

Final Evaluation Report

Tennis Victoria – Drought Proofing Tennis in Victoria Initiative

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Background

Tennis Victoria aims to make tennis part of every Victorian's life.

Tennis is a sport that can be played socially and competitively throughout life. It is therefore as important to community development as it is to the world of competitive sport. In promoting the values of fun, fitness, health and social relationships, tennis clubs and facilities are vital aspects of local communities.

Tennis Victoria is the peak body for tennis activity in Victoria. With over 900 clubs, 105 associations and 88,000 registered members, tennis is one of the state's top 5 organised sporting groups.

Operations at Tennis Victoria head office are underpinned by a detailed Strategic Plan 2006-2010 and can be viewed at [Tennis - Victoria - VIC - About Us](#). The Strategic Plan details a strong emphasis on facility development, participation and player development.

Victorian tennis has a proud tradition of both competition and social play on red porous (often referred to as en tout cas) tennis courts. At the centre of this tradition are strong sustainable tennis clubs that are often the focus of community activity. There are approximately 1700 red porous tennis courts in Victoria. This number is reducing quickly and as they disappear, so does much of the tradition and community spirit that Victorian tennis is based upon.

Victoria has the highest number of red porous courts in Australia. This provides an advantage for elite players who travel overseas to compete on sliding surfaces such as clay courts. This is supported by the Tennis Australia policy of recognising such surfaces above others i.e. National Facility Development Framework. Therefore the survival of red porous courts is important for both the tradition of tennis and supporting the development of talented players.

The challenge faced by the tennis industry is that red porous courts traditionally are reasonably water intensive. Before stage 3 water restrictions, red porous courts used approximately 1,000 L/day in summer and approximately 600 L/day in winter on average over a year. Therefore, the key challenge is to identify technologies that will assist red porous courts to become more water efficient.

Introduction

The aim of the Tennis Victoria, "Drought Proofing Tennis in Victoria" Initiative is to test and further implement water saving technology for red porous tennis courts options for tennis clubs. The pressure to conserve water is influencing court surface installation choices. Where clubs have the financial ability, they are converting red porous courts to synthetic surfaces. This is reducing the number of red porous surfaces within the state and contributing to the reduction in low maintenance, low cost playing surface options for clubs.

Further, in line with recent national policy this too has meant a reduction in appropriate player development surfaces. This reduction of access to international standard playing surfaces has been identified as a key factor in the reduction of elite players. Those clubs who don't have the funds to convert their surfaces are closing courts due to the lack of water.

The 'Drought-Proofing Tennis in Victoria' initiative trialled two new technologies aimed at reducing water usage on new and existing red porous courts by at least 50%.

It was intended that the outcomes derived would ensure an environmentally sound tennis facility development option for clubs and allow for the introduction of policy across Victoria, consistent with the National Facility Development Framework. In addition, the outcomes of the initiative also comprised a component of the "minimum physical and operational facility standards" for tennis facilities within Victoria as outlined in the 2006-2010 Tennis Victoria Strategic Plan.

Objectives/Goals

In partnership with tennis stakeholders, Tennis Victoria was required to show leadership via the development of water saving technology and options for clubs to consider when their courts are in need of maintenance or upgrade. More broadly the outcomes for tennis are that clubs could preserve their existing red porous surfaces, maintaining the number of State sporting amenities and significantly reduce water usage. The detailed objectives of this project can be considered as:

1. The trial of two water saving technologies ensuring environmentally sound tennis facility development options for clubs.
2. Develop policy across Victoria, consistent with the National Facility Development Framework that will assist with providing guidance on optimum environmental standards that the tennis industry should strive for.

The project was agreed to be considered successful if the technologies can be proven over a 12 month period and deliver water savings of at least 50% usage at each venue. The project was also agreed to be considered successful when both technologies are fully documented and specifications can be developed and shared at other tennis facilities throughout Victoria.

Summary of Key Steps / Milestones

The trial results of the two technologies tested as part of this Smart Water Fund project are summarised below. For more detailed analysis, please consult the Environmentally Friendly Tennis Club Guidelines, or contact Tennis Victoria direct (03) 8420 8420.

Objective 1 – Technology Trials (Bentonite Trial)

Location	Dendy Park Tennis Club
Description of Technology	Initial testing and then rebuilding of courts using bentonite clay additive helping to absorb and retain water. Installation of ground water bore, pump and tank.
Testing and Trialling Method	<p>Pre-installation patch testing exercise to monitor water retention characteristics to identify a specification for rebuilding courts.</p> <p>Patch 1 Base layer with 2% bentonite. Levelling layer with 2% bentonite. Sealing course & playing surface 1% bentonite.</p> <p><u>Results</u></p> <ul style="list-style-type: none"> ▪ Unsatisfactory. ▪ Crust goes soft with heavy watering. ▪ When water soaks in, the bentonite softens the crust. ▪ Cannot play on it. ▪ Goes rock hard when dry. ▪ Takes ages to dry. ▪ On excavating, bentonite was holding moisture in base layer. This was an encouraging sign; perhaps another trial with much less bentonite on the surface would give better results.

	<p>Patch 2 As for Patch 1 but ½ the quantities of bentonite. Base layer with 1% bentonite. Levelling layer with 1% bentonite. Sealing course & playing surface ½% bentonite.</p> <p><u>Results</u></p> <ul style="list-style-type: none"> ▪ Problem with crust going soft with heavy watering. ▪ Top layers must be free draining; otherwise there is delamination of layers at different stages of hydration. ▪ Smaller amounts of bentonite in surface layer appear to give better results; suggests another test perhaps with 1% in base and levelling course and ¼% on top. <p>Patch 3 Base level using black scoria (has good water retention) in lieu of usual scoria, no bentonite. Black scoria contains approximately 2% natural clay (type unknown) Levelling layer used black scoria. Sealing course no additives. Playing surface ¼% bentonite & ¼% latex. Two plots tried side by side – 75mm thick (patch 3a) & 150mm thick (patch 3b);</p> <p><u>Results</u></p> <ul style="list-style-type: none"> ▪ Good results ▪ Settled quicker (i.e. going firm) ▪ Materials are readily available <p>Patch 4 Base level no bentonite, free draining. Levelling layer with 1% bentonite. Sealing course ½% bentonite. Playing surface ¼% bentonite & ¼% latex.</p> <p><u>Results</u></p> <ul style="list-style-type: none"> ▪ Surface drains reasonably fast. ▪ Surface still firm after watering.
Any commentary on player satisfaction/court performance	Upon completion of court rebuild, courts described as excellent playing surface and courts preferred over others at Dendy Park.
Costs	Total cost of \$31,000 per court.
Results	<p>Average water savings of 66% demonstrated over autumn - Average water use over the autumn months (16/2/08 to 31/05/08) was 75 litres per day, per court for bentonite courts 14 & 15 compared to 239 litres per day, per court for control group courts 3&4 and 205 litres per day, per court for control group courts 5&6. This represents a 69% saving compared to courts 3&4 and a 63% saving compared to courts 5&6.</p> <p>Average water savings of 58% demonstrated over summer - Average water use from early October was 125 litres per day per court for courts 14 & 15 compared to</p>

	309 litres per day per court for control courts 3&4 and 275 litres per day, per court for control courts 5&6. This represents a 60% saving compared to courts 3&4 and a 55% saving compared to courts 5&6.
Conclusion	<p>Patch testing - Excavation of the bases of the test patches showed that the testing had been successful in holding moisture.</p> <p>Patches 3 and 4 held a firm playing surface after watering; they drain surface water quickly and are firm shortly after a heavy watering.</p> <p>Patches 1 and 2 have surface problems when saturated, they are not playable when the surface is wet and could not be played on straight after rain. It was quite apparent that the problem is mainly in the upper surface layers and how they are treated. These upper layers need to have the combination of additives adjusted to achieve the optimum results.</p> <p>Court rebuild - Success with excellent surface and water savings achieved for the club. Evaluation results suggest that specifications for court construction can be altered to include more bentonite within surface layers.</p> <p>The specification proposed for future court rebuilds at the club include base layer 2% bentonite, levelling layer 2% bentonite, sealing layer 1 % bentonite and playing surface 1% bentonite.</p>

Objective 1 – Technology Trials (Subsurface Trial)

Location	Port Melbourne Tennis Club
Description of Technology	Installation of a subterranean watering system known as the 'water miser red porous tennis court'. Three pods per court are installed into the sub surface of the court. Water is drawn to the surface via capillary action and reduces loss of water from evaporation. Each pods water level, reticulation and drainage is managed by a control unit so that water is not wasted. Also Installation of ground water bore, pump and tank.
Testing and Trialling Method	Courts completed May 2007 and play starting July 2007. Water demand measured by inline flow meter attached to tank outlet and monitored. Tennis Victoria conducted 4 evaluation inspections up from 2007 to 2008
Any commentary on player satisfaction/court performance	Club are happy to retain their preferred surface and players have found courts to be of a high standard.
Costs	Total project cost \$140,000 covering 3 courts.

Results	Installation of system reduced annual usage by 68% to approx 320L/court/day. Initial modifications were required before courts played as per typical red porous tennis courts.
Conclusion	Success - Trial exceeded expectations of a 50% water saving by achieving 68% savings. The club does not draw any mains water and court surface receives positive feedback from players.

Findings/Results/Outcomes

The following is a snap shot of the overall water savings achieved through the evaluation phase of the project.

Dendy Park Tennis Club

This project provided water savings of approx 60% compared to 2005/06 usage data. The Dendy Park Tennis Club has installed a bore water facility on site. Whilst this is providing some bore water, the club is also utilising potable water from time to time as required. This makes recent evaluation difficult to determine how much water savings are due to bore water or the addition of bentonite. Perhaps this highlights the importance of management and water conservation plans for tennis clubs. However the results of the Tennis Victoria evaluation indicate the club uses 125 litres per day on courts 14 and 15 in summer. This is a minimal amount of water compared to pre-test and pre water restriction periods. In addition, verbal reports from club members have indicated that courts 14, 15, 18 and 19 are the preferred surface due to their excellent quality.

Port Melbourne Tennis Club

Water savings of 68% on 2004/05 levels. The Port Melbourne Tennis Club has also installed a bore water facility on site. This has completely eliminated their call on the potable water supply ensuring the club is now self sufficient. In this case a bore water facility was required to fill the tank and eventually the subterranean pods

Objective 2 - Policy Development

With the introduction of water restrictions across Victoria, there was a clear need for the State Sporting Association of tennis to provide clear direction to stakeholders. Developing appropriate policy would achieve a number of key objectives such as to:

- Provide Tennis Victoria with evidenced based research so as to provide clear direction to all tennis stakeholders in Victoria.
- Highlight the results from trials to improve water efficiency at tennis clubs.
- Provide a range of options and tools for clubs to implement in order to become more water efficient.
- Assist club and Councils in making decisions in relation to court surfaces.

The above objectives connect to information sharing and ensuring tennis stakeholders make the right decisions regarding water usage and ultimately making tennis a sustainable sport. A key example is when clubs and Council negotiate to convert red porous courts to another surface. Tennis Victoria can now make available research and options for both parties to make accurate decisions on important and costly facility development. In this way, Tennis Victoria has some influence and control of sustaining tennis into the future.

The majority of policy and research can be found within the Environmentally Friendly Tennis Club Guidelines booklet. This can be found on the website and has been circulated to Councils. Other methods of communicating policy are:

- Water Savings Rankings self assessment worksheet for club committees and club house information boards.
- Posters indicating courts treated with magnesium or calcium chloride.
- Posters reminding players to maintain courts.
- Posters asking clubs to conserve water.
- Tennis Victoria website includes tools and resources in water restriction and water conservation sections.
- Club Ambassador Newsletter containing specific policy affecting club committees.
- Victorian Tennis News magazine containing articles on environment.
- Club Ambassador Booklet sponsored by Vic Health highlighting success stories.

Resources

The resources for the project were comprised of a number of key personnel over the 2 year span of the project and can be outlined as follows:

Port Melbourne Tennis Club

Club President – Initial development and coordination of the project

Tennis Victoria Technical Services – Design and Specification development, Site Supervision and Technical Evaluation

Tennis Victoria Club Development – Promotion and coordination of policy implementation

Crest Tennis Courts – Court Builders / Technology developers

Dendy Park Tennis Club

Club President – Initial development of the bentonite technology

Tennis Victoria Technical Services – Design and Specification development, Site Supervision and Technical Evaluation

Tennis Victoria Club Development – Promotion and coordination of policy implementation

Crest Tennis Courts – Court Builders (courts 18 and 19) / Technology developers

EJ Richards and Sons – Court Builders (courts 14 and 15)

Connell Wagner – Environmental Engineers – Independent evaluation and policy drafting.

Risk Management

The following were considered the perceived risks at the commencement of the project:

- The trialed technologies may not produce the estimated results.
- The trialed technologies may not provide a cost effective option for tennis clubs
- The results of the monitoring and evaluation process may not generate support from other stakeholders within the state.

Risk Management Strategies

- The initial trial phase (patch testing) milestone provided smaller scale results which can be evaluated. Following the completion of this evaluation and consideration by all stakeholders a decision was made on whether to proceed with the installation of the technologies at both venues. This minimised the exposure of all stakeholders.
- Tennis Victoria estimates that the cost of installing the technologies remains affordable to most clubs. An incentive/subsidy program for clubs to install the technologies will be developed as part of the formation of the Tennis Victoria Foundation and future funding applications. If all the technologies were agreed successful, tennis clubs would be left with three different options, at different prices, for converting or replacing their courts.
- Tennis Victoria monitored the response of stakeholders to the project. Educating stakeholders of the outcomes is critical to the uptake of the new technologies. Communicating the positive impact of these projects has proved to be quite difficult due to the limited resources of all stakeholders (ie. Tennis Victoria, council and clubs)

Discussion/Evaluation

Analysis of project milestone

The three key objectives of this initiative were:

- *The project was agreed to be considered successful if the technologies can be proven over a 12 month period and deliver water savings of at least 50% usage at each venue.*

This has been achieved in both locations, providing water savings in excess of 50% at each venue.

- *Provide an option for clubs to consider when their courts are in need of maintenance or upgrade.*

As the water saving targets were achieved, it is considered that both forms of technology are viable options for tennis clubs to consider in the retention of red porous tennis courts and the construction of new courts where a need is identified.

- *The project was also agreed to be considered successful when both technologies are fully documented and specifications have been developed which can be promulgated at tennis facilities throughout Victoria.*

Full design and specification instructions are available on request through Tennis Victoria.

- *The outcomes derived were designed to ensure an environmentally sound tennis facility development option for clubs and allow for the introduction of policy across Victoria, consistent with the National Facility Development Framework.*

The outcomes of the project have been evaluated by independent environmental engineers to develop a policy guiding the retention of red porous tennis courts throughout Victoria (and nationally). *In addition, the outcomes of the initiative will comprise a component of the “minimum physical and operational facility standards” for tennis facilities within Victoria as outlined in the 2006-2010 Tennis Victoria Strategic Plan.*

The Tennis Victoria “Game Set Match” best practise guidelines outline that to meet best practise standards of tennis club operations and environmental sustainability. These guidelines can be viewed in more detail by visiting www.gamesetmatch.net.au Game Set Match is an on-line club development tool which will be continually administered by Tennis Victoria Tennis Access staff.

Benefits/learnings of the project milestone

In addition to the technological advances that this initiative provided, Tennis Victoria attained a very valuable understanding of the nature of the court building industry and the complicated timelines involved in tennis court construction. Timing the construction schedule proved a large

challenge to ensure that the income streams of both tennis clubs were not significantly affected resulted in some significant delays to the construction of courts 14 and 15 at the Dendy Park Tennis Club.

Tennis Victoria, the tennis clubs and the contractors were surprised at the significant settling in time of the newly constructed courts and this delay created pressure on each stakeholder in their respective roles.

Limitations/issues arising

- Red porous court builders

The capacity of the red porous court builders in this project presented some limitations as follows:

Due to the effects of the drought, there has been little to no work available for red porous court builders over recent years. This made the tender process less competitive than was desired to stimulate the growth and development of these technologies. The result of this is that the promotion and further development of both options must be driven by Tennis Victoria and Tennis Australia given the lack of interest/other commercial options/demands placed on tennis court builders.

Due to the complex and relatively undocumented nature of red porous court building transposing many years of “trial and error” into a professional design specification document proved challenging for the Tennis Victoria Technical Services department.

- Evaluation limitations:

The quantification of the playability of the courts at both venues was a real challenge and has been omitted from this report. Whilst all anecdotal evidence suggests that the playability of the courts improved markedly over the settling in phase (6 weeks – 10 months in some cases), this was very difficult to quantify.

Maintaining a comparison court for evaluation purposes was also a challenge. As all courts are required to be used for play, it was difficult to ensure that a similar amount of activity was carried out on them due to the nature of member access to each facility. To overcome this problem at Dendy Park Tennis Centre, the club manager ensured that members were encouraged to try out the new courts and maintained a vigil on the use of the courts in the early stages of them being commissioned.

Conclusion

The initiative has been a success and has provided critical information for Tennis Victoria to use in ensuring the retention of these valuable assets at three key levels:

- Detailed design, specification, construction, evaluation and other relevant technical expertise.
- Provision of a proven platform for policy development and promotion throughout the sport and recreation industry.
- Incorporation of education and awareness initiatives through the service delivery mechanism of the general operations of Tennis Victoria.

The outcomes from this initiative, the technology development and the relationships formed are a critical factor in the tennis industry’s capacity to minimise the impact of water shortages on these delicate yet essential playing surfaces.

Recommendations

Tennis Victoria recommends that these initiatives are widely promoted through the Tennis Club and Local Government networks to further promote the benefits associated with the redevelopment of red porous tennis courts utilising this technology.

This work will be undertaken through two key delivery mechanisms at Tennis Victoria over the coming year/s:

1. Tennis Victoria Best Practise Guidelines website (appendix 3)
2. Tennis Victoria Facilities Master Plan and infrastructure development initiative currently being finalised with Sport and Recreation Victoria.

Acknowledgements

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Tennis Australia – Community Tennis Department

Dendy Park Tennis Club – Club President

Port Melbourne Tennis Club – Club President

Document Status

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