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OF TRAFFIC PLANNING
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INCORPORATED

Committee Secretary
Senate Education, Employment and Workplace Relations Committees
PO Box 6100
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Canberra ACT 2600

SUBMISSION FOR THE SENATE ENQUIRY INTO THE SHORTAGE OF ENGINEERING AND RELATED EMPLOYMENT SKILLS

The Australian Institute of Traffic Planning and Management provides a central point of reference for practitioners in traffic and transport planning and management across Australia.

The AITPM network is extensive, with its underlying strength being its own membership. The Institute now has over 700 members and corporate members across Australia and New Zealand.

The Institute's mission is *"Growing Traffic Skills and Knowledge to Deliver Sustainable Transport".* The AITPM achieves this mission by running Technical Forums on a monthly basis in each state, a monthly National Newsletter and an annual National Conference.

Taking a longer term approach the AITPM in partnership with Main Roads Western Australian and the Institute of Public Works Engineering WA (IPWEA) recently conducted a Feasibility Study for the Development of a Traffic and Transport Qualification. This study concluded in early 2011 and found that such a course is required and should be targeted at the Vocational Educational and Training level (Diploma qualification). Such a course would be attractive to people within the existing traffic and transport industry who have no formal qualification and also to school leavers who could utilise the course as a gateway into the industry. This approach would provide a diversity of age groups to assist in addressing the skills crisis. A number of the units will be attractive as short course options, particularly for government organisations, which adds further value to the course. A copy of the report is attached to this submission.

Since completing the Feasibility Study, the AITPM has committed to developing the course and an Education Consultant is current working with AITPM to develop the high level course structure. We are aiming for the course to be accredited by mid 2012 and an Industry Reference Group has been established to achieve this aim. Individual modules will then be developed with the full course being operational by mid to late 2014. Individual units will be offered as they are developed/accredited, meaning that elements of the course will commence in mid to late 2013. The development of the course is fully funded by the Institute at this stage. Early discussions have been held with IPWEA in Western Australia and New South Wales with the view that these organisations could deliver the course on behalf of AITPM. This approach makes good use of an organisation that is already a Registered Training Organisation and provides an additional link to local government.

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The development of the above mentioned qualification stemmed from significant concerns from our members over a numbers of years regarding the large shortfall of professionals in the traffic and transport engineering fields.

The situation in Australia for Traffic and Transport Professionals is bleak and the nation has been in a skills crisis for these professions for at least the past two decades. Due to little activity at the State/Local Government level and within the private sector to address the situation, the crisis continues to deepen. The roots of the issue can be traced back to mid 1990s when the government and private sectors cut back significantly and in some cases totally from developing new staff. Currently, there are a number of positions within government, particularly in medium to high skilled areas that remain unfilled despite recruitment activities. Within some state government sectors detailed workforce planning has identified the key areas of critical need. The private sector is also experiencing issues attracting staff from a very small pool of professions. Within states such as Western Australia and Queensland the situation is more difficult due to the booming mining sector attracting a significant portion of university graduates and staff that have recently completed graduate training programs within government. The significantly higher salaries on offer in the mining industry are a key driver.

Due to the existing skills shortages a number of organisations are now employing staff with little or no traffic and transport skills, with the aim of building skills over a period of time. While this provides diversity in approach, to be successful the training must be a mix of structured and informal training to ensure that the required skill set is built. Due to the lack of existing qualification programs this approach is likely to be only partially successful. Further compounding the problem is the significant amount of professionals over the age of 60 that will be retiring in the next 5 years. This will have a flow on effect of limiting the amount of expertise available to training new professionals or those in the early stages of their career. The move by State Road and Transport Agencies to invest more in the planning and operation of the existing road and public transport networks will further compound the issues as more skilled professionals will be required.

Another key issue is the lack of pathways for school leavers into the traffic and transport profession. Most practitioners enter the profession after studying civil engineering at University or at Vocational Education and Training Institutions. These courses offer very little exposure to traffic and transport and many of these graduates do not enter the traffic and transport field until later in their careers.

The skills crisis in traffic and transport profession has a large impact on the development and delivery of large, medium and small sized infrastructure projects. All of these projects have traffic and transport components that require professional skills from inception through to delivery and also into the operation of the infrastructure. This whole of life requirement for traffic and transport professional skills creates a great risk for Australia at present and well into the future with the current lack of focus on skills development.

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At present AITPM does not see high level buy in within the Federal, State and Local government sector or the private sector. This is despite clear information being available outlining the existing situation and the worsening of the situation in the coming years. If the situation is not addressed we are likely to see a number of our existing medium to highly experienced professionals leave the traffic and transport industry through frustration and burnout. This will then have a flow on effect to the level of productivity of the national transport network and other areas such as road safety. This is a treatable situation and one that all organisations must work together to solve.

The AITPM would like to see a diverse response to the skills crisis at all levels of government and within the private sector. The AITPM sees the following areas of activity as key drivers to working towards addressing the skills crisis:

- The Federal Government developing a National Framework for workforce planning applicable to the engineering industry (the Main Roads Western Australia model would be a very good starting point)
- Detailed Workforce Planning looking at the existing situation plus the predicted situation over the next 10 years to identify critical skill areas;
- Linking of workforce planning requirements to funding allocations;
- The development of new training programs to address crisis areas that include young and mature age development staff;
- A commitment from Federal, State and Local Governments to take on development staff to address the needs identified in the workforce planning;
- The development of incentives to encourage the private sector to take on additional development staff;
- A commitment from the Federal government to work with organisations such as AITPM to assist in the detailed identification of the key areas of need and the ongoing development of the traffic and transport profession.

I would like to thank you in advance for taking the time to consider the submission from AITPM. If you would like any further information please make contact with our National Education and Skills Co-ordinator, Craig Wooldridge. Craig can be contacted on phone , mobile or email

Yours Sincerely

Peter Doupé
National President
Australian Institute of Traffic Planning and Management
2 February 2012

Traffic Management and Transport:Addressing the Skills Crisis

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A feasibility study into the viability of developing a Learning Pathway through VET into Higher Ed – will this address some of the issues being faced by the current skills shortage?

February 2011

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EXECUTIVE SUMMARY

A feasibility study was commissioned by the Transport and Traffic Management sector, including Main Roads WA, IPWEA (WA) and AITPM. The purpose of the study was to determine a way forward to address the current and impending Skills Shortage. The main focus of this study was to determine the current employment demographics and skills set requirements within the Public and Local Government Sector, with some consultation taking place with the Private sector.

The findings of this research confirmed that the impending Skills Shortage does in fact exist as a current threat to the sector, with the situation likely to become critical within 5 yrs as a significant number of key employees within MainRoads WA and to a lesser extent Local Government reaching retirement age or move out of the industry.

The average time taken to complete an Engineering Degree qualification is 4 years of full time study, and on completion of a Bachelor of Engineering graduates who take up positions within Traffic and Transport then commence a steep learning curve of on the jobtraining. Current Engineering qualifications on offer in WA have a heavy focus on Structural Engineering and Mining, with very few units targeting Traffic and Transport planning.

The current Vocational Education and Training pathway provides a steady flow of graduates into the sector, with majority number of students taking up a cadetship program with Main Roads. The course structure however does not have sufficient units (or modules) targeting Traffic and Transport, and as such graduates are also put through a fairly extensive Engineering Assistant program on commencement at Main Roads. This program is a non-accredited program that does not require the participant to demonstrate a particular level of competence throughout the program, and therefore it is difficult to measure the full success (or not) of the program.

Main Roads is also running a Traffic Engineering Associate Program for mature age staff (25 to 55 years of age) who do not have any formal engineering qualifications. This involves a structured three year rotation program in the traffic areas with targeted formal and informal training. Those participating in the program currently have indicated that whilst the program is robust, more could be done to make it more relevant to their role. On completion of the program there is currently no formal form of recognition for having completed the program, with indications from participants thatit would be beneficial to align the program with current competencies that provide credit towards a formal qualification at a higher

level – eg Advanced Diploma, thus creating a structured career pathway within the sector.

Whilst there is a wide and varying range of non-accredited training products on offer by various 'vendors' they are often only available to staff at certain times of the year, they are relatively expensive to attend, and there is little or no evidence of the training actually improving the quality of work output.

A review of the Higher Education sector (University level) revealed that there are a number of Engineering Degrees available across Australia which meet the professional standards required to become a member of Engineers Australia, however the course structure in many of the Universities does not have a strong focus on Traffic and Transport. The two strongest programs appear to be with Monash University in Victoria and the University of South Australia.

The findings of this research indicate there is a need to develop a structured career pathway through the VET sector which enables participants to work towards (and gain advanced standing) an Engineering degree. This will require further work to review in detail existing qualifications. A preliminary review has been undertaken to map current competencies to existing programs, however a more detailed review and mapping of the competencies required by industry would need to be undertaken at the micro level. Further it is recommended that the sector consider developing a marketing strategy to target high school students and mature age entrants by promoting career pathways and the benefits of working in the industry.

INTRODUCTION

This feasibility study into the Skills Shortage Crisis within the Transport and Traffic Management sector was commissioned by the Institute of Public Works and Engineering Australia (WA), Main Roads WA and the Australian Institute of Traffic Planning and Management.

The primary purpose of the study was to establish the need and level of support for the development of a clear career and training pathway from School through to Higher Education studies. A review of existing qualifications including accredited and non-accredited training was to be undertaken to evaluate and inform the need for development of a specific qualification structure for the sector; or to establish the suitability of any existing off-the-shelf qualifications.

RESEARCH METHODOLOGY

A desktop review of current and existing qualifications within Higher Ed and Vocational Education and Training (VET) sector was undertaken to determine the suitability of such existing programs and the current and future level of take up by staff within the sector. Non-accredited training was also taken into consideration, particularly in relation to "Vendor" based training. The review extended to assessing the availability of such training on demand and analysing the overall costs and benefits of such training.

Concurrent to the above desktop audit, a series of Training Needs Analyses were completed within Main Roads WA, and several Local Government Authorities within the metropolitan area surrounding Perth. The purpose of the Needs Analysis was twofold in that it was designed to not only establish the current gaps in training requirements, but also the level of enthusiasm and likely number of potential participants who would want to readily engage in studies into the future.

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STAKEHOLDER CONSULTATION

EBS conducted 17 separate interviews which comprised meetings with 26 individuals from within the sector. The majority of interviews were conducted co-jointly with managers and staff at Main Roads WA, with only three Local Government Authorities participating in the Needs Analysis – totaling 9 stakeholders from Local Govt.

Other consultation included discussions with the Manager of Roads and Traffic (VicRoads); VET in Schools Manager – Ms Louise Morrison; CCI Group Apprenticeship Training Manager – Mr John Rowe; ROADS – a not-for-profit body providing links for trainees in Road Construction and the State Training Council for Public Works and Local Government – Mr Kevin Peachy.The research also included broad discussions with other Authorities and stakeholders in the Eastern States, as well as inclusion of the needs of the private sector in WA.

A specific consultative forum was held at the Don Aitkin Centre (hosted by Main Roads WA). The forum boasted some 80 – 90 stakeholders who were invited to participate in and provide feedback on the outcomes of the study to that point. Members of the forum included the Executive Director of Integrated Transport Planning at the Department of Transport (WA); President AITPM (Australia); President AITPM (WA) and the A/Executive Director of Road Network Services at Main Roads Mr Felix Pascal.

The findings and outcomes of this research are presented in the following pages. Some specific details of the Needs Analyses are also included here, however where comments are likely to identify a particular participant or participants, the information provided by the collective has been summarised in more generic terms.

PERCEIVED CAUSE OF THE SKILLS SHORTAGE

A number of factors have converged in the past 4 – 5 years that are now impacting on the sector. These include:

- Competitive pay rates within the private sector – and more specifically the mining sector in WA and QLD. Graduate Engineers are 'head hunted' by the mining sector well before they graduate, with many undergraduate Engineers specifically tailoring their elective options for the mining sector.
- Inadequate investment in structured training by the sector over the past 10 years. Whilst some training has been provided, it has neither been specifically structured or designed to target growth in the sector, and has not been sufficient to increase the number of students/employees entering the sector.
- An aging workforce – particularly within the State Government (MRWA) has placed the sector in a position where up to 67% of the workforce will be eligible for retirement within the next 5 yrs. The average age of the MRWA workforce is 46, compared to an average age of 42 within Local Government (figures are approx. only).
- Natural Growth - Expansion of infrastructure within WA is a further consideration. As the road network is expanded to cater for the ever increasing population of WA, so too is the demand for the provision of Traffic and Transport services.
- New and emergent technologies – the sector is quickly embracing the use of new and emergent technologies to support traffic management and transport planning. This is a fledgling area with expertise requirements in the field of Electrical/Computing engineering.
- Perceived image of the sector is less than attractive to Gen Y, when compared with dynamic positions within the mining sector and private enterprise. Younger employees are less likely to promote their place of employment within the public sector than those employed within the private sector.

Employment Demographics

Main Roads WA

Main Roads Traffic Operations and Services department has a current staffing complement of 83 FTE, with an average age within the department of 46yrs. Approximately 67% of staff will be eligible for retirement (55+) within the next 5 years, of which the majority are employed at entry level to middle management (L3 – L6). Staff turnover is approximately 30% in areas such as Traffic Services, with most staff moving elsewhere within Main Roads. Positions in the upper levels of management are somewhat stable (in terms of turnover), which limits or reduces the opportunity for career advancement for those aspiring to develop their skills and knowledge, thus creating movement of staff into other areas within Main Roads. The lack of opportunity at the higher levels within the Traffic Operations and Services department in part has meant that any investment in career development is being lost to other areas, although not lost to Main Roads.

Local Government

Capturing data on employment statistics for Local Government has proved much harder. There are 31 Local Government Authorities (LGAs) noted within the metropolitan area of Perth with staffing numbers (total) of more than 100. Eight of these LGAs have staffing levels in excess of 500, with the City of Stirling being the largest LGA with approx. 884 staff in total. Of the 884 staff at the City of Stirling, the total number of employees dedicated to Road and Traffic Design is approximately 10 FTE, however with recent growth in the region this could be increased within a relatively short period of time.

Smaller LGAs may have only 1 person dedicated to Traffic Operations, and in many cases the duties required of a like position are shared across several positions.

Private Sector

The Private Sector is the other major employer in this area. Again capturing staffing details for this sector has proved quite difficult, however feedback from the forum indicated that the demand for staff remains as strong as ever. The Private Sector is more likely to employ Graduate Engineers into the role, however it is not clear as to whether there is a strong need for staff in the paraprofessional realm.

The majority of positions exist in the metropolitan area, with significantly smaller numbers in regional areas. This is primarily due to the complexities of

the metropolitan road network systems, and the higher concentration of LGAs and Private Consultants.

CURRENT CHALLENGES

The study highlighted the fact that the sector is facing some significant challenges right now, and these will be further compounded by the increasing demand for staff over the next 5 – 7 years. The main factors to be considered in the near future include:

- Managing the current workload of staff
  - The current workload in the Main Roads Traffic Operations and Services is considered excessive, particularly for higher level positions. This is having a negative impact on the desire of younger staff to work into higher level positions.
- Work-Life Balance
  - As per the point above, work-life balance is becoming increasingly important, particularly as the level of awareness is being raised about the impact of stress on health, family and future.
- Attraction and Retention of staff
  - It is becoming increasingly difficult to attract skilled or trained staff to the sector; particularly as there is a strong leaning towards working in the highly paid mining sector. Graduate Engineers are being sought by high profile organisations in their 3rd year, with offers of employment and attractive benefits on completion of a degree in Engineering, and likewise for students completing the Diploma of Civil Engineering at TAFE.
  - Employment in the public sector(MRWA & LGA) is perceived as not being an attractive place of employment, with lingering beliefs/labels such as 'public servant', 'council worker' 'lazy' etc being touted as reasons for people not wanting to be associated with the sector.
  - Traffic and Transport Management is competing with more attractive and "exciting" areas such a Project Management and construction of major infrastructure – where there is greater kudos to be gained from participation in a program.
- Lack of a structured Career Pathway
  - Whilst there are existing qualifications and technical training available to the sector, little has been done to review or determine a structured career pathway specifically targeted at Traffic and Transport.

    - The greatest area of need for training is in the Technical or Paraprofessional area where there is a greater number of staff required to carry out operations. There is a wide ranging need for a variety of skills and knowledge both within the technical arena and with soft skills such as developing interpersonal skills and leadership qualities.
- Knowledge transfer
    - Within MainRoads WA there is acknowledgement of the increased need to capture and retain the knowledge of existing staff. To this end, the Traffic Operations and Services department has created a position which primarily focuses on supporting staff development and the development of policy/guideline documents. Other areas within the sector (LGA and the Private Sector) do not have the capacity to address this need.

Future Challenges

The sector is faced with a number of future challenges that will require consideration today as the remedies identified in this space are seen to need longer term development and implementation. These include:

- Up-skilling of existing staff as qualified trainers and assessors
    - If a move is to be made on developing a specific qualification and or training regime for the sector, then there will be a need to ensure that suitably qualified staff have the additional competencies required to meet the Quality Assurance standards of the VET/Higher Ed sector.
    - Existing staff will need to have as a minimum the Certificate IV in Training and Assessment qualification to assist in on-the-job training and assessment.
    - By effectively utilising the skills and knowledge within the current workforce to provide carefully planned training both on and off the job there is a greater chance of some of the tacit knowledge being passed on to future employment generations.
- Relatively small size of potential training group size
    - The staffing numbers (and therefore training group size) in the sector are relatively small compared to other industry areas, particularly when the various specialised streams within the sector are considered. This may present a problem for some of the larger Registered Training Organisations (RTOs) who have traditionally provided training in Civil Engineering.

- RTOs will need to be flexible and innovative in their approach to training and assessment to meet the needs of the sector as it changes with the demands for staffing/skills.

- New and Emergent technologies
  - New technologies and increasingly becoming more and more integrated into our Traffic and Transport systems, such as Intelligent Transport Systems (ITS). These require specialist knowledge and skills, particularly in and around electrical and computer engineering. At present the sector is greatly lacking in any form of training other than vendor training.
- Linking training to career development/incentives
  - It was identified by staff that there is a preference for career development and advancement to be directly linked to successful completion of training. The greatest challenge here is to determine what can and can't be done within the current award structure. It has been perceived by staff that higher level positions do not necessarily go to those who have completed the necessary training requirements.
  - This is an area that needs greater review before any changes in the system can be made.
- Commitment to development staff by organisations
  - To ensure that any course that is developed is sustainable in the long term, clear commitment will be required by Main Roads and the larger Local Authorities. As a guide a course will require at least 12 students each year in an ongoing basis to ensure financial viability. Commitment from these organisations will be required in an ongoing basis to at least the minimum numbers.

Current Training Regime

Traditionally MainRoads WA has been seen as the main training ground for employees in the sector. However, in the last 10 – 15 years there has been a distinct lack of structured training offered by MRWA and other employer groups, and as a result significant ground has been lost in terms of specialised training provision. In saying that, it is important to recognise that there is support for students training in the field which may lead to employment. Various programs that have been traditionally developed to provide staff within the public sector in generalinclude:

MRWA

- Yr 11/12 Scholarship program
    - Supports students wanting to enter an Engineering degree
        - Paid work during semester breaks
- Cadetship Program
    - Full-time University
        - Paid work during semester breaks
- Graduate Program
    - B of Eng Grads
        - Low retention rate (need approx 50%) – lost to the Private Sector or Mining Industry
- Associate Engineer Program
    - Technical Engineers – Diploma of Civil Engineering
        - approx 80% retention rate – most move sideways within MRWA. However, the intake numbers are insufficient to meet the demands for development staff.
        - Training continues on-the-job for 36 months, however training, whilst structured does not translate into further advancement of qualifications, or recognition provided for higher level studies.

Local Govt WA

- Diploma of Civil Construction (Supervisor)
- Diploma of Civil Engineering
- Diploma of Public Works (IPWEA (WA))

Structure of Higher Ed Sector

The University sector provides higher education generally targeted at Associate Degree level through to PhD, with the majoring of education being provided between Degree and Masters level. The University sector is generally self-regulating in that it has the capacity to determine and endorse its qualification structure and content, within the parameters of the National Qualification Framework.

Traffic Operations and Transport Planning typically looks to Higher Education for qualified Engineers (Bachelor of (Civil) Engineering – 4 yrs), however it can also attracts students from Psychology (Road Safety), Computer Engineering (ITS); Business (Project Management) and other similar areas.

Engineers Australia Chartered Status

The Institution of Engineers Australia, now trading as Engineers Australia evaluates undergraduate engineering education programs conducted by Australian universities and accredits those that meet the academic requirements for Engineers Australia membership at the level of Professional Engineer. Universities are not obliged to submit programs for accreditation.

The degree title for all accredited programs is Bachelor of Engineering, and abbreviated as either BE or BEng. In some cases, a generic degree title only will appear on the degree testamur with the specialisation not shown. Engineers Australia also accredits a Master's degree only if it provides an articulation pathway through to a Professional Engineer qualification, and is thus designed to deliver graduates fit for commencement of practice as a Professional Engineer.

Chartered Status certifies that Engineers practice in a competent, independent and ethical manner; and indicates they are a leader in their field.

Chartered Status represents:

- The highest standards of professionalism
- Leadership
- Up-to-date expertise
- Quality and safety
- The ability to undertake independent practice.

Chartered Status is open to Members and Fellows of each occupational category, eg Professional Engineer – Chartered Professional Engineer (CPEng)

Current Higher Education Options

There is a number of relevant educational options for those studying as an Engineer. The programs vary from University to University and State to State. The following is a snapshot of some of the major University qualifications that are currently considered appropriate for employees within the Traffic and Transport sector:

Curtin University (WA)

Bachelor Engineering (Civil and Construction) – 4 yr degree

- Only 3 units specifically target Transport Engineering
- Primary focus of Core units is on Civil and Structural design and analysis

Masters of Engineering Management – additional 5th year

- Focus on Management with no units touching on Traffic or Transport planning

Murdoch University (WA)

Bachelor Engineering Technology (4 yr degree)

Masters Engineering (additional 5th yr)

Monash University (Vic)

Degree in Engineering, Science or Applied Science – 3 yr degree

Graduate Certificate in Transport and Traffic

- Full fee paying qualification – available for delivery off-campus

Graduate Diploma in Transport and Traffic

- Full fee paying qualification – available for delivery off-campus

Masters of Transport

- Full fee paying qualification – available for delivery off-campus

Masters of Traffic

- Full fee paying qualification – available for delivery off-campus

Monash by far, provides the most comprehensive qualifications in Traffic and Transport in Australia today. However being a full fee paying qualification the costs can be considered by some to be prohibitive with Grad Cert/Diploma each costing $8700 and a Masters costing $17500 in 2010.

Queensland University of Technology

Bachelor of Engineering (Civil) - 4 yr degree

Masters of Infrastructure Management

Some relevant Transport units on offer

Has a Road Safety Unit within School of Psychology

University of New England & University of Southern Queensland

Bachelor Engineering Technology

Share delivery of Road/Transport units

University of South Australia

Bachelor of Engineering (Civil &Transport)

5 Traffic and Transport units offered in year 3 & 4

The program is only offered on campus

Other Universities offering similar Engineering Degrees

Swanbourne University

Griffith University

Sydney University

Several others also available

For more details on these qualifications, including entry requirements, and in some instances unit content see the attached Appendix 1 Career Pathway Options.

Possible partnerships

Brief discussions have been held with Curtin University with a view to establishing a working partnership between IPWEA (and its partners) and the RTO delivering any VET qualification to establish any direct credits for participants wanting to progress their career to degree level of higher.

Curtin University also hosts Planning and Transport Research Centre (PATREC). PATREC's founding sponsors are Curtin University of Technology, Edith Cowan University, Murdoch University, the University of Western Australia, the Western Australian Department for Planning and Infrastructure and Main Roads WA.

PATREC's role is to build professional and academic capability and expand the number and quality of researchers in its specialist fields. PATREC brings together people with very strong national and international experience in research, industry and government, ensuring that its programs are highly

relevant to contemporary public policy, planning and business issues. Able to use resources from all four public universities in the State, PATREC can address a wide range of research issues.

Engagement with PATREC in the early stage of the project has not yet been established, however it is anticipated that contact will be established in the near future to discuss any involvement in the development of future training programs for the future.

Structure of the VET Sector

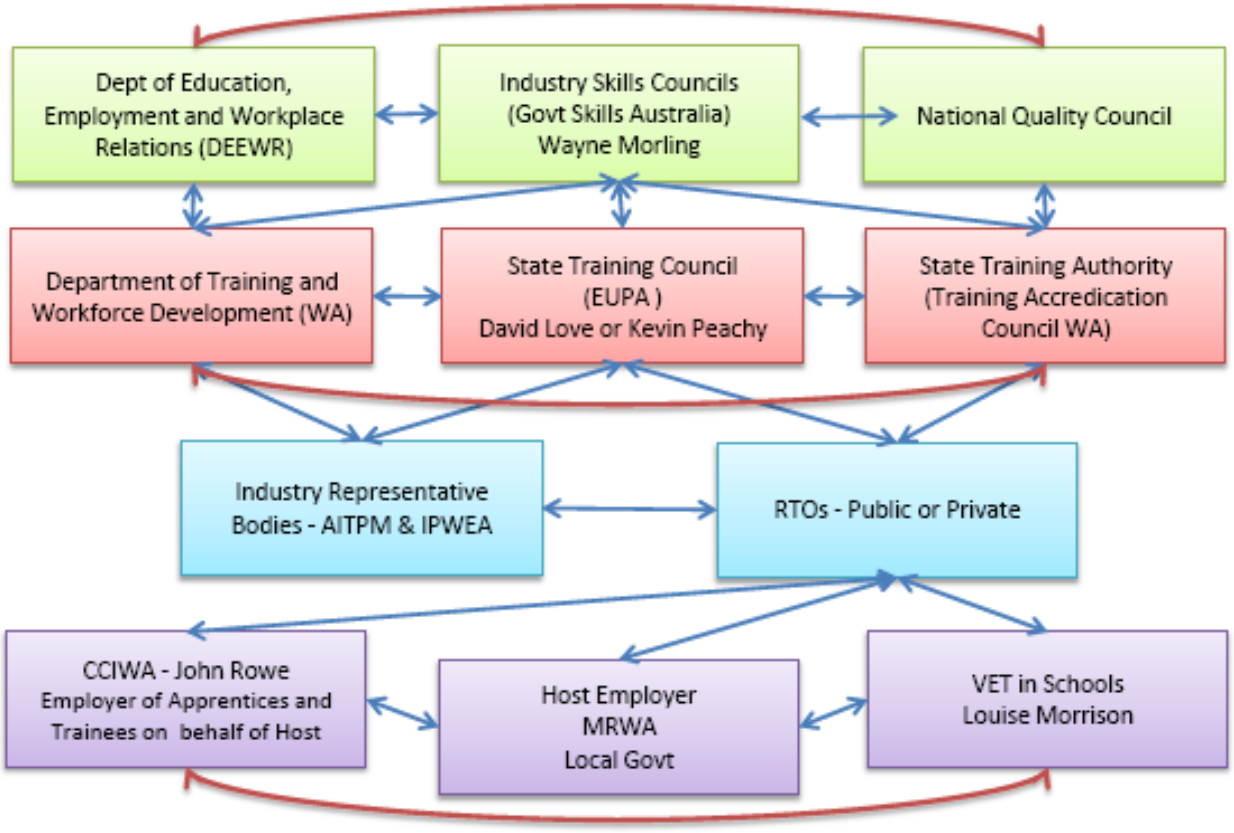
The Vocational Education and Training (VET) sector is complex in nature and is essentially governed by the National Quality Council of Australia. Within each State there is a State accreditation body which oversees the registration and compliance of Registered Training Organisations (RTOs) and any Nationally Accredited Training qualifications.

National qualifications have been developed by the various National Skills Councils, with qualification structures and competency outlines provided in a Nationally Endorsed Training Package.

At a state level Training Packages and the sector are overseen by the relevant State Training Council in conjunction with the State Registering body. In WA the Training Accreditation Council (TAC) is responsible for endorsing RTOs and Accrediting qualifications owned by private entities such as IPWEA (WA).

Who are the Stakeholders in Vocational Education and Training?

The following matrix shows the communications and inter-relationship of the various stakeholders operating within the VET sector to support Industry in Workforce Development.



Current VET Pathway Options

The VET sector boasts a wide range of qualification levels from Certificate I & II through to Vocational Graduate Diploma qualifications. The various qualifications available within an Industry Training Package provide the specific details around entry and exit points of the various qualifications as well as providing details on Unit Clusters which make up an Industry Recognised and Endorsed "Skills Set".

The pathway structure has specific distinguishing features of learning outcomes and competency characteristics at each level which guide both the development of the qualification and ultimately the level of assessment required to attain competence.

Details of the VET Pathway Options is included at Appendix 2.

Possible VET Pathway Options

The following qualifications have been provided as possible options or examples of Pathway Options that currently exist within National Training Packages.

VET in Schools – offered through an RTO of choice

Cert II in Civil Construction

Certificate II in Business

Certificate II in Government

Certificate II in Local Government

* These qualifications could be offered as a School Based Traineeship and would require students to complete approx. 680 hrs of paid work over an 18 month period during Yr 11 and Yr 12.

VET in Schools – Setting up a program

Discussions were held with the Manager of VET in Schools – Ms Louise Morrison – who advised that programs needed to be negotiated with schools early in the previous year to allow sufficient time for potential students to make informed choices about their future studies. Typically students commence their selection of subject for years 11 & 12 in Year 10, with programs being negotiated with RTOs and Schools by August/September.

The Department of Training and Workforce Development offer some public funding of VET in Schools, however there is a 'hard ceiling'on the amount of $s available to schools – and this may in fact be reduced into the future. However, School Based Traineeships are available to years 11 & 12, with students undertaking approx. 680 hours of paid employment (over approx. 18 months).

Any programs that are to be developed as a VET in Schools program should be marketed to attract students to the sector by offering career pathways into and through VET to University, promoting the security of tenure with a Public Sector role and work-life balance!

EXAMPLE QUALIFICATIONS THAT COULD BE OFFERED AS A TRAINEESHIP THROUGH AN RTO OF CHOICE

Cert III in Construction

Cert IV in Civil Construction Design

Diploma of Civil Construction Design

Diploma of Civil and Structural Engineering

Diploma of Public Works

Advanced Diploma of Civil Construction Design

* Some of the units required within each of these qualifications at Cert IV and Diploma level have not yet been mapped and endorsed by the steering committee of this project, however it is expected that a number of the competencies are highly relevant.

WHERE ARE THE KNOWLEDGE/SKILLS GAPS?

There is a varying degree of need for a range of knowledge and skill requirements within both sectors, however generally speaking the level of knowledge/skill required at Local Government level is generally more broad and not as in depth. However in some instances an in-depth knowledge of a particular subject would be considered highly advantageous.

The following table is provided as an indication of the more widely required competencies identified within the sector and possible National Competencies that may map sufficiently to meet the needs of the sector:

WHAT NATIONAL COMPETENCIES ARE LIKELY TO MAP TO CURRENT TRAINING NEEDS	**Competency - Skills/Knowledge (H=High) (M=Medium) (L=Low)**	**MRWA Depth of Knowledge/ skill required**	**LGA Depth of Knowledge/ skill required**
BSBWRT401A Write complex documents	Report Writing Skills	H	H
IPWEA Traffic and Transport Unit	Crash Investigation	H	M
NSW RTA	Road Safety Audit (driver behaviour etc)	H	H
BSBRES401A Analyse and present research information BSBWRK506A Coordinate research and analysis	Research/Investigation	H	
IPWEA Traffic and Transport Unit	CrashTool	H	M
LGAWORK501A Prepare preliminary design for operational works MEM30001A Use computer aided drafting systems to produce MEM30002A Produce basic engineering graphics MEM30003A Produce detailed engineering drawings	AutoCAD – Basic/Intermediate	M	M
RIICWM503A Prepare civil works cost estimate RIICWM504A Prepare civil works bill of quantities RIICWM505A Prepare civil works schedule of rates	Cost Estimating	M	M
BSBPMG502A Manage project scope BSBPMG503A Manage project time BSBPMG504A Manage project costs BSBPMG505A Manage project quality BSBPMG506A Manage project human resources BSBPMG507A Manage project communications BSBPMG508A Manage project risk BSBPMG509A Manage project procurement	Project Management	M	M

WHAT NATIONAL COMPETENCIES ARE LIKELY TO MAP TO CURRENT TRAINING NEEDS	**Competency - Skills/Knowledge (H=High) (M=Medium) (L=Low)**	**MRWA Depth of Knowledge/ skill required**	**LGA Depth of Knowledge/ skill required**
BSBPMG510A Manage projects			
BSBRSK501A Manage risk	Risk Assessment	M	H
BSBCUS501A Manage quality customer service BSBCCO604A Develop and maintain a service level strategy BSBCCO601A Optimise customer contact operations BSBCCO602A Manage customer contact information. LGADMIN417A Conduct community consultations BSBPUB504A Develop and implement crisis management plans	Communication Skills: Community Consultation Negotiation Skills Conflict Management/Resolution	M M M M	M
BSBFLM503B Manage effective workplace relationships BSBMGT606A Manage customer focus	Partnership/Collaboration Skills	M	M
RIICWD503A Prepare work zone traffic management plan	Traffic Management (Basic & Advanced) – Skills Sets	H	M
IPWEA Traffic and Transport Unit	Traffic Modelling (flow)	H	M
IPWEA Traffic and Transport Unit	Traffic Volume	H	M
IPWEA Traffic and Transport Unit	Road Networks	H	M
	Blackspot/Crash Analysis	H	M
	Zoning	H	M
IPWEA Traffic and Transport Unit	Road Hierarchy	H	M
IPWEA Traffic and Transport Unit	Traffic Count analysis	H	M
BSBFLM506B Manage workplace information systems	Software training: SIDRA/HCS; CrashTOOL SCATS; SIGNS MS Project/Word/Excel etc Database mgmt – extraction and analysis	 M M M M	M
RIICWD508A Prepare detailed design of rural roads RIICWD509A Prepare detailed design of urban roads RIICWD502A Prepare detailed design of lighting RIICWD516A Prepare detailed design of bicycle ways	Austroads – Pt 1 – 14 Australian Standards Legislation	H H H	M M M
LGACOM601A Acquire and dispose of Assets	Asset Management	L	H
RIICWD512A Prepare detailed design of motorways and interchanges RIICWD519A Prepare detailed design of intermodal facilities civil works	Intersection Design	H	M
RIICWD526A Prepare detailed traffic analysis RIICWD527A Prepare detailed design of	Traffic Signals – theory not just SIDRA	H	H

WHAT NATIONAL COMPETENCIES ARE LIKELY TO MAP TO CURRENT TRAINING NEEDS	**Competency - Skills/Knowledge (H=High) (M=Medium) (L=Low)**	**MRWA Depth of Knowledge/ skill required**	**LGA Depth of Knowledge/ skill required**
traffic signals RIICWD528A Prepare detailed design of traffic management systems			
	Signs and Lines	H	M
	Sight Distances (H&V)		
	Hydraulic Maths		
RIICWD520A Prepare detailed design of rigid pavements RIICWD521A Prepare detailed design of flexible pavements	Road Design – material technology	L	M
	Road Construction	M	M
BSBWOR403A Manage stress in the workplace	Stress Management	H	M
	Policy development (specialised)/writing	Specialised	Specialised
	Problem solving	H	H
BSBCRT301A Develop and extend critical and creative thinking BSBCRT401A Articulate, present and debate ideas	Critical thinking	H	H
BSBWOR501A Manage personal work priorities and professional BSBWOR502A Ensure team effectiveness BSBMGT605B Provide leadership across the organisation BSBMGT605B Provide leadership across the organisation BSBLED501A Develop a workplace learning environment BSBINN801A Lead innovative thinking and practice	Team leadership; Motivation; Self awareness Supervision; Team dynamics Training/support	H	H
PSPMNGT614A Facilitate knowledge management BSBINM501A Manage an information or knowledge management system BSBINM601A Manage knowledge and information BSBLED705A Plan and implement a mentoring program BSBLED706A Plan and implement a coaching strategy FNSICORG515A Provide mentoring and coaching within the workplace	Knowledge Management	H	H

NON- ACCREDITED TRAINING OPTIONS

ARRB

Knowledge Transfer Workshops

Basic Geometric Road Design

Geotechnical Investigation and Design

Fundamentals of Transport Modelling

Local Area Traffic Management

Managed Freeways

Mining Roads – Safety & Design

Planning and Design of Parking Facilities

Traffic Theory and Applications

Approx $2000 3 day workshops

Program samples include:

SCATS (TYCO)

The Sydney Co-Ordinated Adaptive Traffic System (SCATS) uses a responsive approach to urban traffic control by measuring the traffic flow through an intersection and then automatically adjusting cycle lengths, splits and offsets between intersections to maximize throughput, minimize delays and reduce the number of stops en route.

Cost unknown – Sydney – RTA NSW

CENTRE FOR PAVEMENT ENGINEERING EDUCATION

CPEE offers a number of postgraduate programs via distance education.

- Grad Cert in Pavement Technology
- Grad Cert in Infrastructure

Short Courses also available include:

Pavement Design - Advanced - 2 Day

Fees: $1,095

Course content will closely follow that of the Chapters in the Austroads Guide to Technology (2008) – Part 2: Pavement Structural Design which is used as the principal reference.

Pavement Design in Local Government - Principles & Practices - 2 Day

Fees: $995

With a focus on the roads & pavements in local government, the course program will closely follow the content in the appropriate Chapters of the Austroads Guide to Pavement Technology (2008) – Part 2: Pavement Structural Design, which is used as the principal reference.

CIRCLY WORKSHOP - 1 Day

Fees: $695

CIRCLY Workshop is an independent full day workshop (also becomes day 3 when undertaken in conjunction with either of the CPEE two day Pavement Design courses which provides an understanding of the theoretical basis of mechanistic pavement design methods. This is a hands-on workshop with each student having access to a PC.

Road & Public Space Lighting Workshop - 3 Day

Fees: $2,145 / Discounted fees (for 3 or more delegates) $2,035

This three-day workshop covers the latest practices applying to road and public space lighting design and practice. Used to support learning in the workshop is the Austroads' Guide to Traffic Engineering Practice Part 12 - Roadway Lighting, a general guide to road lighting standards and practice applicable to traffic routes and to a lesser extent, to local collector and minor roads.

Managing the Road Environment - 2 Day

Fees: $ (not stated)

Over two days this targeted course provides valuable practical knowledge on the key issues involved in the pavement selection and design.

Evaluating Pavement Surface Treatments & Workshop- 2 Day

Fees: $875

The Course is primarily concerned with providing delegates with the knowledge, and practical understanding, to enable proper evaluation of various surface treatment options, and their application.

Understanding & Evaluating Pavement Maintenance & Rehabilitation Options- 2 Day

Fees: $875

The Course is primarily concerned with providing delegates with the knowledge, and practical understanding, to enable full evaluation of

maintenance & rehabilitation options, and their most beneficial use Case studies are used throughout to facilitate practical learning.

Insitu Stabilisation - 2 Day

Fees: $875

The use of stabilisation technology for stabilising and recycling of materials for pavement construction and maintenance is widely accepted as a cost-effective method of improving long term performance and reducing whole-of-life costs of modern, heavily trafficked pavements. The Austroads Guide to Pavement Technology – Part 4D: Stabilised Materials, and Part 4L: Stabilising Binder, will be used as basic reference text in the Course which is primarily based on the CPEE Distance Learning Unit: "CPE 658 – Insitu Stabilisation

Heavy Duty Pavements Computer Aided Mechanistic Design Workshop- 1 Day

Fees: $695

This Workshop introduces two major software packages that facilitate heavy duty flexible pavement design:

HIPAVE (Heavy Industrial PAVEment) is a layered elastic software program that conveniently models the effects of detailed payload distributions (spectrum of container weights) by calculating axle loads from vehicle configurations and payloads. It also models lateral vehicle wander. HIPAVE handles the variety of equipment used in container facilities, such as forklifts, straddle carriers, gantry cranes and side loaders.

APSDS (Airport Pavement Structural Design System) is for analysis and design of flexible pavements subjected to the extremely heavy wheel loads associated with large aircraft.

Construction Contract Law- 2 Day

Fees: $1,475

The aim of this course is to provide practicing civil engineers and contract administrators with an in depth understanding of the principles of contract law as it applies to engineering and construction contracts.

Dispute Resolution & Construction Claims- 2 Day

Fees: $1,475

Claims and disputes threaten the speedy and profitable performance of construction projects. Literally millions of dollars are lost in the prosecution and defence of construction claims. Parties are involved in long, costly, time wasting and futile efforts in pursuing and defending claims which perhaps should never have arisen in the first place and perhaps should never have been pleaded in view of the lack of a cause of action.

IPWEA (NSW)

Course In Introduction to Road Safety Audits Expires 23/03/2014

Course in Conduct Road Safety Audits Expires 23/03/2014

Course in Lead Road Safety Audits Expires 23/03/2014

SIDRA

Software and training to support Traffic Signalling and sequencing

Average cost $1200 per unit – Sydney only

METROCOUNT

"MTE Certification" is a full-day, end-to-end course covering traffic data collection and processing. They also offer an "Advanced" course which is a full-day hands-on course, covering MTE in detail using computers.

WHAT IS HAPPENING ELSEWHERE IN AUSTRALIA?

A brief discussion was held with the Manager from Traffic Operations at VicRoads. It was noted that Victoria and to some extent other eastern states counterparts are not experiencing the same levels of Skills Shortage as here in WA. A strong Graduate program is successfully engaging Engineers who typically see VicRoads as a "training ground" and remain there for approximately 5 – 10 years.

Due to their current workforce structure VicRoads has little need for paraprofessional technical staff as much of their workplace structure requires qualified Engineers in the role. The VET sector is not seen as a viable option particularly because of the strong Higher Education program offered at Monash University.

The research did extend to invite NSW and Qld to comment, however, at the time of completion of the project, specific details had not been provided by the NSW RTA or Qlds Traffic and Transport Department. It was however noted that there is a level of interest in participating in the development of a specific program by some LGAs in NSW.

All three Eastern States have similar entry programs to that of MainRoads WA – including supporting School students, Graduate Engineers and Cadetships.

Short, Medium & Long term Strategies

Short Term (within next 6 months)

- Mentor & Coaching program
- Seek Recognition of Prior Learning
- Provide gap training leading to formal qualification
- Assess/Provide immediate non-accredited training

Medium Term (within 1 – 2 years)

- Develop clear career pathways (VET & Higher Ed)
- Develop specific Qualification/s for the industry
- Career and Succession Planning programs

Long Term (on-going)

- Review & Evaluate Traineeship, Cadetship & Graduate programs

Marketing Strategy

It has become apparent that through the course of this research that there is not a strong employment strategy or campaign currently in existence to provide information about the career pathways within the sector.

A Marketing campaign highlighting the work options and benefits of working in the field will support any programs that are being promoted to students in the school sector whether they choose to go to University and study Engineering, or choose a VET pathway option.

Where to from here - Options

Option 1

Do nothing continue as is – likely outcome skills shortage will be at crisis point within 5 years.

Cost – now nil – in 5 yrs (unknown)

Risk level - High

Option 2

Develop a marketing campaign to recruit more Graduates into Engineering Degrees – likely outcome – graduates attracted to the Resource Sector in their 3rd& 4thyear at University with perhaps a few more moving towards Traffic and Transport.

Cost – unknown – in 5 yrs (unknown)

Risk Level – Medium in the short term – Higher in the long term

Option 3

Develop a new qualification pathway at VET level specifically targeting skills and knowledge in Traffic and Transport to meet the needs of the sector now, with embedded flexibility for change into the future.

Cost approx. $100000 – 150000 (includes development of 15 specific competencies, registration of qualification with Training Accreditation Council, and development of learning resources and assessment materials. A firm quotation would be required.

Risk – Medium – requires time and expertise of Traffic and Transport staff

Option 4

Review existing qualifications and competencies and endeavour to find the best fit for the sector now, with a view to reviewing the sector needs within 3 years.

Cost approx. $25000 (needs a firm quotation) doesn't include the development of learning materials and assessments.

Risk – Medium – requires time and expertise of Traffic and Transport staff

Option 5

Collaborate with IPWEA (WA) in the redesign and development of the Diploma of Public Works to establish a strong Traffic and Transport stream with units that provide the in-depth skills and knowledge required of the sector now.

Cost-requires discussions with IPWEA prior to approx. the cost.

Risk – Medium – requires time and expertise of Traffic and Transport staff

OPTION 6

Start with Option 5 as an interim measure. At the same time commence work on Option 3 with the aim of having a Traffic and Transport stand alone course operational within 3 years.

Cost approx. $125000 – 175000

Risk – Medium – requires time and expertise of Traffic and Transport staff

OPTION 7

IPWEA proceeds with Option 5 and AITPM proceeds with Option 3. Each organisation would be responsible for funding the chosen option, would own the intellectual property and would be responsible for arranging the delivery of the course.

Cost approx. $125000 – 175000

Risk – Medium – requires time and expertise of Traffic and Transport staff

Appendices:

Appendix 1 Career Pathway Options

Appendix 2 Career Progression Chart

Appendix 3 Forum Summary – Helen Hardcastle