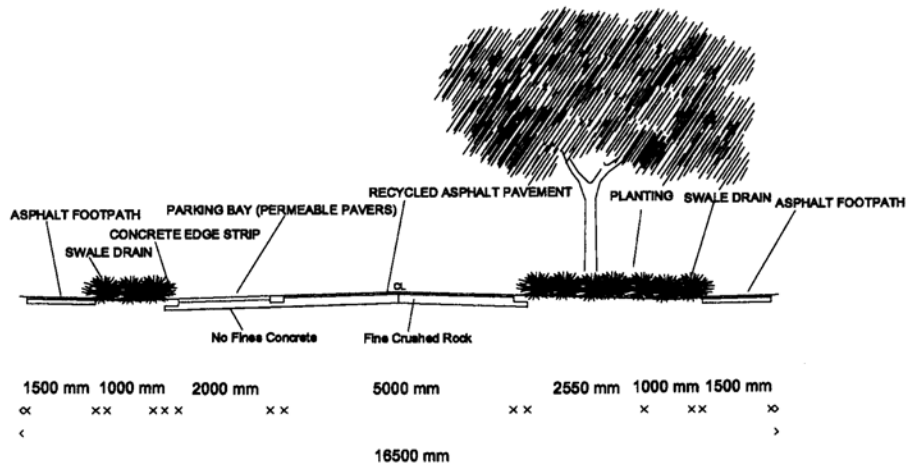
*Matthew Hall – Nillumbik Shire Council Victoria*

Mr Hall presented how a small residential development (2.41ha) in the Shire of Nillumbik, 25 km north east of the Melbourne Central Business District, was designed and constructed.

The project, Henry Arthur Estate, was managed and designed by an in-house team. The project incorporated best practice in environmental management, including Water Sensitive Urban Design practice; the use of stormwater quality protection methods and recycled materials in construction works.

The Henry Arthur Estate is considered to have achieved the environmental objectives set out for the project, and provides a practical ‘model’ for residential development using best practice in environmental management.





**Figure 2: Typical Road Cross-Section**

## Linking our Ground Water to Water Sensitive Design

*Michel Foley and Cr David Fardig – City of Swan, Western Australia*

The paper describes that Water Sensitive Urban Design had its beginnings in Western Australia when the Department of Planning and Urban Development, the Water Authority of Western Australia and the Environmental Protection Authority commissioned the preparation of guidelines titled “Water Sensitive Urban (Residential) Design for the Perth Metropolitan Region.

The guidelines describe planning and management practices designed to achieve water sensitive objectives and outline the planning process required to achieve those objectives.

The guidelines were designed to be used by planning and water resource management agencies, developers and their consultants and local government.

The speakers described how groundwater and water sensitive urban design are important issues for all people living in Perth. Water Sensitive Urban Design is easy to achieve, however we need to put in place more emphasis on water quality because any pollution of stormwater will eventually pollute groundwater source.

## **Water Supply**

### **Water – Towards a More Sustainable**

#### **Use of our Drinking Water Supplies**

*Petar Dennis – Hunter Water, New South Wales*

This afternoon section paper presented a broad range of issues related to the sustainable use of our water supplies. Some of the key topics covered include:

- Sustainable water use – what does it mean?
- Do we place sufficient value on our water supplies? To what extent will water limit population growth in Australia?
- The impact of price on driving water recycling initiatives.
- The need to take a holistic approach to assessing the feasibility of particular water projects.
- A review of some of the key focus areas that will be important in sustainable using our water supplies. These include desalination to meet peak demands, demand management through water saving devices and use of recycled water to substitute potable water demands.

### **Novel approaches in the Development of a Proactive Water Main Replacement Schedule**

*Petras Silinis – University of Newcastle New South Wales*

This paper introduced some novel tools which can give significant insight into the current and potential future state of the main network. A special disaggregation is employed to determine regions across the network, which contains environments that have a deleterious effect upon cast-iron mains. A temporal stratification can ascertain the vintage of pipe in each region most susceptible to these aggressive environmental factors.

These tools can be employed using asset and historical failure data, which is routinely collected by water authorities. This can assist asset managers in selecting and prioritising mains for replacement with potential for substantial cost savings.

## **Risk Management**

### **Methods of quantifying Risk on LG Projects**

***Robert MacDonald – Robert MacDonald & Associates, New South Wales***

This was the theme for the Tuesday morning session where Robert presented methods of quantifying risk in Local Government Projects.

The paper looked at the various ways of calculation of risk. This can range from a simple allocation of contingency to the total project, which may be a suitable method when a project is in a Strategic stage.

As a project progresses to a concept or detailed design, then it is reasonable to undertake a detailed risk analysis. This can be done by nomination of varying contingencies for different components of the project.

Robert presented varying figures at different stages of an actual road project, using different methods of quantifying risk.

### **Applying Risk Management Principles to Asset Management**

***Ian Mann – Knox City Council, Victoria***

This section provided an overview of Ian's experiences and information gathered during his participation in 2002 International Study Tour to Canada, United States of America and England to study "Managing Risk whilst Managing Assets".

He presented a review of how risk was managed across a representative group of Councils in three countries. Although they had varying qualities of asset management plans in place, they had a strong focus on risk management in the provision of road related services to their communities.

During his presentation, Ian identified the number of key observations emanating from the study tour, which could be applied in the Australian context.

Some of the key observations are:

- Professional officer must be kept up-to-date with new technology, maintenance practices, safety standards, driver behaviour standards, new road rules and other intelligence, which relates to road safety and use that knowledge to understand; address safety issues in the field.
- Council must have a system in place to collect and disseminate key information across the organisation to all relevant staff within the organisation to ensure “prior knowledge” is used to the best effect.
- Council must have in place comprehensive information management system for risk management purpose.

### **Contractor Prequalification – A Risk Management Tool**

*John Stewart – Civil Contractors Federation, Victoria*

This presentation visited the issues of contractor prequalification and provided an insight into mechanisms often used in the industry, their effectiveness and applicability.

The presentation also introduced the widely accepted Civil Contractor Prequalification Program. This program has been in place for three years and has seen strong growth and acceptance both by contractors and client groups in Local government, State Road Authorities and Water, Power and Irrigation infrastructure providers. The program requires contractors to develop and maintain third party certified management systems addressing Occupational Health and Safety, Environmental and Quality Management issues. Client groups are then better able to manage risks associated with contractor selection.

## **Traffic & Road Safety**

### **The Road Safety Risk Manager – Maximising the Value of Road Safety Engineering**

***Rob McInerney – ARRB Transport Research, Victoria***

The paper describes how the “Road Safety Risk Manager”, developed by ARRB Transport Research in association with Austroads, is providing authorities with a powerful tool to manage, prioritise and track the status of road safety issues on their networks.

Moreover, the Road Safety Risk Manager provides a consistent, well documented approach to assessing and prioritising road safety hazards and treatments.

Based on 5 years extensive research and development, the system is user-friendly and suitable for use by auditors, investigators, project managers and asset owners.

### **Federal Black Spot Funding – Making Your Council Submission a Winner**

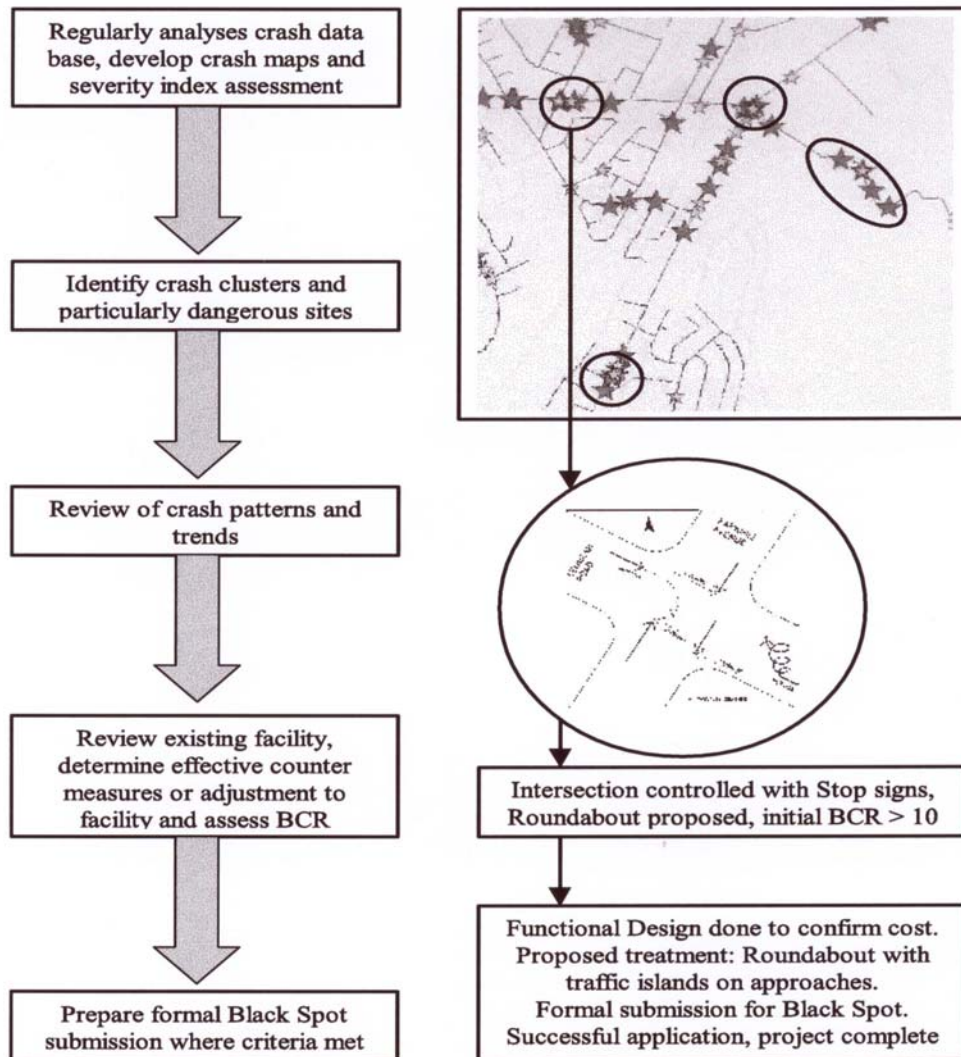
***John Hely – City of Campbelltown, New South Wales***

Mr Hely presented how, as the IPWEA representative of the New South Wales Federal Black Spot Consultative Panel, he finds that some Councils take full advantage of this funding, but there are many Councils both urban and rural that are missing out. This is often due to inadequate assessment, incomplete data and non-complying or ineligible proposals.

Key issues were presented including the eligibility criteria, project evaluation, the benefit/cost ratio for funding allocation and contacts for assistance.

The presentation included examples of the accident review and assessment process to assist councils in submitting projects for Federal funding.

## Crash Evaluation and Counter Measure Development Process



## Local Government Road Safety Audit Strategy & Policy Statement

*Brad Harris - City of Melville, Western Australia*

Brad addressed the key elements of the policy and discussed the implementation of Road Safety auditing at the Local Government level. This included assistance in the promotion of road safety and the benefits of road safety auditing.

The Local Government Road Safety Audit Policy's intent is to set down criteria for which a road safety audit will be undertaken. This falls into five distinct areas:

- New road project
- Existing intersection or road sections
- Subdivisions
- Developments
- Funding Application

### **Public Works in Tourism**

#### **The Tahune Air Walk**

*Shane Abel – Thompson & Brett Pty Ltd, Tasmania*

Shane introduced the Tahune Air Walk, one of Tasmania's major tourism attractions, which is located 34 km from Geeveston at the Tahune Forest reserve on the banks of the Huon River. The air walk is a pivotal attraction to Forestry Tasmania's Tahune Reserve interpretation and recreational area. The elevated walkway was constructed in pristine rainforest with minimal environmental impact and provides patrons with a 528-metre long 20-metre high tree top walk. The structure challenges the visitor as they ascend to heights in excess of 20 metres culminating in the breathtaking views from the cantilever, some 48 metres above the Huon River.

The Air Walk and system of walkways allows tourists to experience the tranquillity and splendour of the forest without endangering the vegetation. The height and movement of the structure provides users with the sensation of being in the trees.

The project was undertaken in 18 months, from concept through to completion, and exceeded the expectations of all involved.

## **The Sullivans Cove Tramway**

***Leyon Parker – Hobart City Council, Tasmania***

This section outlined a proposal by the Hobart City Council to construct a tourist tramway along Hobart's Sullivan's Cove waterfront.

Hobart has a proud history of tram travel, being the site of the Southern Hemisphere's first electric tramway system started in 1893. The Council has recovered five tram bodies in very poor condition and has begun a process of extensive restoration so that these trams will run again giving Tasmanians and visitors to the island a taste of early 20<sup>th</sup> Century tram travel.

The proposed tramway is an excellent example of how Local Government can be a major player in developing tourist infrastructure leading to growth in economic development in their local area.

The section included a number of photographs that give the delegates a feel for what the project is about.



**Very Early Hobart Tram circa 1900**

**Hobart trams had personality. We held affection for them. Our double-deckers were the pride of the City, and a great tourist asset. Over the recent years, stage by stage, trolley and fuel buses have been superseding the trams, and in 1960 we say good-bye to Hobart's Electric Tramways. We also say good-bye to an industry of which we are tremendously proud. Nearly all these trams were built by expert craftsmen in the Hobart tram Workshops – members of the Hobart City Council still feel a possessive affection for the trams.**

## **Projects & Management**

### **Georgetown an Innovative Management Arrangement**

***Shane Gregory – Civil Construction Corporation***

The section described how the George Town Council and Tasmania's Civil Construction Corporation entered into a unique resource sharing and labour management agreement.

The agreement commenced in the 1997/1998 financial year and was initially based on a cost-plus fee structure.

Under the arrangement Civil Construction Corporation provides the following:

- An experienced supervisor for management of Council's workforce
- Supplementary labour, through both CCC's workforce and casual labour contracts operated by CCC
- Payroll services for council's external workforce
- Integrated Management Systems, including work procedures that address, quality, safety and environmental standards
- Technical advice – Engineering and IT services
- Centralised Purchasing systems – CCC buying power
- Hire of plant and equipment at cost
- A 50% share of leasing costs for Council's depot
- A Maintenance management System with online access for Council Staff to daily costing information
- Asset Management services including condition rating and predictive modelling.

Over the six years that the arrangement has been in place a number of benefits have been realised.

## **Operating a High Pressure Gas Pipeline in Tasmania**

***Greg Donald – TAMS, Tasmania***

This presentation provided an overview of some of the aspects of operating a high pressure natural gas pipeline in the Tasmanian environment. It covered issues such as the initial planning of the project and details of the construction phase.

The process of ensuring the integrity of the pipe, including maintenance requirements, risk assessment, third party awareness and new to the Australian pipeline industry is the Pipeline Planning Corridor developed and introduced by Tasmanian State Government.

Planning for the construction of the Tasmanian Natural Gas Pipeline began with a feasibility study in 1998. By the end of 2001 approval of the three Governments, Federal and State of Tasmania and Victoria was obtained and in January 2002 onshore construction commenced.

## **Managing Non-Feasance**

### **A Back to Basics Approach to Highway Asset Georgetown an Innovative Management Arrangement**

***Paul Hiller – TRL Ltd, New South Wales***

Mr Hiller explained how the historical basic underlying principles of highway asset management are still valid today, despite the many advances/changes in material, equipment, methods of procurement, public expectation, and legislation. He explained how modern technology has been used to assist the highway management engineers in their role, providing a number of short case studies. These will range from relatively low-tech, bespoke solutions (using technology such as Palm Pilots, IPAC units and Microsoft Access databases) through to the implementation and use of off-the-shelf commercial packages (such as the AUS-SPEC series)

## **An Integrated Approach to Road System Management as a Response to Nonfeasance**

*S Carmichael, P Hawley and A Grigg – Consultants, New South Wales*

This address recognised that nonfeasance is going to continue to be a challenge to all local governments. The question is, “What combination of management initiatives provide a cost-effective response to nonfeasance?”

The authors argued that most currently proposed management approaches are incomplete in that they lack community involvement, understanding, and effective ownership. A total management approach needs to be successful, affordable, and accepted by the community.

This paper presented a project plan, provided working examples of key issues and offered a project template that may have universal application for regional councils.

## **Managing Non Feasance and Asset Management**

*Peter Tood – Aust Roads & DIER, Tasmania*

This last technical section paper presented a summary of current research being undertaken by Austroads in road network asset management. The research is designed to provide managers and practitioners at all levels with strategies, tools and information to better manage road networks noting that Road Asset Management is “a comprehensive and structured approach to the delivery of community benefits through management of road networks”.

This paper discussed the benefit of an integrated asset management approach in managing risk as part of the responsible management of road networks.

## CONCLUSIONS

During the three days of the conference a wide range of papers were attended; however papers considered of most importance and interest to public works engineers in Western Australia are:

- Re-Use of Stormwater & Wastewater in the Urban Environment Colin Pitman
- An innovative Management Arrangement George Town
- The Road Safety Risk Manager-Maximising The Value of Road Safety Engineering Rob McNerny
- Managing Non Feasance and Asset Management Peter Tood

All of the above papers promoted the importance of public works engineering to the community.

Colin Pitman presented the Parafield Stormwater Harvesting Facility as an outstanding and innovative example of best practice in urban stormwater management involving Local Government, industry and community. It has ensured that more than a billion litres of water previously being pumped annually from the River Murray to service local industry will stay in the river to help enhance flow and arrest rising salinity.

Ian Mann shared with us his experience and information gathered during his participation in the 2002 International Study Tour to Canada. He presented a number of key learnings from the study tour which can be applied in the Australian context.

Rob McNerny presented a newly developed road program that maximises road safety benefits, achieves a safe road network and limits the negative impact of road trauma.

Peter Tood presented an innovative project, which has a significant dollar saving to the community.

Finally, at the end of my report I would like thank all the Trustees, Fellows and colleagues for enabling my attendance at the Conference. All sections attended were of great value to my professional development.

**HOBART INTERNATIONAL  
PUBLIC WORKS CONFERENCE  
TASMANIA  
26-30 AUGUST 2003**

**INTRODUCTION**

In July 2003 I was successful in receiving a Fellowship from the IPWEA Foundation towards the cost of attendance at the Hobart International Public Works Conference. I present the following report to fulfil the condition as required for the Fellowship.

**OVERVIEW**

The National Public Works Engineering Conference in Hobart promised to be a most informative event with an impressive mix of leading practitioners, elected members and overseas visitors making the journey. The conference organising committee under the chairmanship of Ron Sanderson had put together an exiting technical program, focussing on contemporary issues in public works engineering. This was mixed with what turned out as an exciting and enjoyable social program with many interstate and overseas partners also in attendance.

The conference theme “Back to Engineering” recognises the increasing public demand for leadership and the development of better services from public works engineers. With important events such as the National Conference it is assuring that the institute committees continue to raise the professional profile of public works engineers and provide opportunities to increase our knowledge and widen our networks.

They’re were many highlights at the National Conference but the following stood apart as sessions that should not have been missed.

Of particular note were the keynote addresses from industry leaders around the world and the entertainment and thought provoking opportunities they provided for the audiences. The panel debate discussing “Future Directions in Asset Management” provided many collective ideas and arguments particularly on the topic of who should be running asset management for an organisation. With the timely use of examples such as the recent failed airlines maintenance disaster surely prove that there is much more to the management of assets than the accrued financial sums.

Another highlight was the well presented trade exhibition and many opportunities were provided to gain information on the latest technological advances and products in the market place. It is always of great benefit to visit the exhibitions as it presents as a most relaxing way to gain product information away from the pressures of the normal work environment.

## **PLENARY SESSIONS**

A number of innovative sessions were featured in the program over the duration of the conference.

The first session of the conference was the welcome by the Conference Chairman Ron Sanderson, IPWEA President Ross Moody and the official opening by the Governor of Tasmania, Sir Guy Green.

This was followed by keynote addresses from Mark McCain and Chris Champion.

Mark McCain a principle consultant from Public Works Emergency Management Services, USA provided an entertaining address titled “Back to Public Works Engineering Through Leadership”.

Mark showed an underlying passion for the public works engineering industry and the struggles and pitfalls for those practising in America. In what was ultimately to be a constant concern throughout the conference was the problem with a lack of young engineers and young people generally within the industry. Mark suggested that the public works engineering profession should be actively marketed through universities to show graduates the opportunities and diversity that is available within the public arena.

The address by Chris Champion the National IPWEA CEO, focussed on the range of topics available through the conference program with about 90 papers in all to be presented. Chris also provided information on new services available to members and in particular the Ask your Mates website had proved popular. The site has provided an opportunity for members to further gain information on any issue or topic with the possibility of tapping into many members Australia wide.

### **Review Panel and Delegates Forum**

#### **‘Future Directions in Asset Management: Should Asset Management Plans be Compulsory’,**

This session took the form of an informative debate over the issue with an invited panel of David Adamson, John Howard, Chris Champion presenting their thoughts on the issue.

It was explained that asset management plans are required to balance service levels and costs with the shift in focus to be from long term and not yearly.

There is a funding shortfall to achieve these service levels that must be identified and be the foundation for long term financial plans. This was further ratified with the comment that we should look after what we have and not leave liability for others.

There was agreement that a standard approach was needed as it was debated that all sectors are doing asset management differently and the need for a national approach was questioned. It was suggested that all Councils should unite to fund a national asset management committee to further the issue. This resulted in the final challenge to all local government authorities – ‘What are the Asset Management Policies of your Council?’

## **TECHNICAL PROGRAM**

The following is a brief summary of the technical presentations that I attended at the conference:

### **Innovations in Stormwater**

#### **Urban Stormwater – Managing a Resource replaces Controlling a Problem**

*Peter Wood, City of Burnside, South Australia*

Peter's address detailed that local government municipalities have a responsibility to efficiently manage stormwater and provide for cost-effective environmentally sustainable solutions.

The City of Burnside has embarked on a course of ensuring that valuable watercourses are retained and water sensitive design principles are adhered to. They have implemented a policy that states that natural watercourses must be retained and restored as part of any infill urban development. Other commonsense approaches have been taken including the installation of permeable paving and litter baskets to manholes and gully grates.

A quote by Peter that “ no experience is ever a bad example “ gives comfort to those taking the risk to provide for alternative solutions.

#### **Re-use of Stormwater and Wastewater in the Urban Environment**

*Colin Pitman, Director of Contract Management, City of Salisbury, South Australia*

In this session Colin described how the City had been proactive in the storage. Of interest was the storage of stormwater in natural aquifers after collection and cleaning through the use of constructed wetlands. This has provided a ready medium for the retrieval of stormwater through bores and eventual reuse in high water use industries such as the motor industry, nurseries and fruit and vegetable growers.

The cost of producing the water is one third that of scheme supplies and is sold to clients at a saving of approximately 50% of the scheme cost.

Another interesting aspect is that the Council entered into joint ventures with a number of private sector organisations , where they share the development cost and become the recipients of the reclaimed stormwater.

### **Service Delivery**

#### **Logan Works – Transforming Roads & Drainage Service Delivery.**

***Peter Way, Director City Works, Logan City Council, Queensland and Anastasia Hildred, Director Morrison Low Consultants, New South Wales..***

The presentation described the process by Logan City Council to address issues such as decreasing workloads, increasing resource costs and the desire to maintain a balance of day labour and contracts to complete municipal works.

This resulted in a review of current operations and the recommendation of a course of action for the future. The option chosen was to retain the in-house team but proactively enhance its performance in all key result areas. The improvement in the capability of the team was made possible through the use of consultants to work with in-house teams to manage the change on a daily basis. The result of the process was for a stronger focus on defined service agreements, improved costing and reporting systems and a multi-skilled and motivated workforce.

### **Water Sensitive Urban Design**

#### **The Evolution of Stormwater Management – A Case Study**

***James Rennie, Waterways Rehabilitation Officer, Blacktown City Council***

James’ session described the concerns of many local authorities in the use of ‘Magic Box’ end of pipe stormwater solutions that have been so actively marketed to local government engineers.

The paper discussed the traditional approaches to stormwater conveyance and the evolution of low flow channels providing for better amenity and appearance. This also includes the reconstruction of creeks for additional environmental outcomes and the focus of treating water as a resource and not a waste product.

James spoke of the change in management objectives that had allowed this to occur and the new challenges of integrating and designing living spaces around the management of stormwater to fully gain the benefits possible.

### **The Practical Application of Water Sensitive Urban Design in a 22 Lot Residential Subdivision**

*Mathew Hall, Nillumbik Shire Council, Victoria*

The presentation detailed the construction of a subdivision by the Council with design, project management and construction supervision undertaken by in-house staff. The design criteria for the site included the management of stormwater impacts on the receiving waters of the Diamond Creek located downstream. The project was also developed as a model subdivision to show others the outcomes that the Council was requiring.

The project was carried out considering the issues of public amenity and safety, site topography, stormwater quantity and quality management and treatment

### **Linking Our Groundwater to Water Sensitive Design**

*Michael Foley, Executive Manager Operational Services, City of Swan and Cr Tony Turner, City of Swan*

The paper describes the concerns that the City of Swan has as to the sustainability of new subdivisional development over groundwater resources. The groundwater is a major source of potable water for the residents of the wider Perth metropolitan region and also as to the remnant vegetation that exists within this area.

The importance of water sensitive design can not therefore be under estimated as a course to replenish the groundwater supplies in this area. A problem exists in the lack of baseline data on groundwater and the modelling of effects from urban development. Another concern expressed is that the pollution of stormwater will also have adverse effects on the groundwater and this also must be monitored.

The simplest way to ensure as much and as clean as possible water returns to the ground is to ensure that near predevelopment conditions exist after subdivision. This is best accomplished by ensuring rainfall infiltrates back to the ground as close to where it falls as possible.

## **ASSET MANAGEMENT 11**

### **Asset Management for Long Term Road Maintenance Contracts**

***Geoff Webb, G R Webb Consulting Pty Ltd, Tasmania***

The presentation by Geoff describes long term maintenance contracts and the opportunities that they have brought to organisations that are able to shape themselves into delivery of asset management services. The contracts that have been delivered in Tasmania are for terms of 10 years and require performance to be measured for the payment of the contract sums.

They require the contract organisation to provide the required level of service in the most cost effective manner and deliver agreed service levels to the road user. The successful delivery of the business requires the employ of professional personnel who have a mutual respect for the business and the goals to be achieved.

Geoff makes several quotes throughout his session to question the thinking of participants in the delivery of service. Such as ‘ we lead people and manage objects’ and where there’s a will there’s a way, where there is no will there’s no way ‘.

### **Sustainable Infrastructure Maintenance Service**

***Bruce Douglas, Director – Sustainable Infrastructure, Mornington Peninsula Shire Council, Victoria***

As the title suggests the paper outlines the process of the Council reviewing its service delivery and specification for the provision of physical infrastructure services.

In a process that has taken two years the Council awarded a package of contracts for a period of 10 years with a value of \$180 million.

The change in delivery from in-house was brought about initially by compulsory competitive tendering and the need to ensure service levels were not lowered with its introduction. The contracts enable risk sharing with the contractor and a proactive management of customer requests. This has ensured the gap between normal service delivery under CCT has been bridged. It also allows for the community to be engaged in the measurement of the contractors service delivery and the establishment of service levels by mutual agreement.

## **BEST PRACTICE IN ENVIRONMENTAL MANAGEMENT**

### **Building the Capacity of Local Government & Industry Professionals in Best Practice Urban Stormwater Management**

*Jacquie White, Project Manager MAV/SIAV Stormwater Capacity Building Program, Victoria*

Jacquie's role is part of the Municipal Association of Victoria strategic project to develop and implement a program to improve best practice environmental management of urban stormwater. This has seen the development of stormwater management plans, developed by Councils across the state and the knowledge building as a high priority to achieve these goals.

This is achieved through a Capacity Building Program ( CBP ) that targets the professional disciplines involved in stormwater management across both local government and the stormwater industry. The key stages of the CBP are to identify building requirements in stormwater best practice and provide for education and training in those areas. A key component of the program is to establish networks and partnerships across the state and the sharing of knowledge, experience and technical skills in the delivery of best practice stormwater management.

**“Restoring the Waters “, Sydney, New South Wales: A Sustainable Alternative to Concrete Stormwater Channels**

*Stephen Frost, Fairfield City Council, New South Wales*

The speaker describes the journey in creating one of the most innovative stormwater projects in Sydney that sees a 2.7km concrete lined channel returned to a naturally functioning stream. Restoring the stream does not imply that the stream has been transformed to its original pristine condition but more to a sustainable system in harmony with the urban environment.

The challenge with the project is to design a new kind of urban stream using natural elements, rather than restoring what was originally there. The stream had to serve the needs of both the community and the stormwater engineers and provide an aesthetic place that also provided the stormwater functioned as required.

Of particular note were the sources of funding available for such projects and the possibility of tapping into Government programs for labour resources in replanting of the stream beds and surrounds.

**Affordability of Best Practice Environmental Management**

*Dr Ian Woodward, Principle Environmental Scientist, Pitt & Sherry Consulting Engineers, Tasmania*

The speaker explains that the local authorities test criteria in practising environmental management is often guided more by price than by level of service to be provided. Councils can be criticised for requiring best practice when others are forced to pay but fail to support the concept when the ratepayer must wear the cost. The Council may be criticised for implementing a level of management purely to cover itself rather than actually gather any meaningful results.

It is fair to say that monitoring requirements for environmental reporting should be commensurate with the likely environmental impact of the activity and not the activity cost.

## **Practical Solutions**

### **A New Rainwater Utilisation System For Conservation of Water Resources**

***Ian Bryant, Rocla Water Quality, Sydney New South Wales***

The presentation concentrated on the problem of water shortage that is being felt Australia wide. Now more than ever there are increasing demands being placed on our water reservoirs due to increasing development as well as the now recognised requirement to allow for environmental flows in the rivers and creeks downstream of these reservoirs.

Rocla are marketing rainwater tanks that can utilise rainwater runoff from roofs as one tool in the creation of more sustainable developments in Australia. Therefore rainwater can now be seen as a resource and used to reduce our demand on the potable supply.

The tanks can be supplied in any size from under eave units to large below ground tanks that have little visual impact with an access chamber only visible. The tank size most suitable for urban areas is in the range 5,000 – 10,000 litres.

### **Hydrapave – An Ecological Paving Solution**

***Bill Maloukis, Marketing Manager, Boral Masonry Australia***

Boral are now marketing a permeable brick paver that allows stormwater to pass through the paver by means of small channels formed in the end of the pavers. The water then passes into a prepared subbase and is then detained, filter treated and dispersed, discharged or redirected to a storage system for later re-use.

The benefits of Hydrapave are the low construction costs with the flow on of stormwater control that reduces the need for piped drainage systems. Other added benefits are that the stormwater is treated and ready for reuse in a number of non-potable applications such as reticulation. The pavers are most suitable for use in carparks and longitudinal carways where reuse of water is most possible into landscaped areas.

## **Traffic and Road Safety 1**

### **Local Government Road Safety Audit Strategy & Policy Statement**

***Brad Harris, Civic Design Manager, City of Melville Western Australia***

Brad explained that road safety auditing has been undertaken within Australia for over ten years but to varying degrees in each state. The take up of audits has been slow considering that most local governments would have appropriately skilled staff who could complete the audits in-house.

The idea has been to develop a pro-forma Road Safety Audit Policy for Local Government that would make it easier for them to adopt a policy that is universal and promotes the use of auditing as a means of improving road safety.

It was further suggested that the policy should be a requirement of planning applications at subdivision planning stage and be an integral component of the planning process. The audit would also be required when designing new schools and for all subdivisions over 100 lots that front a distributor road.

The policy has been adopted by IPWEA and all members sent a copy. Members are therefore urged to read the policy and take necessary steps to implement as part of their Councils procedures.

## **Environment**

### **Eenie Creek Road Environmental Project**

***John Lee, Noosa Council, Queensland***

The paper provided an insight to the environmental concern that had been raised as to the construction of the Eenie Creek Road. The Council had to overcome much public and government debate as to the location of the road through significant environmental areas. The requirement for the road had been on the drawing board since 1974 and a long process had been undertaken.

The flora and fauna issues centred around the presence of mangrove swamplands and the presence of rare fauna such as frogs, fish and koalas.

### **Enviromark – A system for Identifying and Managing Significant Environments.**

*Alistair Clark, Greening Australia, Tasmania.*

Enviromark was presented as a system for identifying and managing significant environments. These features can be anything from threatened species to problem weed areas that require information to be communicated to ensure their effective management.

The system consists of a integrated set of field markers, field guides, standard specifications and a custom built mapping database. There are three different markers that cover areas such as rare species, weeds, native habitat and revegetation areas.

Being modular the system can be used either wholly or in parts, depending on the priorities and resources of the prospective user. The system can compliment existing asset management systems to add overall value or it can be used as a complete stand-alone system. The system is also most suitable to be added to mapping databases to generate schematic road maps.

### **Pavements & Roads**

#### **Automated Video Feature Recognition in Road Management**

*Shao NG, University of Tasmania, Tasmania*

The paper describes a low-cost image-based artificial intelligence system developed to facilitate the assessment of road infrastructure condition using videos reported by road patrol vehicles. The system uses GPS technology to provide real time solutions to the gaining of road information at any time.

The system would prove most useful in gathering road network information on the states highways and main roads but the application to local government roads may not be as convincing. The video images can be processed to identify features to the level of guide posts and line markings with the orientation of video cameras.

## **Projects and Management**

### **Public Works – A Geotechnical Engineering Perspective**

*Alaa Ahmed-Zeki, Coffee Geosciences, Tasmania*

The paper described the uncertainties in the industry regarding the specification of geotechnical works. This is due to the many natural variations in geologic conditions and poor construction methodology and control. It was explained that the risks in failure to recognise pre existing conditions are paramount and can lead to significant problems during construction with the likely delay to works and ensuing cost increases.

It was suggested that not enough was being done in regards to geological investigations and that they were commissioned at the whim of development personnel to meet requirements of authorities at the lowest cost. The problem was also apparent with the limited sampling often commissioned that sub-surface conditions were not being truly represented.

### **Conference Summary & Invite to Adelaide 2005**

The final session chaired by Chris Champion, reflected the feeling of the wider audience in that an excellent forum for the gaining and sharing of information had been completed. The challenge was to share the information gained with coworkers back at the workplace and invite as many as possible colleagues to the Adelaide conference in 2005.

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