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Report on the Feasibility of providing "iVote" Remote Electronic Voting System

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Executive Summary

Parliament has requested the Electoral Commissioner to investigate the feasibility of remote electronic voting for vision-impaired and other disabled persons, with the primary objective being to enable a secret vote for people who are blind or vision impaired.

Following initial consultations and previous reports into accessibility of the voting process, it became apparent that a remote electronic voting system would be of benefit to a broader audience of stakeholders than the blind and vision impaired. As a consequence, the stakeholder group has been defined as:

- people who are blind or vision impaired (around 70,000 electors);

- people with other disabilities (around 330,000 electors); and

- people in remote locations (around 6,500 electors).

In preparing this feasibility report, the NSW Electoral Commission (NSWEC) has drawn upon the following sources of information:

- consultations with stakeholders including groups such as Blind Citizens Australia and also with other Electoral Commissions that have trialled electronic voting in Australia;

- research into the operations and issues of electronic voting including reviewing trials and the available suppliers of remote electronic voting systems;

- analysis of the responses to a Request for Information from selected potential vendors of remote electronic voting systems; and

- analysis of the results of a membership survey conducted by Blind Citizens Australia.

An assessment of the numbers of stakeholders (around 400,000 electors) and potential take-up rates has estimated that between 5,000 and 15,000 votes could cast using a remote electronic voting system if it was introduced for the State General Election in 2011 (SGE 2011).

Previous studies undertaken for the NSWEC have indicated that a remote electronic voting system could be a cost-effective option of enabling a secret vote for people who are blind or vision impaired. The analysis undertaken for this report indicates that such a system can indeed be cost effective when compared with alternative voting options on a cost per vote basis.

To determine the feasibility of providing remote electronic voting, the analysis by NSWEC has:

- identified the demand for a remote electronic voting service;

- examined the capability of solution vendors to provide a solution to meet the identified requirements;

- determined the capability of solution vendors to provide a solution within the limited timeframes necessary to be operational for the SGE 2011;

- determined that the risks and issues associated with the security and scrutiny of a remote electronic voting system can be satisfactorily addressed;

- determined the processes and systems that the NSWEC will need to change or introduce to ensure that the remote electronic voting system can be operational for the SGE 2011; and

- identified the critical activities and risks that may impact on the timely implementation of the remote electronic voting system and how these risks may be mitigated.

The conclusion of this report is that remote electronic voting is technically feasible and that such a system can be implemented for the limited stakeholder group in time for the SGE 2011. It is noted that the fast track implementation of the system is not without risk and that particular consideration will need to be given to the careful management of those risks as part of the overall project management effort for the project.

The research and consultation also identified that the word "electronic" has been a major barrier in the adoption of Internet voting in prior trials, and this report recommends that a brand, such as "iVote" be used for any remote electronic voting system implemented.

Therefore, the NSWEC will **commence immediately** with the procurement process for a system to be called "iVote", in order to ensure that the project timeframes are achievable.

A detailed model for the adoption of an iVote system has been developed and incorporates:

* estimated iVote service demand, determined through stakeholder consultation and disability reference groups, for both Internet and telephone channels;

* high-level system design, process flows and system architecture;

* identified security and scrutiny features required of an iVote system and potential issues; and

* design of an appropriate registration process, to engage the potential system users, determine their eligibility and provide authenticated access to the iVote system.

Operational timeframes for iVote would match the existing pre-poll voting period and applications to vote via iVote would follow postal vote applications with the addition of a call centre to support electors who are blind or vision impaired.

The cost for implementation for delivery for the SGE 2011 has been estimated, based on the plan as outlined in this report and indicative vendor pricing, to be $3.2m ($1.5m has already been approved and allocated). Based on the estimated take-up, the likely cost per vote of around $320 compares favourably against current Australian benchmarks for electronic voting. Cost estimates for future events have also been prepared which indicate that following the initial investment in the system and with a modest increase in take-up within the stakeholder group, the cost per vote could be reduced to around $44. This marginal cost will continue to reduce with further increases in take-up.

A detailed implementation plan has been prepared which shows that the objective of enabling a secret vote for people who are blind, vision impaired or otherwise disabled can be achieved for SGE 2011.

Key decision points in the implementation are:

* completion of the tendering process by August 2010;

* approval and allocation of the additional $1.7m in funding by August 2010
(the initial $1.5m funding will allow continuation until end September 2010 if approval is delayed); and

* passage of enabling legislation by December 2010.

In the event that the Premier does not wish to proceed or that Parliament does not pass the enabling legislation the implementation will be terminated to minimise the expenditure. The project deliverables will be preserved to permit re-commencement of the project at a later date should iVote be required for a subsequent election event.

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Glossary of Terms

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ADF	Australian Defence Force
AEC	Australian Electoral Commission
DPC	NSW Department of Premier and Cabinet
DRE	Direct Recording and Enumeration Equipment (electronic or mechanical voting machine)
EMA	NSWEC's Election Management Application
EML	Election Mark up Language
FAT	Factory acceptance testing
IT	Information technology
IVR	Interactive Voice Response
JSCEM	Joint Standing Committee on Electoral Matters
LA	Legislative Assembly, the Lower House of the NSW Parliament
LC	Legislative Council, the Upper House of the NSW Parliament
LGE	Local Government Elections
NSWEC	New South Wales Electoral Commission
PIN	Personal Identification Number
PIN/VIN	A pair of PIN and VIN where VIN is unique to all voters but PIN may be shorter and not unique, like an e-banking PIN
PKC	Public Key Cryptography
PKI	Public Key Infrastructure
REV	Remote Electronic Voting
RFI	Request for Information
RFT	Request for Tender
RMANS	AEC's electoral roll management system
Roll	The NSW electoral roll
SGE	State Government Election
SMS	Short message service (mobile phone messaging feature)
VEC	Victorian Electoral Commission
VIN	Voter Identification Number
WCAG	World Wide Web Consortium Accessibility Group
XML	Extensible Mark up Language

1. INTRODUCTION

This report investigates the feasibility of providing Internet voting (also referred to as "Remote Electronic Voting") for vision-impaired and other disabled persons for elections under the Parliamentary Electorates and Elections Amendment Bill 2010, and, if this is feasible, will propose a detailed model of such voting for adoption.

Since the word "electronic" was identified as a major barrier in the adoption of electronic voting in prior trials; **"iVote"** was chosen as a working name for this project, and is used throughout this report to refer to the proposed new mechanism for a secret vote to be available to electors who are blind or vision impaired.

1.1 Background

The Premier announced on 16 March 2010 that the "Electoral Commissioner will investigate Internet voting for visually impaired people of New South Wales improving their democratic right to a secret ballot".

The Premier's press release stated that "Nationally, there are 300,000 people who are blind or visually impaired with a third of them living in NSW" and that "Previously, blind and visually impaired people were only able to vote through the assistance of a friend or relative or through a large Braille ballot – which may run up to 67 pages."

The initiative was addressed in an amendment to the Parliamentary Electorates and Elections Amendment Bill 2010 which requires the "Electoral Commissioner to conduct an investigation as soon as possible into the feasibility of providing Internet voting for vision-impaired and other disabled persons for elections under this Act and, if such Internet voting is feasible, to propose a detailed model of such Internet voting for adoption."

1.1.1 Use of Braille Ballot Papers

In April 2008, the Administrative Decisions Tribunal held that the *Local Government Act 1993* did not preclude the provision of Braille ballot papers. This matter was brought by a blind elector who had requested a Braille ballot paper at the 2004 Local Government Elections, but had not been provided with one. To put the matter beyond doubt, appropriate amendments were made to the Local Government (General) Regulation 2005, and for the first time Braille ballot papers were made available at the 2008 Local Government Elections (2008 LGE).

Under this initiative, the NSWEC partnered with Vision Australia to arrange for the printing of ballot papers in Braille. Vision impaired electors requiring a Braille ballot paper were required to register prior to the election and nominate their preferred method of voting (ie. pre-poll, postal or in person) with the NSWEC. Braille ballot papers were then delivered to the pre-poll centre, postal address or polling place nominated by the electors.

An information campaign advertising the availability of Braille ballot papers was conducted by the NSWEC. The facility was also communicated to potential users by Vision Australia using its database of over 5,000 vision impaired electors in NSW over the age of 18. At the 2008 LGE, 52 electors registered to vote using Braille ballot papers.

1.1.2 Democratic Right to a Secret Vote

The Secret Ballot was first introduced in 1856 in Tasmania, Victoria and South Australia, with NSW adopting it in 1858. Consequently, when introduced into the USA in the late 1800's, the system became known as the "Australian ballot".

The United Nations Convention on the Rights of Persons with Disabilities, which Australia is a party to and entered into force in 2008, assures equal participation in political and public life for disabled voters. Article 29 part a.ii of the Convention requires that all States Parties protect "the right of persons with disabilities to vote by secret ballot in elections and public referendums without intimidation"[1].

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[1] Convention on the Rights of Persons with Disabilities (http://www.un.org/disabilities/default.asp?id=289)

In NSW, as in many democracies, some disabled persons, and most electors who are blind or vision impaired in particular, vote by appointing another person to mark the ballot paper on their behalf. This does not assure secrecy of the ballot for such electors.

Even with the use of Braille ballot papers in the 2008 LGE, it is difficult for the voter to be certain they have marked the ballot paper correctly and there were reports of election officials "helping" by visually checking the ballot papers as the blind voters marked them.

A number of democracies (including the USA, Netherlands and India) use electronic voting machines to enable voters with a disability to vote independently and secretly.

1.2 Types of Electronic Voting Systems

There are two broad categories of electronic voting systems, namely:

- Direct Recording and Enumeration (DRE) systems, and
- Remote Electronic Voting (REV) Systems.

Whilst the key features of each of these categories are described below, this report focuses on remote electronic voting systems.

1.2.1 DRE Voting Systems

The DRE systems incorporate electronic voting devices which are installed at polling places, pre-poll or other designated locations. These systems would require the NSWEC to install the voting infrastructure at these locations prior to the commencement of voting. While this is less of an issue in the case of pre-poll voting, for polling places this creates a difficult logistical challenge. For NSW, this would require the NSWEC to roll-out, install, configure and test voting devices and their associated equipment to up to 2,000 locations across the state (typically school halls) within a very short window, typically from Friday afternoon on Election Day eve to before the polls open on Election Day. The cost of both the infrastructure and the implementation would be significant.

Consequently, as described below, DRE electronic voting systems are used in limited deployment scenarios, at locations which are controlled by the NSWEC (eg. pre-poll or early voting locations) or in small jurisdictions (eg. ACT).

The advantage of these systems is that they offer greater direct control of the voting process, as the elector can be authenticated in the usual way (face-to-face with an electoral official) and access to the system can be tightly controlled.

For the stakeholder groups under consideration, the elector is still required to travel to the DRE voting device location in order to access the voting device.

1.2.2 REV Systems

The REV systems enable the elector to access the voting system at any location that has access to either a telephone or a web browser on an Internet connected computer. The advantage of this approach is that the system can take advantage of the communications infrastructure and devices already available to the elector, namely a telephone or computer and their associated assistive technology, such as screen magnifiers, screen readers or Braille keyboards.

The central infrastructure need only be deployed by the NSWEC within a secure data centre and can be installed, configured and tested in advance of the election period.

The REV systems require additional attention to ensure that systems remain secure, robust and tamper proof during the course of the election event.

1.3 Experience in other Australian Electoral Jurisdictions

Electronic voting has been used in a limited way for government elections in Australia, with the ACT being the only electoral jurisdiction that has incorporated electronic voting within its normal election processes. The complex vote counting system within the ACT was one of the principle drivers for its introduction.

Electronic voting was first used for the ACT Legislative Assembly election[2] in October 2001 and has been successfully used in each election since. By the October 2008 election, the electronic voting system took 44,000 votes or nearly 20% of the total votes counted.

The ACT's electronic voting and counting system uses voting terminals located in 5 selected pre-poll voting centres located in each of the main town centres for the period of 3 weeks up to and including Election Day. Voting terminals are linked to a server in each polling place using a secure local area network, with votes transferred to the counting centre on CD (Compact Disk). No votes are taken or transmitted over a public network like the Internet.

The system also provides voting facilities for both able-bodied and vision impaired or incapacitated voters. Through this facility, many vision impaired or incapacitated electors have been provided with the opportunity to cast a secret ballot for the first time.

It is noted that the proportion of informal votes cast by electronic voters were significantly less than the proportion of informal votes cast by electors using paper ballot, a trend that has been evident since the ACT's 2001 election.

1.3.1 Electronic Voting Trials

A number of electoral jurisdictions have conducted electronic voting trials including those listed below:

- The Australian Electoral Commission (AEC) conducted trials for electronic voting in 2007, which included:
  - an Internet voting trial conducted for ADF personnel serving in Afghanistan, Iraq, Timor-Leste and the Solomon Islands, which was a remote voting trial using ADF provided computers at designated locations; and
  - an electronic voting trial for blind and vision impaired electors who were otherwise unable to vote without assistance, which provided voting devices in 30 pre-poll voting sites.
- Victoria piloted electronic voting machines for vision impaired and blind voters in 6 polling places in 2006. This utilised voting kiosks which incorporated a touch-screen, keypad and headphones.
- In 2007, Tasmania provided an electronic voting machine for vision impaired and blind voters in one Hobart location.

1.3.2 Lessons from the Trials

Some of the key findings from the AEC trials are listed below.

- The formality rate was higher for the AEC trial systems than for the general voting population who voted with a paper ballot.
- There were higher rates of "below the line" voting in both the remote military and vision impaired trials, roughly twice as many people voted below the line on the new systems.
- The cost per vote for these systems can be high, if the take-up is low. The take-up rate appears to be affected by several issues, namely:
  - geographical accessibility, many of the DRE trials have been made available in a limited number of locations;
  - the requirement for a change in voter behaviour to become familiar with the "new way of voting" and hence there tends to be an increase in take-up over successive election cycles; and
  - the level and impact of focussed promotional campaigns to make potential electors aware of and familiar with the new system.
- Feedback indicated that the term "electronic" had discouraged a significant number of older, less computer-literate electors.
- The extension to all print handicapped electors was strongly supported[3].

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[2] Source: The Report on the ACT Legislative Assembly Election 2008, http://www.elections.act.gov.au/pdfs/election_08/2008ElectionReport.pdf

1.3.3   Future Plans

Both the AEC and Victorian Electoral Commission (VEC) are committed to introducing electronic voting as an aid to blind, vision impaired and incapacitated electors in the near future.

In Victoria, the VEC is currently implementing an expanded version of the trialled electronic voting system in time for the early voting period of the 2010 State election. It will be available in each District across Victoria and also in certain mobile early voting centres.

The electronic voting service involves either using a kiosk with a touch-screen and headphones (optional) for those voters with low vision or a telephone for blind voters. No personal details are recorded by the system and so an elector's details or elector's preferences cannot be identified, ensuring the anonymity of the elector at all times.

The AEC is planning to use a call centre (human resourced) to allow blind or vision impaired electors to vote via the telephone for the upcoming Federal Election due in 2010. Under this interim arrangement, eligible electors will attend designated pre-poll locations where following verification of their eligibility (name on electoral roll and address), they will be given access to the AEC voting call centre, where their vote will be captured by the telephone operators onto paper ballots (this is not an electronic system).

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[3] Source report "Evaluation of the electronic voting trial for blind and sight impaired electors at the 2007 Federal Election" – paragraph 3.1.5

2. STAKEHOLDERS

With the primary stakeholders identified as people who are vision-impaired and other disabled persons, NSWEC commenced consultation with these groups early in the process of preparing this feasibility report.

Prior to Parliament requesting this feasibility report the Joint Standing Committee on Electoral Matters (JSCEM) had identified remote electors as stakeholders for Internet voting in the report on the "Administration of the 2007 NSW election and related matters".

> *"In the Committee's view, i-voting is a potential initiative which could benefit electors in rural and remote areas and people with disabilities by broadening their voting options."*

Consequently, remote voters have been included as potential users within this report. Other groups such as interstate and overseas electors are also potential users of a remote electronic voting system but have not been considered as potential users for SGE 2011 due to logistical challenges.

2.1 Consultation During Report Preparation

The initial consultations included participation and briefings at a number of forums in regards to electoral issues for people who are blind or vision impaired or with other disabilities and these included:

- **NSW Electoral Commission – Disability Reference Group**
- **Electoral Council of Australia (ECA) – BVI (Blind and Vision Impaired) Reference Group**
  - **Electronic Voting Forum**
    During the preparation of this report the ECA – BVI (Blind and Vision Impaired) Reference Group formed this working group with the specific aim of agreeing standards for the electronic (Telephone and Internet) voting experience of Australians who are blind or vision impaired.
- **Australian Electoral Commission – Disability Advisory Committee**

Direct consultation also occurred with two key groups representing people who are blind or vision impaired (all the above reference groups included representation from one or both of these organisations):

- **Vision Australia**
- **Blind Citizens Australia**

To take advantage of the prior experiences of other Australian electoral jurisdictions, NSWEC also engaged in direct consultation with the following electoral commissions:

- **Australian Electoral Commission (AEC)**
- **Victorian Electoral Commission (VEC)**
- **ACT Electoral Commission ("Elections ACT")**
- **Western Australia Electoral Commission (WAEC)**

2.2 Blind Citizens Australia Member Survey

Notwithstanding considerable consultation with Vision Australia and Blind Citizens Australia, there was still a lack of definitive data on the demographics and ability to use different technologies.

To address this lack of information, Blind Citizens Australia (BCA) agreed to conduct a survey of its members as well as blind or vision impaired non-members who might be encouraged to participate in the survey. The survey was supported by an email campaign to the membership and an advertising

campaign through media aimed at the community of people who are blind or vision impaired, such as Radio for the Print Handicapped (RPH).

The survey (refer Table 1 in section 2.3.1 below) yielded 342 completed responses that provided useful information on use of modern technologies and preferences on different voting options.

2.3   Stakeholder Groups

A description of the potential user groups of the proposed remote electronic voting system is provided below.

2.3.1   People Who are Blind or Vision Impaired

This group includes people who are blind and those with Low Vision (various levels of partial sight that cannot be corrected by glasses). A significant proportion are elderly with their sight affected by age-related problems, whilst others have been blind since birth and so never have seen the layout of a ballot paper nor cast a ballot at a polling place as a sighted person.

Considerations in enabling this group to have a secret ballot include:

- some may have additional disabilities;
- Braille can be read by some (estimates vary from 5% to 15%);
- most are able to use a telephone;
- many may be familiar with phone banking style interfaces (IVR); and
- some may have Internet access with adapted home computers or special devices.

The survey conducted by Blind Citizens Australia provided some useful information on the technology capabilities and preferences of this group and a summary is shown in Table 1, below.

Table 1 – Summary of BCA Member Survey Results

Blind Citizens Australia (BCA) Member Survey Results
342 respondents who are blind or vision impaired completed surveys, of which 337 were members of BCA
95% of those surveyed are on the electoral roll and over 96% of these voted at the last SGE
42% use telephone banking
30% use Internet banking
68% do not read Braille
When asked "how would you prefer to vote?" • 36% would prefer to use the standard paper ballot • 18% would prefer to vote using the Internet • 47% would prefer to vote over the telephone
When asked "where would you prefer to vote?" • 73% would prefer to vote from home prior to, or on Election Day • 2% would prefer to vote at a Returning Officer's office or pre-poll Centre prior to Election Day • 24% would prefer to vote at a polling place on Election Day

The World Health Organisation (WHO) estimates for 2002 indicate the prevalence of Blindness in Australia at 0.3% and the prevalence of Low Vision at 1.2%.

When applied to the Australian population of approximately 22.3 million there would be approximately 334,000 Australians who are blind (around 66,000) or with Low Vision (around 267,000).

This aligns with the Royal Blind Society [now merged with other state bodies to form Vision Australia] estimate in 1996 that 300,000 persons in Australia had at least some difficulty reading ordinary print, even when wearing glasses or contact lenses.

Applying these prevalence figures to the approximately 4.5 million people on the NSW electoral roll suggests 13,500 electors who are blind and 54,000 electors with Low Vision.

Thus, the primary stakeholders for this initiative probably number nearly 70,000 and ABS figures quoted by Vision Australia indicate an annual growth rate of 2.5%, which would mean growth of approximately 10% between each State General Election.

2.3.2   Other People with a Disability

As a group this includes people with a very wide range of disabilities, such as:

- physical movement, (eg. paraplegic, quadriplegic);
- physical control/fine motor skills, (eg. Parkinson's, MS);
- sensory, (eg. deafness, unable to speak); and
- intellectual, (eg. with the capacity to vote, but perhaps difficulty interacting with polling place staff).

Amongst these groups the individual capabilities and issues in regards to electronic voting will also vary widely:

- some may access the Internet with standard equipment and software;
- some may have Internet access with adapted home computers or special devices;
- many will be able to use a telephone; and
- some may be familiar with phone banking style interfaces (IVR).

Consultation through the NSWEC Disability Reference Group has shown a strong preference amongst some people with a disability for accessible polling places to enable equal and visible participation in polling alongside able-bodied people.

Unlike people who are blind or vision impaired; if polling places are physically accessible to people in this group, many would not have significant difficulty in placing a vote or voting secretly. In addition, NSWEC has developed a new approach to identifying polling places which offer either partial or full disabled access.

However, with approximately 49,000 electors in NSW registered as General Postal Voters for reasons of "infirmity" or "incapacity", it is likely that a significant number will find voting from home preferable to travelling to a polling place, regardless of any improvements to polling place accessibility.

In 2003, there were an estimated 3.9 million people with disability in Australia and, within this group, 1.2 million people sometimes or always needed help or supervision with self-care, mobility or communication.

Proportionately, NSW would contain nearly one third of the population with a disability, or around 400,000 people who sometimes or always needed help or supervision with self-care, mobility or communication. Many amongst this group would also be expected to have some difficulties in voting; however it is not within the capacity of this report to consider all the varied difficulties that they might experience.

Assuming the above estimate includes the 70,000 electors who are blind or with low vision, there is a group of approximately 330,000 NSW electors with other disabilities that might benefit from iVote.

When considering remote electronic voting for this group it is difficult to assess the number that might find it beneficial. Consequently this report takes the conservative approach of assuming only 1% would take-up iVote for SGE 2011, or 3,300 electors from this group, whilst the number may in fact be higher with a consequent reduction in the estimated cost per vote to be expected.

2.3.3 Remote Electors (Rural, Antarctica)

There is a big challenge in the postal voting process in areas of regional and rural New South Wales, where some parts of the State only receive a mail delivery once a week. Consequently, with a two-week period for an elector to obtain and make a postal vote, if the elector is late in making their application and they miss the mail going to the returning officer, effectively they are not going to receive their ballot papers in time. It is a very tight window for those electors to cast a vote that is included in the count. For this group of electors it is expected that;

- some will have access to the Internet; and
- almost all will have access to a telephone.

There are approximately 3,600 electors in NSW registered as General Postal Voters for the reason of being more than 20km from a polling place.

A high level demographic analysis of the NSW electoral roll indicated that the number of electors in remote and rural areas that are distant from a polling place, to be in the range of 5,000 to 9,000 and for the purpose of this feasibility report, an estimate of 6,500 will be used.

For voters stationed on Antarctic bases, the current process used to collect votes does not allow a true secret ballot as certain intermediaries in the process are aware of how the Antarctic electors voted. There are only tens of electors in the Antarctic and both the Internet and telephone are available to them.

It is assumed for electors in this group that their needs for Internet and telephone voting can be expected to be met by any system implemented to support electors who are blind or vision impaired or with other disabilities. However, Internet voting is likely to be more usable for those with vision, than the audio-only telephone voting service.

2.3.4 Other Possible Users of an iVote System

Although not included in the initial brief, it is noted that interstate and overseas electors are a group that could benefit from the availability of a remote electronic voting system.

Interstate electors are generally able to remotely cast a vote at a limited number of interstate capital city locations. Overseas electors are entitled to a postal vote or a pre-poll vote and are able to obtain the forms and complete this at selected Australian Embassies (includes Australian Embassies, High Commissions, Consulates, multilateral missions and representative offices). Overseas electors, who are not near these Embassies or in major world centres with fast, reliable postal services, can experience difficulties in successfully completing a postal vote in time.

An iVote system could potentially address this problem for many remote overseas electors just as for remote electors in rural areas of NSW.

2.4 Potential Take-up Numbers

The likely number of people to cast their vote using iVote will impact the total costs, but the cost per vote is particularly influenced by this number.

Without direct experience of remote electronic voting for these stakeholder groups in Australia, all initial estimates are very approximate.

2.4.1 Electors Who are Blind or Vision Impaired

No trials within Australia have offered Internet voting to people who are blind or vision-impaired, so predictions on the take-up amongst people who are blind and vision-impaired have to rely on a combination of overseas experience, Australian experiences with electronic voting at polling places and pre-poll voting centres and to a lesser extent the Australian trial of Internet voting for overseas ADF personnel.

Data from the AEC electronic voting trial for blind and vision impaired electors at the 2007 Federal Election indicated that 4.2% of estimated local populations of blind and vision impaired electors in the locations of the trial voting centres actually voted using the trial system, whilst also noting that those population estimates might be subject to considerable error.

The Blind Citizens Australia survey found that if a usable system to vote via the phone or Internet was available for the next State General Election:

- 73% would prefer to vote from home rather than attend a polling place or pre-poll location; and

- 64% would choose to vote via the telephone or Internet rather than using a paper ballot.

This very high indicative acceptance rate may be higher than for the entire cohort of blind people in NSW due to the higher levels of political awareness implied by BCA membership and also could be expected to decrease with the inclusion of higher numbers of people with Low Vision. Consultation has also indicated that take-up is likely to be lower with older electors who have age-related vision impairment.

For electors who are blind a 30% take-up is estimated for the younger half of the group and a 5% take-up amongst the older half. Similarly split by age for electors with Low Vision; a lower 15% take-up is estimated for the younger half of the group and only 2.5% take-up amongst the older half.

This would indicate an aggregate take-up of approximately 10% across the entire group.

2.4.2   Other Potential Electors

The AEC trial in 2007 of Internet voting for ADF personnel deployed overseas had a take-up of 80% of ADF personnel deployed to the trial areas registering to vote in the trial (with the alternative being a postal vote) and 75% of these actually casting a vote in the trial. Participation was increased; with 50% of all deployed personnel casting a vote during the 2007 trial compared to only 23% who cast a vote during the 2004 Federal Election.

Estonia has made Internet voting available to all electors over four elections; local government elections in 2005 and 2009, European Parliament elections in 2009 and a general election in 2007. The take-up has increased with each election with Internet voters amongst total voters rising from 1.85% in 2005 to 5.4% in 2007 to 14.7% and 15.75% in the 2009 elections.

In a military environment a higher compliance rate may be expected so the Estonian experience is likely to be more indicative of take-up amongst people with other disabilities and people living in remote areas.

The estimated 1% take-up amongst people with other disabilities assumes that only a proportion will face significant difficulty with existing methods of voting and that promotional activities for iVote would predominantly focus on people who are blind or vision impaired.

For electors in remote areas it is expected that a take-up of around 10% is reasonable and that this may come from both those who previously would use a postal vote and those previously voting at polling places or other pre-poll locations.

2.4.3 Estimated Take-up for SGE 2011

Based on the above analysis, the following estimate of the potential take-up for the iVote system is presented below.

Table 2 – Estimated iVote Take-up Levels for SGE 2011

Group	Estimated No. of eligible electors	Estimated take-up for SGE 2011	Estimated No. of iVote users
People who are blind or vision impaired	70,000	10%	7,000
		5% to 15%	3,500 - 10,500
People with other disabilities	330,000	1%	3,300
		0.5% to 1.5%	1,650 - 4,950
People in remote, rural areas	6,500	10%	650
		5% to 15%	325 – 975
Total	406,500	Average of 2.7%	10,950
(Ranges in italics)		Approx. 1.3% to 4%	5,475 - 16,425

Putting this in round numbers, **the estimated number of iVote users is 10,000** within a range from **5,000 to 15,000 electors, based on 400,000 eligible electors.**

3.   VOTING OPTIONS

While the original focus of this report was on "Internet voting" options, it became clear during the consultation phase conducted with the blind and vision impaired stakeholder group, as described in the previous section, that the blind and vision impaired community had a strong preference for an audio or telephone based remote voting system to register their secret ballot.

Remote and disabled electors have not expressed such a strong preference either way. The preference of remote electors, in particular, is much more likely to be dependent on the availability of Internet connectivity.

On that basis, the focus of this report was broadened to establishing the feasibility of a remote electronic voting system, incorporating both telephone and Internet based remote voting capabilities.

3.1   The Current Situation for People Who are Blind or Vision-Impaired

Within the key stakeholder groups, the options available to vote in a State General Election vary between and across each grouping. For all stakeholders, the current options for casting their vote are as follows:

- vote on Election Day at a polling place;
- apply for a postal vote and complete (many are already registered as General Postal Voters); or
- other pre-poll options, which are;
  - come to pre-poll location/RO office and vote with assistance; or
  - vote with assistance at a nursing home or other designated institution.

For the blind and vision impaired electors, each of the above options requires assistance from a companion or family member or an electoral official to read out the ballot paper and record the vote.

For Local Government Elections there is the option of a Braille ballot paper, but with 52 Braille ballot paper votes cast at the last Local Government Elections, they are relatively expensive and are clearly not demanded by the majority of electors who are blind or vision impaired.

3.2   New voting Options being Considered

The options under consideration are voting via the Internet, voting via the telephone, or a combination thereof, and these are outlined below.

3.2.1   Internet Voting

Internet voting would be intended to be used by sighted electors (remote or with other disabilities), while also being usable by people who are blind or have low vision through assistive technology they already use to access the Internet.

The web-based ballot presentation would need to be compatible with current and popular web-browsers that may be found in electors' homes.

Characteristics of an Internet voting system would include:

- access control and authentication – to ensure that only authorised electors can gain access to the system, using credentials provided as part of a registration process;
- provision of easy to use on-screen (and audio) instructions on the operation of the system to enable an elector to cast their ballot for the Lower and Upper Houses as well as any relevant referenda;
- representation of the upper and Lower House ballot papers in a form consistent with the ballot papers used normally; and
- confirmation of the electors vote once completed and the option of going back to modify the elector's choices, and then a clear step to commit (cast) the vote.

For the Internet voting channel to be accessible to electors who are blind and vision impaired it will need to be compatible with:

- screen readers (such as "JAWS" from Freedom Scientific or "Window-Eyes" from GW Micro);

- screen magnifier applications for partially sighted electors (such as "Zoomtext" from Ai Squared and "Magic" from Freedom Scientific); and

- conform to accessibility standards, such as the World Wide Web Consortium's WCAG 2.0 (Web Content Accessibility Guidelines).

Requirements for both high levels of accessibility and high levels of security can sometimes conflict with each other, making it more difficult to provide Internet voting which is both secure and accessible for electors who are blind or vision impaired, even when security poses few difficulties for other electors.

3.2.2   Telephone Voting

It may be hard for a sighted person who is familiar with the NSW Legislative Council ballot paper (which included 324 candidates in 2007) to contemplate interpreting and navigating the ballot paper over the telephone.

Whilst it is acknowledged that it is not an easy proposition to vote "below the line" for the Legislative Council without seeing the ballot paper, this is exactly the difficulty faced by an elector who is blind, whether they are in the polling place on Election Day with a person assisting by reading the ballot paper, or if they are at home with someone assisting them to complete a postal vote.

The experience of electronic voting trials by the AEC and VEC has shown that whilst voting "below the line" can take a person who is blind or vision impaired as long as an hour, many have been pleased to do this since they are able to complete their vote in secret and without taking up the time of a person to assist them.

Whilst important to some electors who are blind or vision impaired, based on approximately 65,000 "below the line" votes received for SGE 2007, only about 150 people would be expected to vote "below the line" if iVote attracted 10,000 electors in total.

Telephone voting would use the public telephone network and a conventional telephone[4] to enable voting via an IVR system similar to that employed for telephone banking and other automated phone services.

Characteristics of a telephone voting system would include:

- access control and authentication – to ensure that only authorised electors can gain access to the system, using credentials provided as part of a registration process;

- easy to understand spoken instructions and spoken prompts for the voter on the operation of the system to enable an elector to cast their ballot for the Lower and Upper Houses as well as any relevant referenda entirely via the telephone keypad;

- speed and perhaps volume controls to allow electors to adjust the speed and loudness of the audio they are listening to;

- use of the twelve key telephone key-pad for data entry by users;

- a voting interface that waits for the voter and provides simple linear steps with neither too many instructions nor too many choices at one time;

- in-built spoken help for the user; and

- confirmation of the elector's vote once completed, by offering a means for reading out all selected candidates in preference order and the option of going back to modify the elector's choices, then a clear step to commit (cast) the vote.

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[4] A mobile phone could be used but the call charges and battery life make it less suitable, particularly if voting below-the-line, given the time required as mentioned earlier.

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3.2.3 Summary of Voting Options

The different stakeholder groupings are expected to favour different channels as follows:

Table 3 – Stakeholder Preferences

Group	Telephone	Internet	Comment
Blind & vision impaired	Majority	Minority	Strong preference indicated for telephone channel
Other disabled	Minority	Majority	Preference data not available
Remote Voters	Minority	Majority	Expect a preference for Internet channel

Based on stakeholder preferences and research into accessibility issues, in particular with regard to secure Internet sites, the outcomes achieved by the four options can be ranked as follows:

Table 4 – Voting Options Summary

Option	Outcome	Comment
Do nothing/current situation	Poor	No improvements for any stakeholders
Internet Voting only	Modest	Improved ability to vote for those who use the Internet
Telephone Voting only	Moderate	Good for electors who are blind but less useful for others
Internet and Telephone Voting	Good	Most stakeholders have improved access to a secret and independent vote

Based upon this assessment of the options, this report focuses on the **feasibility of offering iVote system which offers both Internet and Telephone voting channels**.

4.   iVOTE OPPORTUNITY ANALYSIS

A key objective of the remote electronic voting system is to complement (and not replace) the existing voting channels for the vision impaired, disabled and remote area voters of NSW.

A successful model would be expected to take advantage of the existing telephone service and "assistive technology" already available and used by people who are vision impaired, disabled and remote area voters, and thereby provide a private, secure means to cast their vote from home.

4.1   Success Criteria

The success criteria for introduction of an iVote system largely mirror the normal success criteria for any method of voting, as follows.

4.1.1   Privacy – a Secret Vote

One of the key drivers of this initiative is the right to a secret vote. Currently, people who are blind are unable to cast a secret vote, since either an election official or a person chosen by them must assist them in reading and marking the ballot papers.

Even in a recent trial of Braille ballot papers an election official would often check the ballot was properly completed because the elector who is blind or vision impaired may not know whether the pencil marked the paper or not.

The success of this initiative in this regard will be that an elector who is blind or vision impaired may, if they choose, successfully cast their vote independently.

Similarly for any elector using this model of voting, their vote must remain secret.

4.1.2   Access and Usability

Improvements in the accessibility and ease of voting are a key outcome for all the identified stakeholders.

This would include the ability to vote independently using iVote, however physical access to polling places is not part of the brief for this report. Whilst voting accessibility might be further improved by placing electronic voting in Polling Places as well as offering it remotely via the telephone and Internet, it would be prohibitive for the NSWEC to provide all the technologies at Polling Places for all those with a disability that prevented them completing a paper ballot without assistance. (Note the AEC trial in 2007 included only 29 locations at a cost of over $2M.)

4.1.3   Security, Auditability and Scrutiny

Community confidence in the electoral system is of paramount concern to the NSWEC and any new means of casting a vote must ensure that confidence is maintained.

Consequently any electronic voting system must:

* be secure from hacking and denial of service attacks;
* ensure only registered electors can cast only one vote; and
* the process, both electronic and manual, to capture and count the votes must be open to audit before and after the election event and be open to scrutiny during the election event.

These outcomes are achieved and supported in slightly different ways by the available electronic systems.

Collectively, these issues have all been addressed by successful implementations of electronic voting around the world (eg. Estonia and AEC 2007 ADF trial), so for the purpose of feasibility it is possible to implement a system with appropriate security, auditability and scrutiny.

However there are specific aspects of the proposed iVote system that will be different from other successful examples (eg. a "secure" military network for ADF trial and smartcard ID cards in Estonia), which will mean that security will be a critical stream to the procurement and implementation project for iVote.

4.1.4 Other Issues Such as Equality

All candidates would have to be presented to electors in an equal way, as the ballot papers do, without bringing any bias or changes to the order of presentation.

Since many of the primary stakeholders will hear the candidate names rather than read them, it will be important for any system to ensure that all names are correctly and consistently pronounced to all electors and with equal emphasis across announcement of all candidate and party names.

4.1.5 Take-up and Promotion

Whilst estimated use is 10,000 electors, the actual experience could vary significantly since electors will self-nominate for the new voting option, just as for postal vote applications.

Promotion in targeted media by NSWEC will aim to educate as well as promote the use of iVote by the stakeholder groups. Within the disability sector a number of organisations will be approached to help promote iVote to people with a disability and those in particular who are blind or vision impaired.

Dependent in part on the level and success of promotional activities; it would be prudent to expect and plan for between 5,000 and 15,000 electors using iVote.

However, given prior efforts in NSW and Australia to facilitate a secret vote for people who are blind or vision impaired, the initiative should be deemed **successful if around 5,000 votes or more are received through iVote** during SGE 2011 (when compared with around 850 votes for the AEC trial in 2007, around 200 votes for the VEC trial in 2006 and 52 votes using Braille ballot papers in the NSW LGE 2008).

4.2 Achievable for the 2011 SGE at Reasonable Cost

Whilst it is reasonable to expect a higher cost per vote for electors who are blind and vision impaired to use iVote to gain a secret ballot, there are limitations to the justifiable expenditure to achieve this outcome.

The brief for this feasibility report also sets the target as being for the SGE in 2011, which is only nine months away and places some tight constraints on a project to procure and implement the appropriate systems in time for the election.

The two constraints of cost and time are considered in section 5 'IMPLEMENTATION OUTLINE AND TIMELINE' and section 6 'COST ANALYSIS' later in this report.

4.3 The iVote Model

To assure feasibility of Internet and telephone voting via the proposed iVote system, considerable analysis has gone into preliminary design of the business processes that would be required for this to succeed.

The analysis has been beneficial in raising a number of issues that will need to be resolved and also in identifying potential impacts on other election processes and projects at NSWEC. Refer to Process Flow Diagrams in Appendix A (page 40).

The following design elements are indicative and may change during the implementation project.

4.3.1 Proposed Calendar for iVote Operation

Remote electronic voting would require pre-registration and the elector would typically cast their vote from home, which is basically the same situation as a postal vote. Consequently it is proposed that iVote closely mirror the postal vote and pre-poll voting in general.

An advantage of this approach is that the load on iVote is spread over 12 days, with significant benefits in regards to the ability of the NSWEC to support electors using iVote for the first time.

The following calendar in Figure 1 shows how iVote would fit within the election calendar in comparison to current processes.

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Figure 1 – Calendar of iVote and current processes
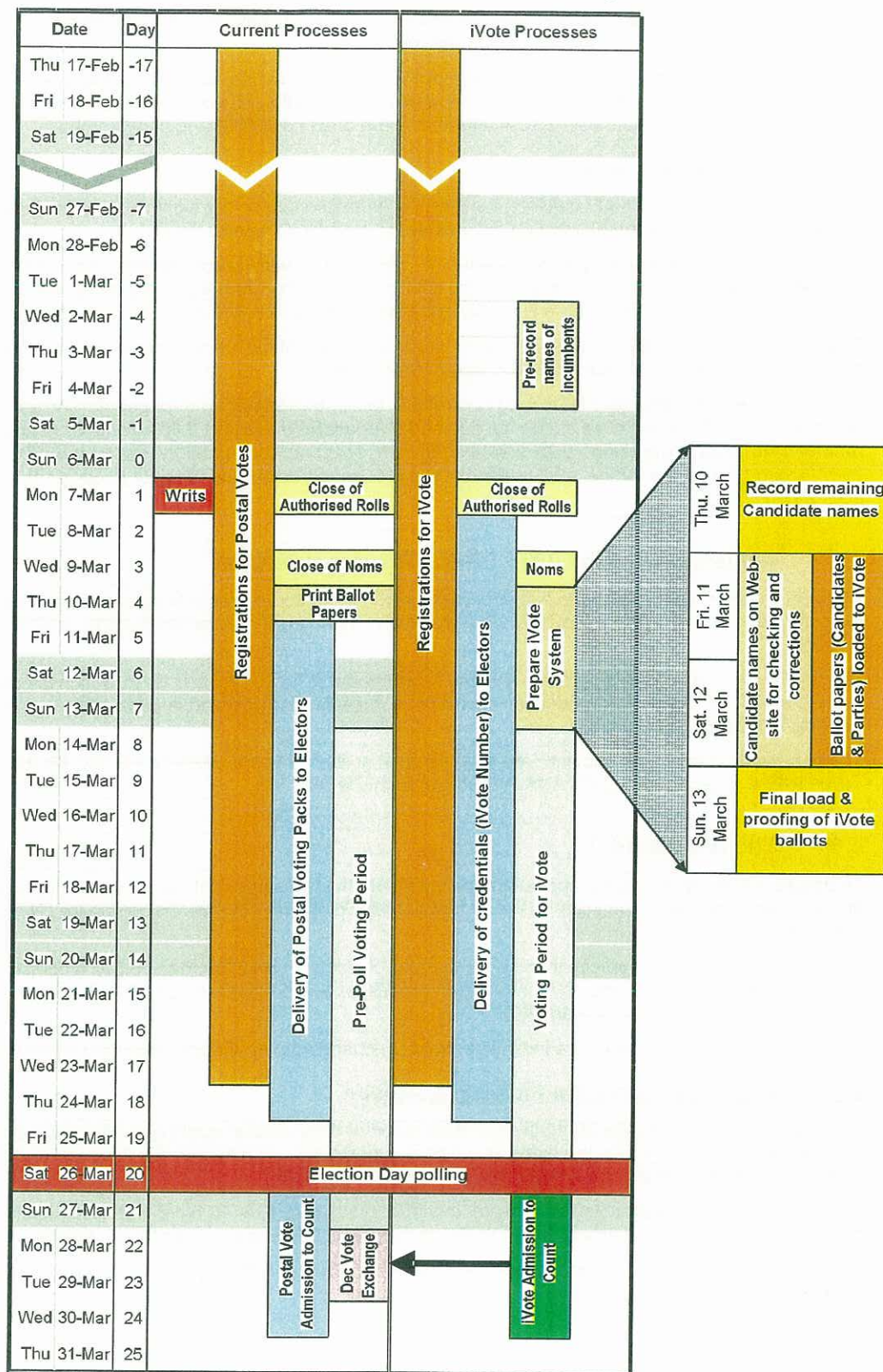
It appears feasible to load the ballot and candidate names into iVote to be ready for voting on Monday 14th March 2011. It may require more time in practice but is not considered a significant risk because the consequences of delaying the start of voting on iVote by one or two days would be minimal.

4.3.2 Vote Admission

The current measures in place to prevent the admission of multiple votes by an elector will need to be expanded to incorporate the iVote voting channels.

The first vote accepted takes precedence, for example; an elector would be marked as having voted at the time of voting in a pre-poll location and if a postal vote was subsequently received, the admission process checks whether the elector has already voted and so their postal vote would be discarded. Similar business rules will be applied to votes made using iVote.

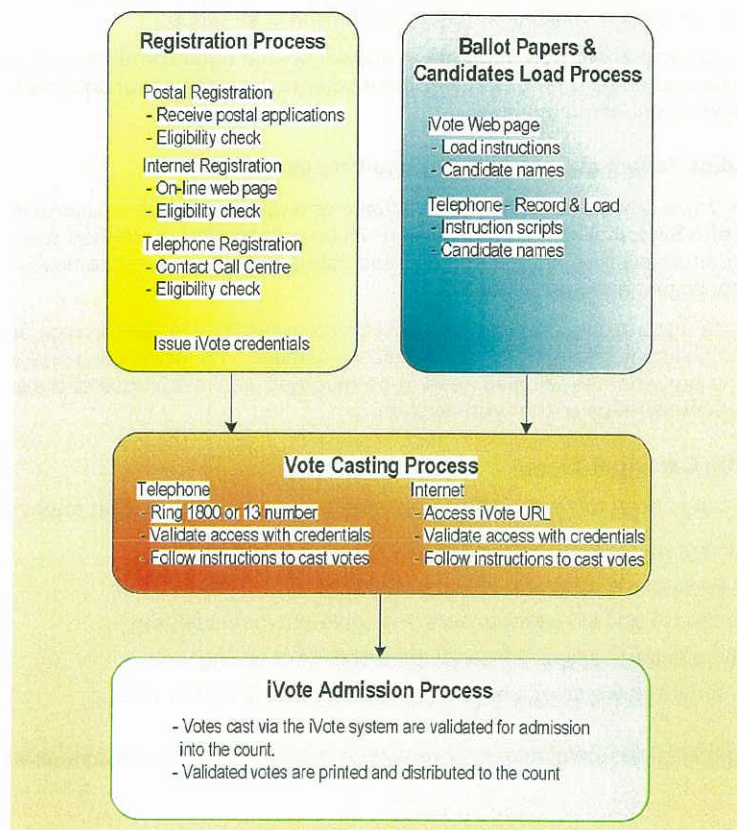### 4.3.3 iVote Process Description

The processes required for iVote are described below and depicted in Figure 2.

The four main processes are:

(a) registration of electors;

(b) loading candidate and ballots;

(c) casting votes; and

(d) admission and counting of votes.

Figure 2 – iVote Process Overview

A more detailed description of the processes is included in Appendix A (page 40).

(a)   Registration Process

The iVote system will require electors to register in advance, in a similar manner as required for registering for a postal vote. Consequently, it is proposed to leverage the existing registration processes for postal voting to support iVote.

As electors can apply online for a postal vote, there is no signature collected on the application but a "secret question" is used instead. The answer to the secret question is entered in the online application and must also appear on the declaration envelope for the votes to enter the count.

Similarly, an application to use iVote will collect a PIN (Personal Identification Number) chosen by the elector which must also be provided when voting in order for the vote to be counted. (A PIN of 4 to 6 digits can work well with both phone and Internet voting, whereas a useability expert has advised that non-numeric passwords are difficult to enter on a telephone.)

The iVote registration process would mirror the existing postal voting application process, except that instead of sending a postal ballot (ballot papers plus declaration envelope), the NSWEC would distribute the iVote credentials which will comprise a unique "iVote Number" (this could also be referred to as a "VIN" or Voter Identification Number) to the elector, which would be used in conjunction with their chosen PIN to vote using iVote via the Internet or telephone.

A new option is being introduced for SGE 2011 to enable electors to use the Internet to apply for a postal vote and a variation of this process could also be used for iVote registrations as outlined below. (The website would need to meet WCAG Internet accessibility standards.)

Whilst the existing postal vote registration processes will support many electors who would use iVote, they are not ideal for the core stakeholders who are blind or vision impaired. Consequently a staffed call centre is proposed to facilitate registrations for this core group.

A proposed demonstration system will be available, so that upon completion of the application, the call centre operator could offer to transfer the elector to the demonstration system to experience iVote and practise voting on the telephone.

(b)   Ballot Papers and Candidate Load Process

Professional voice actors will record all candidate and party names in a recording studio under supervision of NSWEC. Whilst the recording will be spread over more than one day the actor will be the same for all sessions to ensure that all candidate and party names are heard in the same voice and with a consistent and neutral tone.

In contrast, the instructions for using iVote will be recorded by a different voice actor in a different voice style to distinguish them from the candidate names. The instructions and a set of "dummy" candidate and party names will also need to be recorded well in advance of the election to enable testing and demonstration of the iVote system.

(c)   Vote Casting Process

The elector can choose to vote via the telephone or the Internet and each method will:

- check the credentials of the elector (iVote Number and PIN);
- deliver instructions by voice and/or written text;
- provide the LA and LC ballot papers in audible and/or visual form;
- allow the elector to select the candidates of their choosing; and
- clearly confirm the elector's selections before committing the vote.

After casting their vote, the elector may request a receipt from iVote as confirmation of voting.[5]

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[5] This feature will be dependent on the selected iVote vendor but will be in the form of a receipt indicating that a vote had been lodged and the time and date. This will not include any information that could indicate how the elector voted.

(d)   iVote Admission Process

The process for admitting electronic votes into the count will check if the elector has voted via other means (eg. Pre-poll or postal) to determine whether the iVote vote can be admitted into the count. Once the admission process has validated the vote, it will be printed and transferred to the relevant counting location for inclusion within the local count.

This process ensures that the ballot is separated from the elector identity, ensuring a secret ballot.

Note on maintaining a secret ballot in districts where a very small number of electors cast their votes using iVote.

Since the iVote ballots will be printed and may be on A4 paper; they will be identifiable from the usual hand-marked ballot papers and there is a risk that a scrutineer might observe a few iVote ballots being counted and be able to connect these to particular electors in a district with only a few iVote users.

With between 5,000 and 15,000 votes expected to be cast using iVote, the number of iVote ballots is likely to be sufficient to ensure secrecy is maintained in all districts. However, NSWEC already manages this risk with other voting methods (such as the arrangements for voting from Antarctica) and will use the following existing mechanisms to ensure secrecy of iVote ballots:

*   merge iVote ballots in with postal ballots and the declaration vote exchange; and
*   where the number of iVote ballots is below a threshold (say 20) for a district, election officials will, under supervision, manually transcribe the printed ballots to normal ballot papers before admission to the count and destroy the printed ballots.

In addition to the above, proven methods; NSWEC will also explore the possibility of making the iVote ballots harder to identify by printing on normal ballot papers rather than plain A4 paper.

4.4   Review of Available Technical Solutions

A review of the electronic voting systems available within the marketplace, both in Australia and overseas, identified a list of 19 potential vendors, though a number of these clearly focused on polling place devices, primarily for the US market. The potential vendors are listed in Appendix C (page 49).

The top 10 potential suppliers were contacted with a Request for Information (RFI), which sought to gain information on their capability, potential electronic voting offerings and indicative pricing. The RFI document is included in Appendix D (page 52).

Detailed responses were received from 7 vendors and this information was utilised within the analysis conducted for this feasibility report.

4.5   The iVote System – Architecture

The iVote system architecture implemented may vary from the description below once a software vendor is selected, however this outline reflects features available in a number of vendor solutions and has been used to test the feasibility of a technical solution.

Figure 3 - iVote System Architecture Schematic
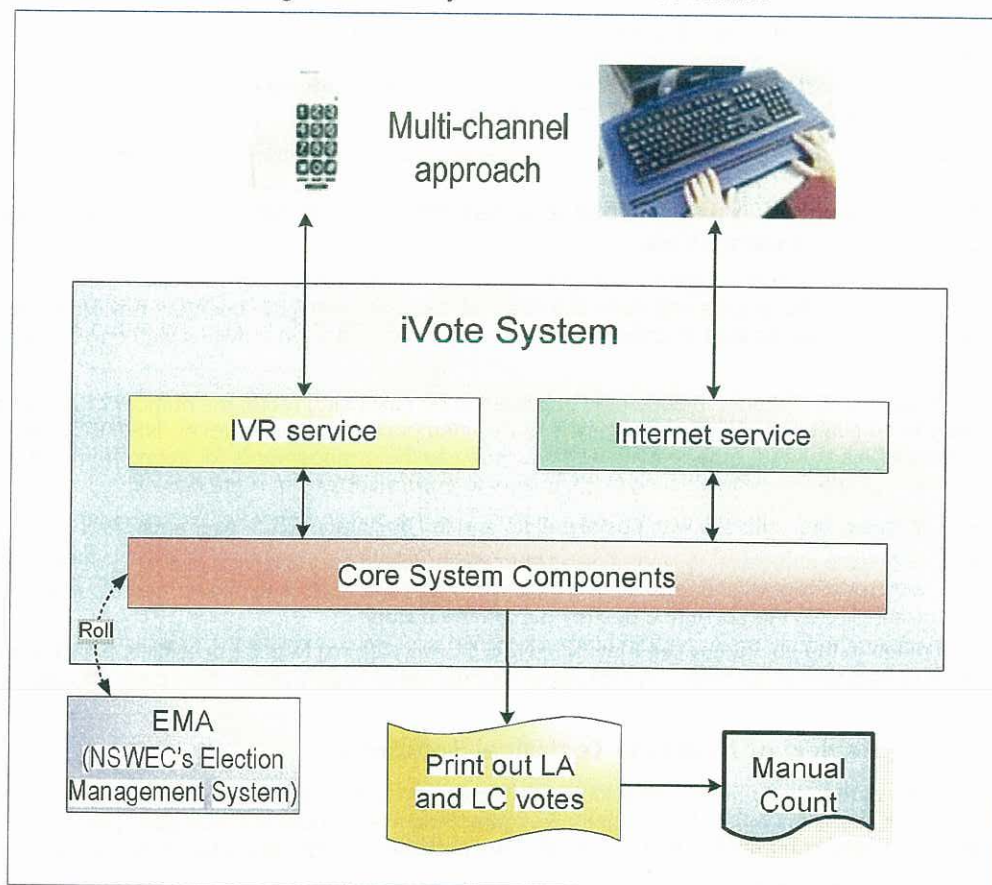
4.6   The iVote System – Functions

The following functionality descriptions may vary from the final system implemented following the procurement process, but are useful to inform the feasibility of the proposed iVote system and also to inform the creation of a Request for Tender (RFT).

4.6.1   Telephone Voting Sub-system

The telephone voting function would use the public telephone network and a conventional or mobile telephone to enable voting via an IVR system similar to that employed for telephone banking and other automated phone services.

It would offer the following functions:

- access control and authentication, to ensure that only authorised electors can gain access to the system, using the credentials provided as part of the registration process;
- easy to understand instructions on the operation of the system to enable an elector to cast their ballot for the Lower and Upper Houses as well as any relevant referenda entirely via the telephone keypad;
- speed and perhaps volume controls to allow electors to adjust the speed and loudness of the audio they are listening to;
- audio instructions and names of candidates and political parties would all be recorded under the control of the NSWEC using Australian pronunciations and accents, with all names spoken in a neutral form;

- a future enhancement will include multiple language support for the audio instructions, to reflect alternate languages prevalent within the NSW community (Note however, that the candidate names would only be recorded in English); and
- a standards base, such as VXML and others, including portions of AS/NZS 4263 Interactive Voice Response Australian Standard.

4.6.2   Internet Voting Sub-system

The Internet voting function is intended to take advantage of assistive technology employed by people who are blind or have low vision, while also being easily usable by sighted electors.

The web-based ballot papers, authentication, instructions and security will need to be compatible with various screen magnifier and screen reader applications (such as "Zoomtext" and "JAWS") used by the vision impaired and also compatible with current and popular operating systems and web browsers that may be found in electors' homes.

Ideally it should present the ballot as a simple web-page that conforms to WCAG 2.0 (Web Content Accessibility Guidelines).

It would offer the following functions:

- access control and authentication – to ensure that only authorised electors can gain access to the system, using the credentials provided as part of the registration process;
- easy to use on screen (convertible to audio) instructions on the operation of the system to enable an elector to cast their ballot for the Lower and Upper Houses as well as any relevant referenda;
- a means to have the names of candidates spoken aloud, based on the recordings for the telephone voting service;
- a standards base, such as WCAG; and
- a simple and direct linear voting interface that guides the voter toward submitting a formal vote, but which can allow them also to quit at any time before completing the vote and start again if they wish or vote via another channel or revert to attendance or postal voting.

4.6.3   Core Functions to Support Telephone and Internet Voting

The system design would need to preserve the fundamental requirements of NSW State General Elections:

- voter privacy;
- voter anonymity (secret ballot);
- system availability;
- equity of access;
- free from influence on voters or votes;
- one person one vote;
- open to scrutiny and audit; and
- provide a mechanism for identifying that an elector has lodged a ballot using the system.

The system will also need to securely store the lodged ballots during the voting period and deliver them to the relevant vote counting process:

- in the case of the Lower House (LA) ballot, this will require the ballot to be printed in order that it may be subject to the normal scrutiny processes and included within the local count;
- in the case of the Upper House (LC), this will require the ballot to be printed in order that it may be subject to the normal scrutiny processes and included within the count at the LC Counting Centre (an output file for transfer to the LC counting system could also be included, subject to appropriate security and scrutiny); or
- in the case of referenda, the lodged referenda will be printed for inclusion in the referenda count.

Facsimiles of the completed ballots would be printed following the close of the polls at a central location. Bar coding might be utilised as a further security feature whereby the barcode can be scanned to verify the vote has not been modified.

The NSWEC will despatch the printed ballots to the relevant counting location within each electoral district to be included in the manual ballot counting process.

The system may issue some form of receipt number to the voter on request as proof that they voted, without revealing the actual nature of the vote cast.

4.6.4   Registration

The current postal vote application processes, both online and by post, can easily be modified to support iVote registration. The reasons for applying will be different and the PIN will replace the signature or "secret question".

After close of rolls the registered electors who are on the Authorised Roll will have their iVote number sent to them by mail to their enrolment address.

With the primary stakeholder group being people who are blind or vision impaired, a telephone channel for registration will also need to be offered. A staffed call centre will be established to take registrations over the telephone and this could also provide support to electors trying to use iVote for the first time.

Modelling of the stakeholder group suggests that, of the estimated 10,000 electors;

* 7,000 might register via the call centre;
* 2,000 via the Internet; and
* 1,000 via the post.

This will account for a significant proportion of the cost of iVote, but is considered critical for both the take-up of iVote and the success of the voting process.

The call centre process is appropriate for the initial user group and scale, although in future if the user group is widened and the number of electors using iVote grew significantly, the registration process for the majority of iVote electors would have to be Internet based or IVR based to be more scalable and cost-effective.

4.6.5   Voting Session

The system would provide the opportunity for the elector to complete all required ballots within a single session.

During voting, the interface provides feedback to the elector in an attempt to prevent errors that may result in an unintentional informal vote. Without influencing the voter, the interface needs to make it clear to the elector what the choices are and what choices the elector has made. The feedback mechanism needs to provide summary information such as, "twelve candidates are not selected", rather than only listing the twelve non-chosen candidates by name. However, the names may be available as output from the system, on request.

The system should always let the elector know that their vote has been successful or unsuccessful. If the session is abandoned part-way through voting, it should be clear to the elector that the vote has not been submitted. Any kind of failure, suspicious events, user time-outs and so on should alert the elector so that it can be known at all times that the system is operational. Any error messages should clearly state to the elector whether their vote has been recorded or discarded and, if so, whether the elector can start over and get another blank ballot paper.

As an indication of the time required, the Upper House ballot paper may take a blind person over 60 minutes to complete if they choose to vote "below the line"[6].

Due to the amount of time required to complete a ballot paper, the system could also allow an elector to save a partially complete ballot paper and return to the system later to complete the ballot and vote.

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[6] Approximately 65,000 'below the line' votes were received for SGE 2007, which indicates that if iVote attracted 10,000 electors in total; about 150 people could be expected to vote 'below the line'.

4.6.6 Periods of Operation

The principal periods of operation for the iVote system are as follows:

- demonstration system available for electors who are blind or vision impaired to experience and practise upon from approximately 17 February 2011 onwards;

- iVote system open for registration from Monday 7 March 2011 through to Wednesday 23 March 2011 and open for pre-registrations (prior to close of Authorised Rolls) from approximately 17 February (similar to postal vote applications);

- iVote system open for voting from Monday 14 March 2011 through Friday 25 March 2011 (the same as the pre-poll voting period);

- iVote system centrally delivers/prints votes for counting after the election closes at 6pm on 26 March 2011; and

- the iVote system remains (minimally) functional and available for recounts, scrutiny and audit until the poll is declared for all the LA districts and the LC, this can be up to 40 days after Election Day.

4.6.7 Accessibility

The system should meet or exceed World Wide Web Consortium Accessibility Group (WCAG AA) or similar standards.

Vendors' experience in designing systems for use by the vision impaired and prior work with blind, vision impaired and other disability representative bodies is of interest to the NSWEC.

4.6.8 Pronunciation of Candidate Names

NSWEC will ensure correct pronunciation of candidate names and party names is provided as voice files. These will need to be used for Telephone system users and must be available to users of the Internet system who are using a screen reader to vote via the Internet. (Candidate names may not be consistently or correctly pronounced by the various screen-readers.)

4.6.9 Multiple Language Support

Whilst candidate names would only appear in English, the system instructions for the Internet and telephone channels could be made available in different languages, both written and spoken.

All of the vendors responding to RFI have the capability to support multiple languages; however it would fall to the NSWEC to arrange for the translations and the recording of the audio instructions in the additional languages.

The NSWEC currently offers some materials in 8 languages, in addition to English. There are also voting instructions produced for State General Elections and Local Government Elections in 24 languages other than English.

Each additional language would add around $20,000 to $30,000 to the cost of implementing iVote and, given that this is the initial implementation of iVote and that it is for a limited group of electors, it is currently planned to offer iVote with instructions in English only.

4.6.10 Parallel Voting System

To the extent possible, the iVote system should mirror the normal pre-poll voting processes associated with a NSW State General Election, which starts five days after the candidate nominations close and runs for two weeks (14 March to 25 March).

4.6.11 EML and Modular Design

The NSWEC favours an EML type modular messaging system which implements some or all of these features:

- modular design with clear separation of the parts of the system which must be trusted;

- uses open protocols such as XML or EML such that communication between modules can be inspected;

- uses common techniques and formats for security such as RSA and AES and not proprietary and undocumented methods for cryptographic primitives; and

- provides interfaces to aide integration with NSWEC systems for provision of election configuration, emission of election outcomes and reporting of election states, errors and other dashboard information.

4.6.12 Scalability

For procurement purposes a number of 15,000 electors, being the upper range of estimates, will be used as the capacity for the system to be introduced.

Given the use of a call centre to support the registration process, this is likely to be the main constraint rather than the voting capacity via iVote. In case of much higher than expected levels of registration with the call centre, this would be managed by contingency planning.

4.7 iVote System Security and Scrutiny

Electronic voting systems, such as iVote, present different issues to a traditional paper ballot process in regards to security and scrutiny of the election. These issues need to be specifically addressed to ensure that confidence in the system is maintained.

Broadly speaking, election security issues fall into the following two categories:

1. Risks of individuals or groups gaining improper access to the election process or materials to corrupt or tamper with the results, to obtain confidential information or to prevent successful conduct of the ballot.

   For an electronic voting system these security risks are similar to anything accessible via the Internet: securing access, hacking to corrupt/tamper or extract confidential data and denial of service attacks.

2. Risks of election workers/officials attempting to corrupt or tamper with the results, or to obtain confidential information.

   These security risks are similar for an electronic voting system: insider attacks that seek to corrupt, tamper or extract confidential data

The next two sections of the report (*4.7.1 Security* and *4.7.2 Scrutiny and Transparency*) provide more detailed analysis of these risks and how they will be successfully addressed through prevention measures that include the following:

- strong network security provisions applied to the network infrastructure and iVote servers to ensure the integrity before, during and after the voting process;

- extensive scrutiny of the system to provide an additional level of confidence that it is performing in accordance with the voting requirements and that does what it is supposed to do and that there are none of the security breaches, as identified above;

- audit trails and system logs recording all activities and changes; and

- quorum based access controls for election administrators, e.g. if the system requires insiders to handle certain technical events, then this should always require a quorum (say three or more people) to enact.

4.7.1 Security

Although usage will be limited to the target audience of stakeholders, the security of the system still must be commensurate with its use for the election of a State Government.

From an expert report on electronic voting[7] commissioned by the NSWEC; the commonly cited classes of risk and known defences for providing remote elections are outlined in Table 5.

Table 5 – Risks and Defences for Remote Electronic Voting

Risk	Defence
Hacking: One or more hackers attempt to penetrate the election web servers or supporting infrastructure.	Internet servers need to not hold votes in a form that can allow the votes to be seen, modified or deleted before they are received by the NSWEC. As above, the votes are encrypted before they are received by the web server. The web server list of allowable PIN/VINs is checked online as well as off-line. In short, trust of the collected votes and authentication are replicated in a number of places and segregated from key public services such as the web server.
Viruses or malware: a virus is spread or a worm propagates that is designed to change voter's votes on their PCs.	An advantage of REV is that attackers do not know what PCs are going to be used for voting. This means they must widely seed systems with viruses. The larger the virus attack, the more likely it is to be detected. If the attacker seeks to simply disrupt the service, the attacker would use a Denial of Service attack (as below).
Distributed Denial of Service (DdoS) attack against the REV servers.	The provider's design should be distributed so that there are several services providing REV. In addition, DdoS deflection services have advanced the kind of defence that can be mounted against such attacks.
Phishing: voters are directed to a fake REV site. Their PIN/VIN is stolen and used.	Again, phishing attacks are more successful where the attacker knows and can reach the target audience such as with known individual targets or business targets (so called "spear phishing"). With REV, the phishing attacker has to cast a wide net and is at greater risk of detection. In addition, any voters using REV will be the recipients of a voter education programme. A receipting system would also expose that an elector's vote was not submitted by them.
Undue influence: Coercion, family voting or vote selling	It is possible to allow voters to log in and vote more than once with their last vote being the only vote tallied. This does not remove the risks of undue influence but it does make it harder for the coercer or buyer to be sure that the votes they influence are the votes that are eventually counted.
Commercial or industrial interruptions	The supplier must provide redundancy in their designed services at all levels so that there are no single points of failure. This includes using data centres controlled by more than one company.

Individual vendors are unlikely to have addressed security in exactly the same way and NSWEC will not specify a particular security solution as a requirement of the RFT.

In evaluating vendor proposals with regard to security, NSWEC will apply at least the following selection criteria, whilst also seeking to ensure good accessibility is maintained:

- support for scrutiny of the election process including possible deep audit by a NSWEC appointed auditor and/or specialist election scrutineers who may be members of the general public or selected academics who are experts in security;

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[7] Alternative Voting Methods for Vision Impaired Electors, Nesci & Burton 2009

- robust and secure architecture to ensure a high level of availability during the voting period, with no single point of failure and no single storage locations in the system design;

- resistance to hacking of the server devices and/or a highly tamper-evident design;

- protections against insider attacks and/or tamper evident features;

- protection of system from attacks via the user's device (virus etc.);

- in the case of Internet voting, no information relating to a voting session shall remain on the home computer once the session has been completed;

- appropriate handling of voters who attempt to use unsupported browsers;

- no indeterminate states and no silent failures;

- use of modern security techniques to ensure reliable and accurate operation, and a security-in-depth design is preferred;

- maintenance of voter privacy;

- protection from identity theft; and

- protection against various denial-of-service attacks or support for hardware and network protection that may be put in place in a web hosting data centre.

Most of the potential vendors that responded to the RFI have sophisticated security mechanisms to allow them to safely offer remote electronic voting and have satisfied other electoral bodies on this matter in the past.

Consequently, this report concludes that security concerns are not an obstacle to proceeding with remote electronic voting in NSW: Security remains an important issue to be managed during both the procurement and implementation of iVote.

4.7.2   Scrutiny and Transparency

Scrutiny of an electronic voting system has additional requirements to scrutiny of manual election processes. The concern is with validating security claims of a REV system, which needs to guarantee privacy, secrecy, and other democratic outcomes of vote casting.

A system provider's claims about software security techniques require a number of audit processes to confirm their techniques have been implemented properly.

It is also necessary to audit that the system is used properly for the security design it implements. This arises from the fact that most major security incidents arise out of (human) misuse of (otherwise adequate) security systems.

The UK Electoral Commission extended its notion of registered observers in the 2007 trials to include academics and community group members. Once registered, these observers were given (supervised) access to data centres and requested to see voting servers, early demonstrations of the systems used and reports and other information exchanged between the UK Government and providers. This registered observer model is probably the best model to follow since it results in proper identity management, exclusion of known troublemakers and an executed legal agreement for observers.

The processes which might be scrutinised without security or privacy risks to the election are listed below.

- Observers can watch operators setting up the election. With the exception of the keying in of passwords, all of these operations can be designed to be observed without risk.

- Observers can read the operator manuals and the system manuals.

- Access to election technical set up and "business rules" to show technical observers the "settings" NSWEC has used to configure the iVote system.

- Demonstration systems: Any observer and any member of the public should access a freely available demonstration system that collects an actual test vote. (This has already been incorporated into the implementation plan.) In addition, it should be considered that any source codes specific to the demonstration system are made available along with testing documentation.

- Testing harnesses: Any software that is needed for testing (such as decryption tools), including dummy security keys. This allows a technical observer to go further and explore how their test vote was captured.

- Live system testing scripts and documentation: These scripts are used for acceptance of the live system. All of them should have been run and ultimately passed prior to observer access.

- System design documents, development information and standards used in development and testing.

- Configuration / Release Management: A form of version control documented and managed to prove that audited systems are the production versions operating the live election.

- Some form of digital signatures should be offered so that scrutineers and hopefully also voters can validate the system they are using. There must be some form of version control and lock down to prove that audited systems are the ones that go on to run the live election.

- System artefacts: The process of votes being printed and the electoral roll audit (that the number of printed out votes matches the number of marked electoral register entries). That the number of system logins is greater than or equal to the number of votes emitted, and so on.

Information that should be withheld from the general public and only provided on request after the election is shown in Table 6.

Table 6 – Information for Controlled Scrutiny Only

Item	Reason
"White hat" penetration testing reports	These are the results of a "hired hacker" attempting to break in to the systems.
System logs	The system logs are created as the exhaustive record of all actions taken by the computer system and its users during the election.
System access	Any kind of technical access to systems, even by the auditors, has to be indirect and mediated by the NSWEC.
Threat analysis	A description of the threats to the REV system will necessarily give manageable risks.

In addition to the scrutiny over the operators and the system, electors themselves should also be given the ability to confirm the inclusion of their vote via a voter receipt.

All of the above will be incorporated into the RFT and, pending the selected vendor, will be considered within the implementation plan.

More details on scrutiny and transparency are provided in Appendix B (page 46).

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5. IMPLEMENTATION OUTLINE AND TIMELINE

5.1 Project Timeline Feasibility

A preliminary timeline was developed on the basis of the primary constraint, namely the election date for SGE 2011, in order to determine a reasonable allocation of time to the range of tasks that needed to be completed to achieve the required outcome.

These milestones were included within the RFI documentation and respondents were asked to indicate if they had the capability to deliver such a solution within the nominated timescales and within the New South Wales electoral environment.

From the information received, most vendors indicated that even though the timeline is short, they are in a position to meet NSWEC's requirements. Most provided qualified indications that this could be achieved, subject to how much adaptation and configuration had to be provided to their existing product suites.

5.2 Proposed Implementation Plan

On the basis that the initial indication suggested that the overall timeline was achievable, planning was undertaken to further verify that the program in the Implementation Plan was feasible. The outcome of that analysis was the detailed task schedule that is included in Appendix E (page 59).

A summary version of that program is presented in Figure 4, below.

Figure 4 – Indicative Implementation Plan for iVote
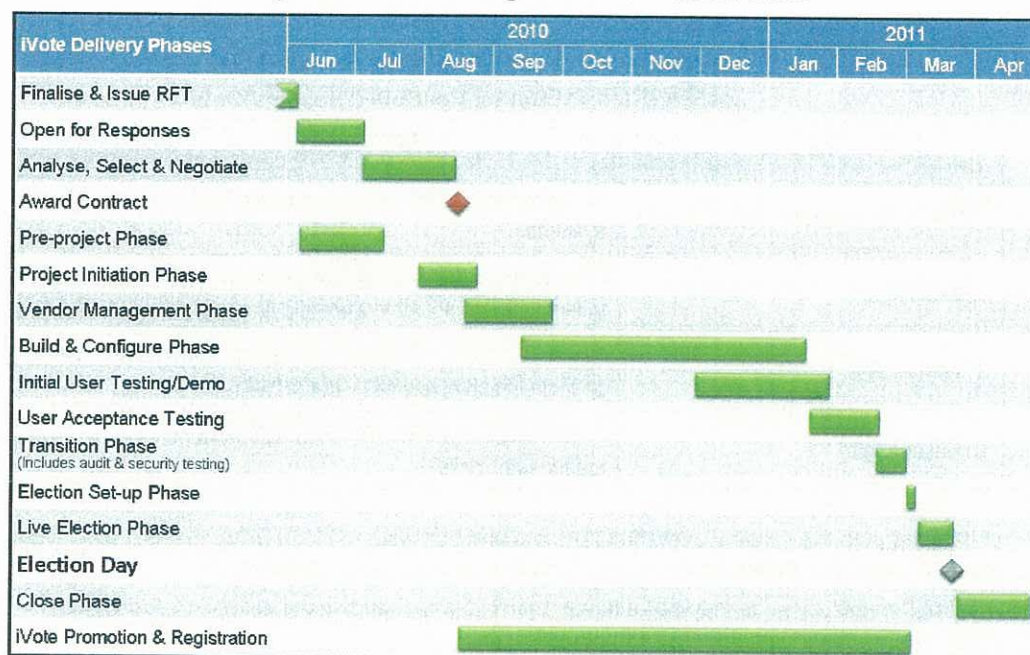
This timeline has been developed to ensure that the project proceeds at a sufficient pace to ensure that iVote is successfully implemented in a timely manner and ensuring that due process is followed.

Significant resource levels for the project and contract management team have been included within the project plan to ensure a strong management focus on achieving the project outcomes within this timeline.

Since the supplier of the system will not be known until August, the detailed Implementation Plan in Appendix E will be revised in August in conjunction with the selected supplier.

5.3   Project Risks

The most critical project risks are as follows:

- the iVote system will not be implemented in time for the 2011 SGE;
- the iVote system will not meet the objectives of providing a secret ballot for the nominated stakeholders;
- approval and allocation of full project funding; and
- enacting the necessary enabling legislation for the operation of the iVote system for the SGE.

A list of the project risks has been included within Appendix F (page 65).

5.4   Risk Mitigation

The key elements to mitigating the potential risks for the project are outlined in the following sections.

5.4.1   Project Management

The NSWEC will appoint a project manager and establish governance structure to:

- manage and oversee iVote contractor;
- co-ordinate the information and materials that will need to be provided to the contractor;
- manage/coordinate the internal NSWEC tasks and activities necessary to support the iVote implementation;
- manage/co-ordinate external resources, such as a specialist useability advisor, necessary to support the iVote implementation; and
- liaise with stakeholder groups.

5.4.2   Procuring the Technical Solution and Required Services

It is proposed to conduct a competitive tender process to select a suitably qualified vendor for the iVote application and associated services. In particular, this will include:

- iVote application software;
- iVote hosting services; and
- generation and management of the iVote credentials.

Preliminary work has already commenced on the preparation of the RFT documentation.

Discussions have commenced with NSW Procurement to determine the approach for the preparation of the RFT. An application has been submitted to NSW Procurement for an exemption under Clause 38 of the Public Sector Management (Goods and Services) Regulation 2000, and SCCB Delegation 16. NSW Procurement has indicated that they do not have the available resources to undertake the iVote System procurement. They have further indicated that the NSWEC would be in a better position to conduct the tender process and to utilise the NSW tendering infrastructure to publish the RFT and receive the tender responses.

Other elements of the overall iVote solution will be procured within existing arrangements available to NSWEC. This would include:

- registration call centre services;
- hardware;
- voice recording services for telephone voting ballot papers and instructions; and
- marketing and promotion.

5.4.3   Assuring Appropriate Security

The security, privacy and integrity of the iVote system will be critical factors for its success. Consequently, these features will receive a critical focus within the system specification and the evaluation of the tender responses.

In addition, a number of process steps have been developed, including audits of the software and systems to verify the security, traceability features and scrutiny provisions to ensure that the security of this system is maintained and managed during the election period.

5.4.4   User Testing and Demonstration System

It is proposed to engage people who are blind, vision impaired or with other disabilities as well as sighted people to test the usability and accessibility of the iVote system as part of the system development and user acceptance testing. In addition, security testing, covering both internal and external attacks, and software audits will be undertaken to verify the integrity of the iVote system.

A demonstration system will be made available prior to the actual voting period to enable the potential system users to gain confidence in the system's use and operation. This facility will also provide an opportunity for potential users to provide feedback on the system and an indication of the potential take-up of the system prior to the voting period.

5.4.5   Independent Review after Election

In addition to any security reviews or audits that may occur after Election Day, there will be an independent review focussed on confirming whether iVote delivered the desired stakeholder outcomes and capturing any improvements that could be made to iVote, including the processes, system and promotion before use at other election events.

This might included surveying iVote registered electors and/or conducting focus groups with NSWEC staff and selected electors.

6.   COST ANALYSIS

A cost analysis was undertaken to determine the expected costs associated with the implementation and operation of the proposed iVote system. This analysis was based on the information provided by vendors through the RFI process and estimates of the associated costs necessary to manage the implementation, and identification and development of the high level processes to support the introduction and operation of the iVote system within the existing voting systems.

6.1   Project Funding

The initial funding allocation for the project was $1.5M and this was based on some early reports prepared for the NSWEC which suggested that the actual remote electronic voting system costs would be in the range of $750,000 to $1,000,000.

However, the analysis undertaken as part of this report has found that while the initial estimates of the system costs were within range, a number of other issues have emerged and needed to be addressed in order to implement the system in a robust and complete manner. In particular these include:

- the need to provide a greater focus on the telephone voting channel for the iVote system for the blind and vision impaired community;

- the need to develop an iVote registration system to enable potential iVote users to register, which includes checking their identity, their eligibility and issuing the iVote system credentials that will enable access to the system;

- provision of a call centre to support electors using iVote and as a channel for registrations;

- the need to fast track the implementation process in order to ensure that the system is operational for the SGE 2011, requiring a larger level of project and contract management resources from NSWEC;

- a greater focus on promotion and usability to ensure the service is well publicised and is easy to use; and

- provision of a demonstration system to facilitate elector familiarity and acceptance of iVote prior to the actual voting period.

6.2   Costing Assumptions

The cost estimates have been developed for the potential implementation of an iVote system based on the following assumptions:

1.   the initial implementation of the iVote system is for SGE 2011;

2.   the design capacity for the initial implementation is for 15,000 electors, to cater for a projected take-up level of 10,000 electors;

3.   the design capacity for the system (software and hardware) will be 15,000 electors;

4.   the implementation project will commence in June 2010;

5.   an iVote Registration Call Centre will be provided to accept registration requests for potential iVote users;

6.   a number of interfaces will need to be established with existing systems such as EMA and the Candidates web-site;

7.   the iVote marketing and promotion campaign will include radio (including regional and Radio for the Print Handicapped), Internet and selected print publications; and

8.   the system will be operational for the pre-poll election period and then closed for voting on the day prior to Election Day. The system will be shut down after vote admission and post-election system audit.

6.3 Developing the Budgetary Cost Estimates

Budgetary cost estimates for the proposed iVote system include the following elements:

- the median system costs for the software and services based on the pricing provided by the respondents to the RFI;
- the project management, contract management and specialist advice that will be required to ensure the timeline is achieved to meet the deadline imposed by the 2011 SGE;
- the establishment of a call centre based registration system;
- marketing and promotional costs, including educational materials and advertising the availability of the new iVote option;
- internal costs for specification, procurement and delivery of system;
- call centre costs for elector registration and voter support for using iVote;
- hardware costs (servers and printers) for equipment specifically required to support the iVote system operation;
- equipment and IVR hosting costs during testing, demonstration and operational stages of the project; and
- a contingency of 20%.

6.4 Summary of Estimated Costs for iVote

The budgetary cost estimates for the implementation of the iVote system are based on take-up of 10,000 users (with a design capacity of 15,000 users) and are presented below in Table 7.

Table 7 – Cost Estimate for Initial iVote System Implementation

Item	Estimated Cost
Project & Contract Management	$419,577
Procurement & Specialist advice (including Report preparation and initial RFT development)	$494,490
Registration & Support	$290,000
iVote System Software & Configuration	$900,000
Voice Script Recording	$25,000
Interfaces to Existing Systems	$85,000
Hardware	$94,000
Equipment & IVR Hosting	$104,125
External Audit & Testing	$75,000
iVote Awareness & promotion	$200,000
Contingency (20%)	$512,438
TOTAL (Ex GST):	**$3,199,630**

There are a number of significant one-off costs that impact on the initial implementation, which include:

- procurement of the iVote software application;
- adaptation and configuration of the iVote software application;
- establishing the Registration system;
- strong emphasis on project and contract management for a fast-track project; and
- specialist support for design and specification of the accessibility and usability aspects of the system.

7. CONCLUSIONS

7.1 Feasibility of iVote

Remote electronic voting via both the telephone and Internet would effectively address requirements of the identified stakeholder group for:

- privacy;
- independence;
- accessibility and
- usability.

The preceding analysis of the proposed model and available technology has demonstrated that:

- suitable technical solutions and support appear to be available;
- appropriate security, auditability and scrutiny can be achieved;
- the estimated costs and timeline are reasonable for delivery for the State General Election in March 2011; and
- other issues such as equality, registration of electors, admission of votes, promotion and education of the target elector groups, etc. can be successfully addressed within the procurement and implementation plan.

> **Consequently, this report concludes that it is feasible to offer iVote for the 2011 State General Election to electors who are blind, vision impaired, with other disabilities or are living in remote rural locations.**

Whilst feasible, the eventual success of iVote will require a number of elements to conform to expectations, but in particular that:

- the RFT process confirms that at least one vendor has the capability to deliver a system within the costs of their indicative pricing;
- the implementation plan is able to commence with the RFT process in June 2010;
- the funding (additional to the initial $1.5m) is approved by August 2010;
- enabling legislation is passed by Parliament by December 2010; and
- sufficient marketing effort is made to promote iVote and educate potential users.

7.2 Budget Required to Select, Implement and Operate iVote

The budget of $3.2m as identified in Section 6.4 is yet to be approved, although $1.5m has already been allocated to this program.

In order to achieve the implementation of the SGE 2011, the NSWEC commenced the project. In practical terms, work has already commenced with the release of the RFI in April 2010 and work on the preparation of the RFT documentation has also begun.

Funding approval for the additional $1.7M should occur prior to entering into a contract (estimated for August 2010) with the iVote vendor.

7.3 Project Approach

The proposed approach that will be adopted by the NSWEC will be to proceed with the project through a series of decision points where the progress of the project will be reviewed and the decision to proceed made.

The key decision points are outlined in Table 8.

Table 8 – iVote Implementation Decision Points

Decision Point	Criteria	Comments
1. Completion of the tendering process. **(August 2010)**	a. A preferred tenderer has been selected b. The tenderer's solution is achievable within the required timescale c. The tenderer's solution is achievable within the budget	With the successful outcome of this phase, and satisfying all the criteria, the decision will be made to proceed to contract award and initiation of the iVote voting system implementation.
2. Full funding approved and allocated **(August 2010)** *Note that if the approval was delayed, the initial $1.5m funding will allow continuation until* **end September 2010**	The full funding required for the project is approved and allocated by NSW Treasury. ($1.7m in funding needs approval and $1.5m is already approved and allocated)	With funding approved the project will be able to run to completion. Failure to provide funding approval will result in a decision to terminate the project. *An estimated cashflow projection has been prepared and is presented as Table 9. This indicates the expenditure of the $1.5m as the implementation progresses.*
3. Implementation Phase **(August to December 2010)**	a. Development and implementation proceeding according to schedule b. Development and implementation proceeding according to budget	Failure to meet these criteria during any regular review points will result in a decision to terminate the project by the Electoral Commissioner.
4. Enabling Legislation **(December 2010)**	Enabling Legislation passed.	With the enabling legislation passed, the project can proceed to testing, demonstration and operational phases. If enabling legislation for the operation of iVote is not passed by December 2010, then the project will be terminated.

In the event that the project is terminated, the project outputs will be preserved for potential use in the future.

With the need for enabling legislation and additional funding, combined with the need to commence procurement in June 2010, it is important to understand the cashflow commitment at each milestone in the project, in case at some time it may be decided to cancel the iVote project.

The expected cashflow commitment by NSWEC for the project is presented in Table 9.

Table 9 – Cashflow Commitment for Initial iVote Implementation

Period Ending	Major Tasks/Milestones	Cumulative Total
30/06/2010	Feasibility Report preparation and RFT preparation RFT released	$230,008
31/07/2010	RFT Evaluation	$335,017
31/08/2010	Contract Negotiation Award of Contract to iVote Supplier	$440,025
30/09/2010	iVote design Progress Payment	$1,257,834
31/10/2010	iVote development	$1,549,460
30/11/2010	iVote development Progress Payment	$1,751,086
31/12/2010	Progress Payment Enabling Legislation in place	$1,919,242
31/01/2011	Hardware procurement System testing and Audit System interfaces development	$2,283,198
28/02/2011	Registration system development	$2,691,404
31/03/2011	System operational	$3,155,860
30/04/2011	Post-election system shutdown	$3,199,630

Note that the contract commitments are assumed, pending selection of a tenderer and consequently the progress payments shown may change once a contract is negotiated with the successful tenderer.

7.4   Legislative Changes Required for SGE 2011

The principal Act will need to be amended with supporting subordinate regulations to enable the use of remote electronic voting for SGE 2011. This could take a number forms and, for the flexibility needed to expedite the implementation plan, it would be preferable for as many aspects of remote electronic voting as possible to be left to the discretion of the Electoral Commissioner.

The drafting of changes to the legislation would need to consider a number of points, including:

- reflecting the fact that iVote could be either telephone based or Internet based or both;
- that the legislation might refer to "electronic voting" as a more all-encompassing term;
- that current legislation only contemplates paper ballots, which will become both "virtual" and also voice-based scripts;
- whether the legislation be continuous or have a "sunset clause" to be reviewed after SGE 2011;
- that scrutiny of an electronic system consists of audit and testing rather than visual observation;
- whether an elector registering for iVote should be doing this for one election or until requesting otherwise; and
- allowing the Electoral Commissioner to adapt iVote with advances in technology and security.

The legislative changes will need to be enacted before iVote can be launched which, in practical terms, means December 2010 at the latest.

If it was desired to maximise the potential return on the initial investment in the iVote system by using it for LGE 2012, similar legislative changes will also be required to the Local Government legislation to enable the use of the system within that context as well.

7.5   Using iVote for Future Election Events

In order to identify the cost sensitivities associated with the proposed iVote system, a number of scenarios have been considered for iVote cost estimates, namely:

1.   Initial implementation of the iVote system for SGE 2011 based on an estimated take-up of 10,000 electors as already outlined above.

2.   Subsequent operation of the iVote system at a future state-wide election event, such as the 2012 Local Government Elections[8], again assuming a take-up of 10,000 electors. This scenario demonstrates the underlying cost structures associated with the on-going use of the system.

3.   As above, but with a take-up of 50,000 electors (See Table 10, below). This scenario demonstrates the impact of user take-up levels on the "Cost per Vote" indicator for the system.

Operation of the iVote system at a by-election event has been considered but the estimated iVote usage of 150 electors suggests that it would be more viable to offer a telephone solution similar to the solution the AEC will provide for the 2010 Federal Election.

7.5.1   Future Take-up

With successful promotion at a subsequent election event and in particular to the wider group of people with other disabilities, the take-up could be expected to build on to that achieved at SGE 2011 and an estimate appears in the following table. These estimates should be considered somewhat speculative, pending knowledge of the actual take-up for SGE 2011.

Table 10 – Estimates of Future Take-up for Proposed iVote System

Group	Estimated of eligible electors	Take-up estimate for SGE '15 ('11)		Estimated No. of iVote users
People who are blind or vision impaired	77,000[9]	25%	(10%)	19,250
People with other disabilities	330,000	9%	(1%)	29,700
People in remote, rural areas	6,500	20%	(10%)	1,300
SGE 2015 totals	413,500	Average of 12%		50,250

7.5.2   Cost Estimates for Future Events

By extending the costing model to consider the three scenarios outlined earlier gives a perspective on the opportunity to use iVote for future election events.

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[8] Note: this assumes that further legislative changes were made to enable the use of the iVote system for Local Government Elections.
[9] Assumes 10% growth over 4 years as cited at the end of Section 2.3.1

Table 11 – Cost Estimates for iVote System - Future Scenarios

	Scenario 1	Scenario 2	Scenario 3
	Estimated Cost for SGE 2011	Subsequent LGE or SGE	Subsequent LGE or SGE
Capacity (No. of Users)	10,000	10,000	50,000
Project & Contract Management	$419,577	$64,950	$64,950
Procurement & Specialist advice	$494,490	$40,000	$40,000
Registration & Support	$290,000	$161,000	$556,500
iVote System (Licensing & Support)	$900,000	$330,000	$680,000
Voice Script Recording	$25,000	$25,000	$25,000
Interfaces to Existing Systems	$85,000	$10,000	$10,000
Hardware	$94,000	$0	$188,000
Equipment & IVR Hosting	$104,125	$62,833	$172,480
External Audit & Testing	$75,000	$35,000	$35,000
iVote Awareness & promotion	$200,000	$150,000	$150,000
Contingency (20% for scenario 1 and others at 15%)	$512,438	$131,818	$288,290
TOTAL (Ex GST):	**$3,199,630**	**$1,010,601**	**$2,210,220**
Cost per vote	$320	$101	$44

7.6   Cost Benchmarking

The "average cost per vote" is often used as a comparative measure of cost effectiveness for voting systems. The following table presents the average cost per vote for the traditional paper-based voting systems and the costs associated with recent trials and alternative modes of voting.

Table 12 – Cost Benchmarking for Proposed iVote System

Voting Event	Average cost per vote cast
NSW Baseline Costs	
Average of all votes cast in March 2007 NSW State General Election	Approx. $10
Trial Costs	
Braille ballot papers used for NSW LGE 2008	$478
AEC 2007 ADF trial of Remote Electronic Voting System	$521
AEC 2007 Electronically Assisted Voting (EAV) for Electors who are Blind or have Low Vision (Offered at 29 specific locations)	$2,597
VEC 2006 trial of electronic voting kiosks for Electors who are Blind or Vision Impaired (Offered at 6 locations)	$3,750
Projected iVote Costs	
1. Initial System Implementation (SGE 2011, with 10,000 votes cast)	$320
2. Initial System Implementation (SGE 2011, with 5,000 to 15,000 votes cast)	$221 to $617
3. Future Election Event Operation (state-wide, 10,000 votes cast)	$101
4. Future Election Event Operation (state-wide, 50,000 votes cast)	$44

It should be noted that the high costs associated with the trial systems are principally affected by take-up rate and hence the number of votes cast through the system. In the case of the AEC's EAV trial, the limited geographical accessibility of the system (the limited number of locations) and changing the behaviour of the targeted users were seen as significant factors.

In the case of the iVote system, the geographical accessibility issue is greatly reduced; however, the behaviour change will no doubt have an impact on the initial take-up of the system and subsequently the average cost per vote.

7.6.1   Use for Local Government Elections

Utilisation of the iVote system at subsequent election events will improve the level of return on the initial investment in the system.

If use of the iVote system is to be considered for Local Government elections, then the following will need consideration:

* additional legislative changes to enable use of the iVote system at Local Government elections;
* the funding model for use at :Local Government elections – it is recommended that direct funding be applied for use of the system at Local Government elections rather than the normal cost recovery model; and
* operation of the system at by-election events.

Appendices

A.   Process Flow Diagrams

1.   Elector Registration Process

The iVote system will require electors to register in advance the same as required for a postal vote. Consequently it is proposed to leverage the existing registration processes for postal voting to support iVote.

As electors can apply online for a postal vote, there is no signature collected on the application but a "secret question" is used instead. The answer to the secret question is entered in the online application and must also appear on the declaration envelope for the votes to enter the count.

Similarly, an application to use iVote will collect a PIN (Personal Identification Number) chosen by the elector which must also be provided when voting in order for the vote to be counted. (A PIN of 4 to 6 digits can work well with both phone and Internet voting, whereas a useability expert has advised that non-numeric passwords are difficult to enter on a telephone).

Where a postal voting pack is then sent to the elector, the iVote registration will supply an "iVote Number" instead.

The processes to apply to use iVote are shown as flow-diagrams below, starting with applications sent by the post.

Figure 5 – iVote Postal Applications
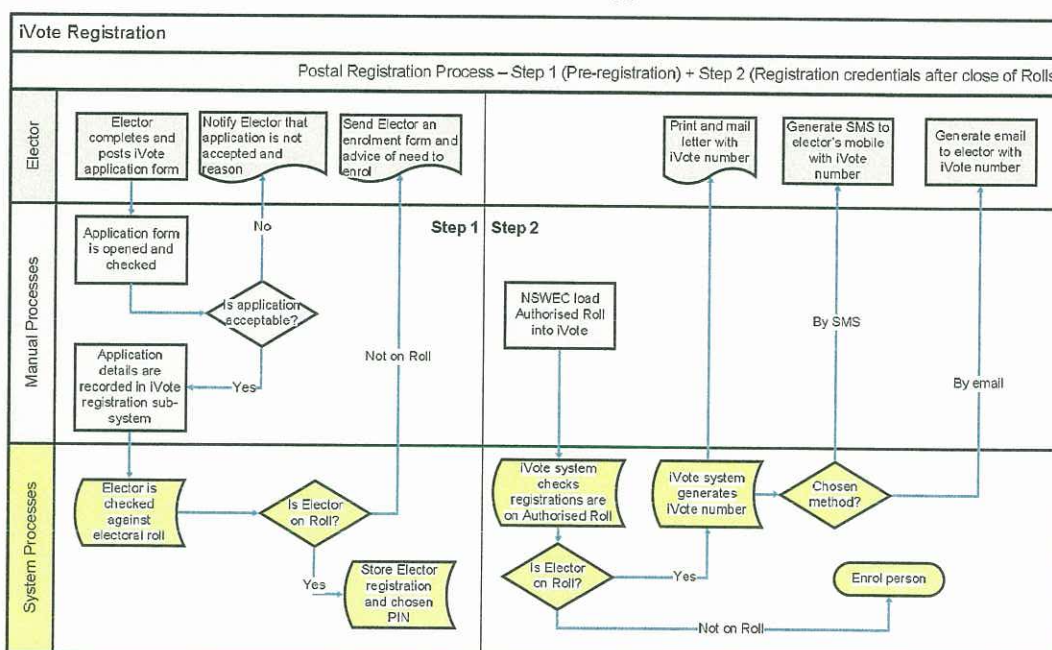
The process as outlined above would mirror the existing postal voting application process, except that instead of sending a postal ballot (ballot papers plus declaration envelope), the NSWEC would send a unique "iVote number" to the elector, which would be used in conjunction with their chosen PIN to vote using iVote via the Internet or telephone.

A new option is being introduced for SGE 2011 to enable electors to use the Internet to apply for a postal vote and a variation of this process could also be used for iVote registrations as outlined below. (The website would need to meet WCAG Internet accessibility standards.)

Figure 6 – iVote Internet Registrations
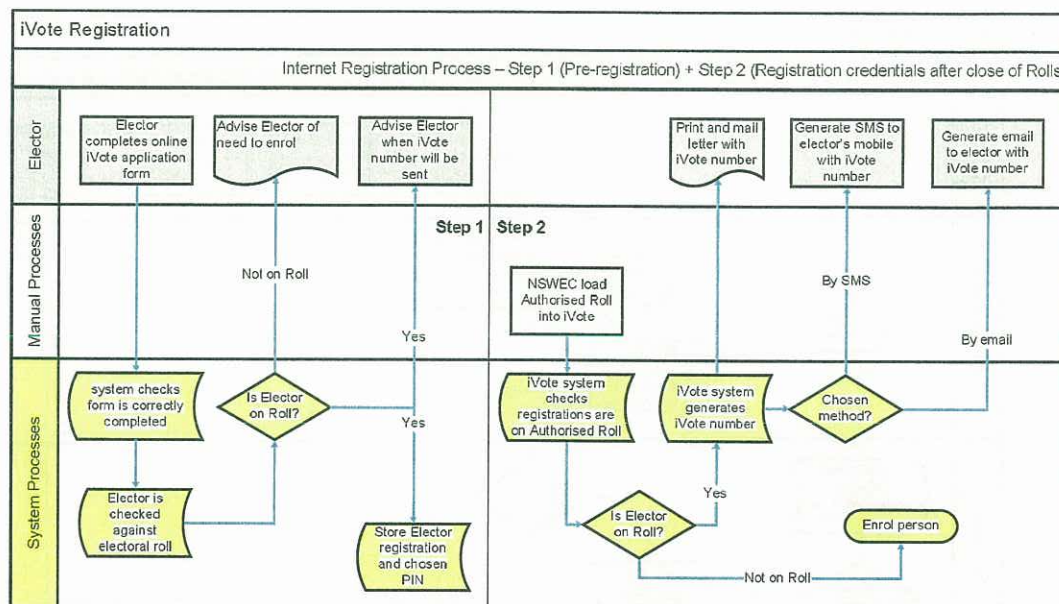
Whilst the existing postal vote registration processes will support many electors who would use iVote, they are not ideal for the core stakeholders who are blind or vision impaired. Consequently a staffed call centre operation is proposed to facilitate registrations by this core group.

Figure 7 – iVote Applications by Phone
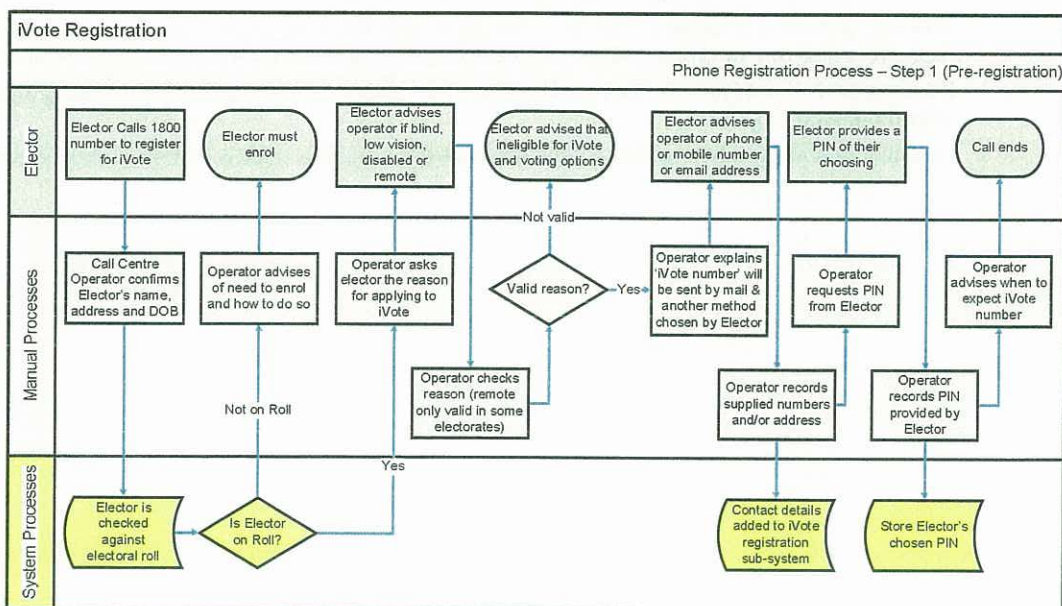
If a proposed demonstration system was available upon completion of the application, the operator could offer to transfer the elector to the demonstration system to experience iVote and practise voting on the telephone.

Figure 8 – Registering iVote Phone Applicants
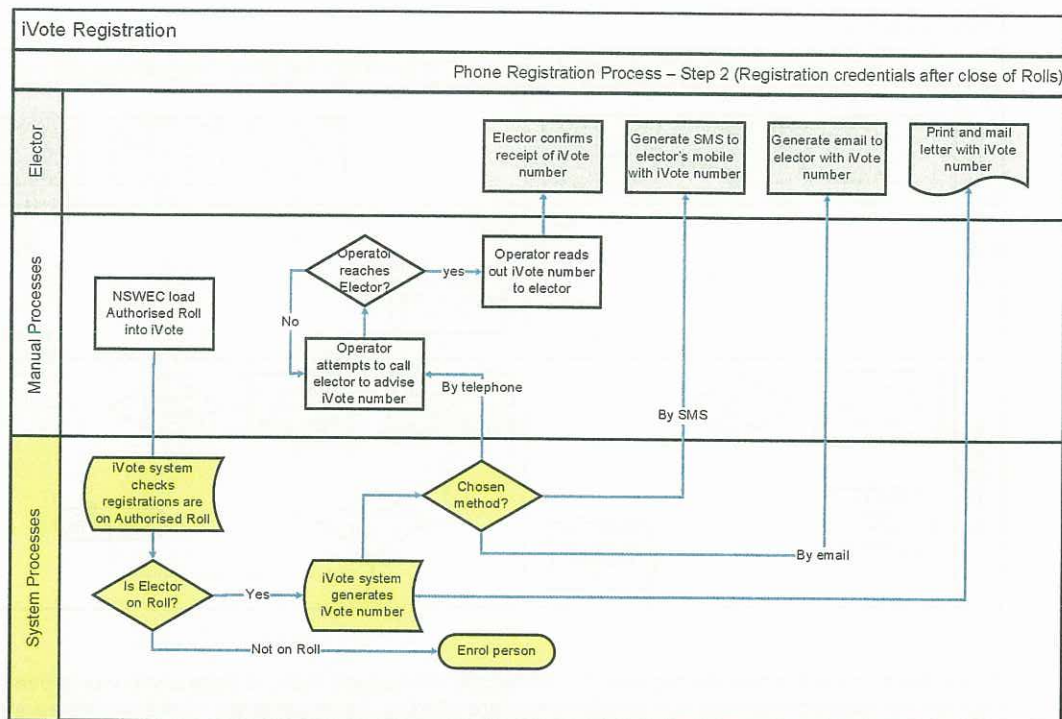
Business rules will be developed to address the following issues:

- when an elector calls because they have forgotten their PIN they might hear the PIN again or be asked to supply a new one;
- if an elector is not on the roll, they can be given the option to immediately apply to be enrolled over the phone; and
- collecting a preferred time of day for the call centre to call an elector with their iVote number.

2.   Process Description of Loading Candidates/Ballot Papers

Figure 9 – Loading iVote with Ballot Papers
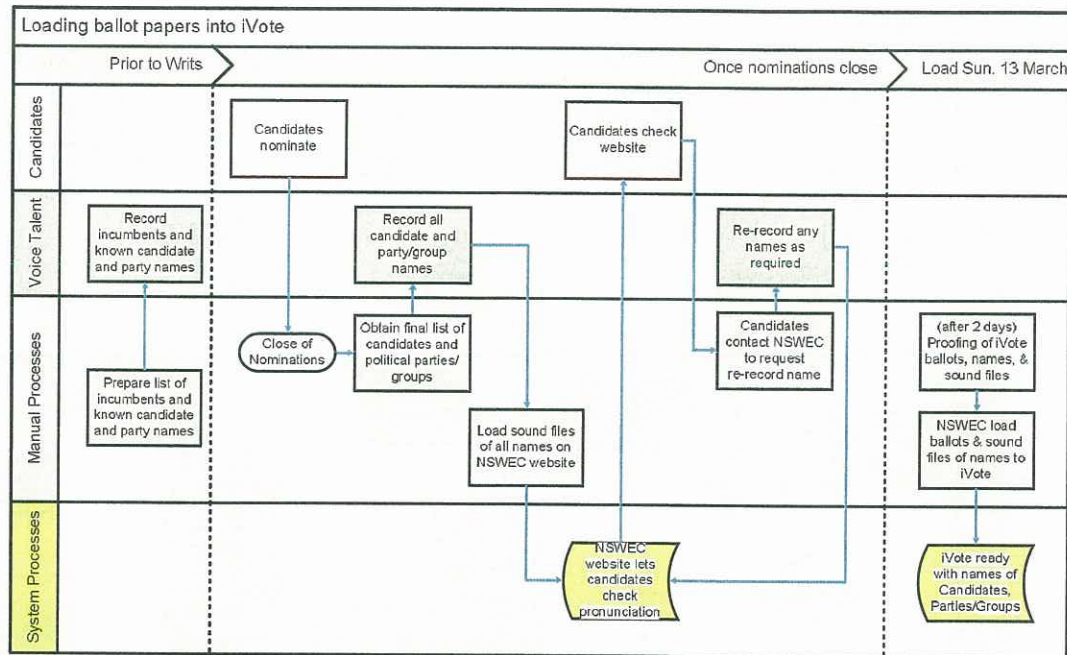
The Voice Talent is a role for a professional voice talent who will record all candidate and party names in a recording studio under supervision of NSWEC. Whilst the recording will be spread over more than one day the actor will be the same for all sessions to ensure that all candidate and party names are heard in the same voice and with a consistent and neutral tone.

To ensure correct pronunciation of candidate names, the spoken candidate and party names will be made available on the Candidates Web Site, which lists all candidates for the election. A candidate or party may then contact the NSWEC to advise of a mispronunciation and request that the name be rerecorded. The candidate's own pronunciation may be recorded at this point to assist the NSWEC in obtaining the correct pronunciation from the voice talent.

In contrast, the instructions for using iVote will be recorded by a different voice talent in a different voice style to distinguish them from the candidate names. The instructions and a set of "dummy" candidate and party names will also need to be recorded well in advance of the election to enable testing and demonstration of the iVote system.

3. Process Descriptions of Casting a Vote via iVote

Figure 10 – Voting via iVote telephone channel
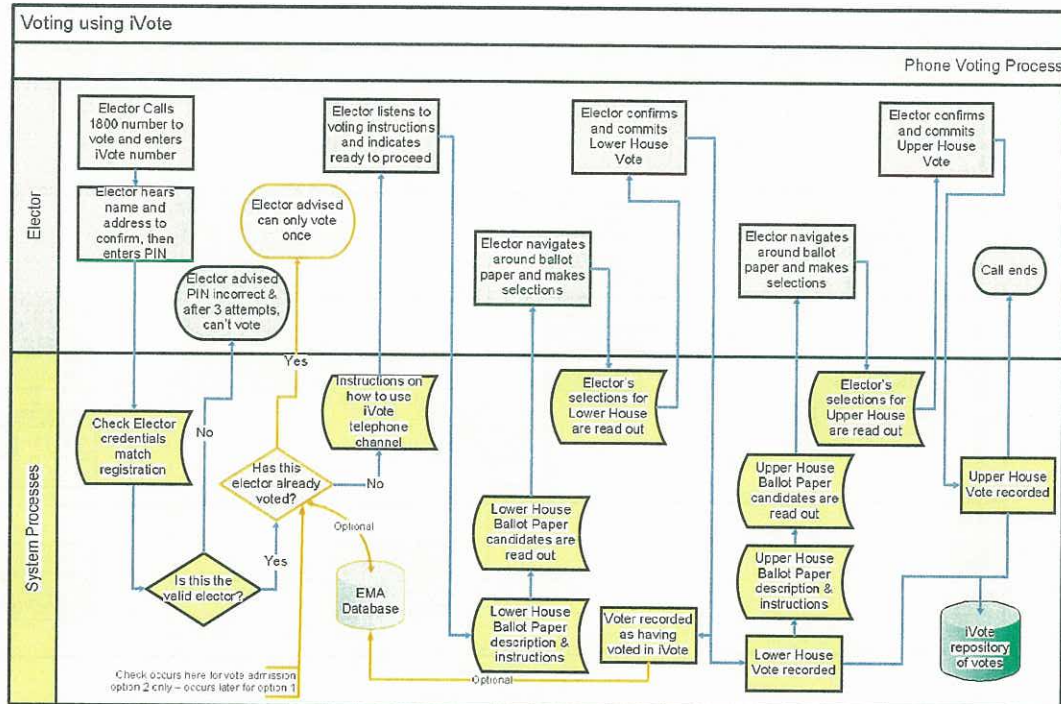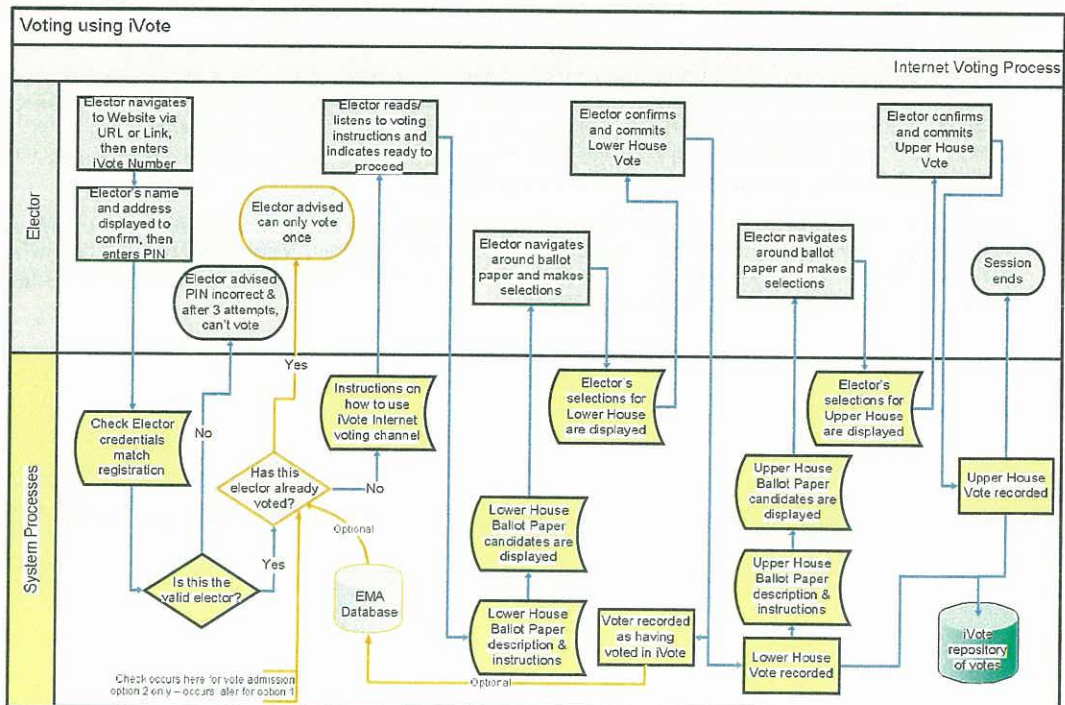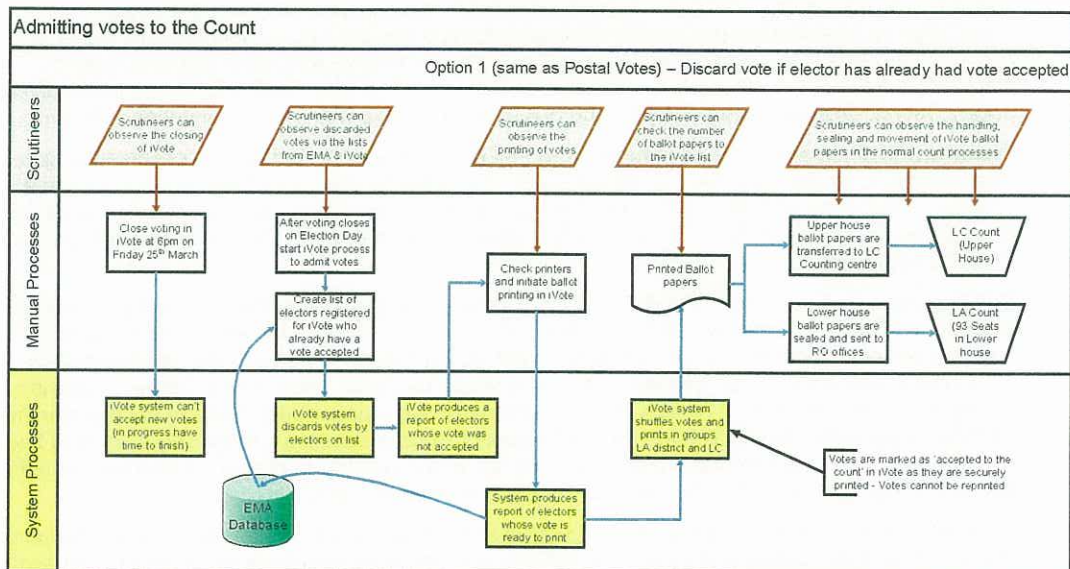

Figure 11 – Voting via iVote Internet channel

In addition to the above indicative processes, the elector may receive a receipt from iVote upon completion of voting.

4.   Process Description of Transferring Electronic Votes to the Count

The process for counting votes made in iVote is shown as a flow-diagram here:

Figure 12 – Vote Admission for iVote

B. Scrutiny and Transparency

The following is an extract from a report commissioned by NSWEC, "Alternative Voting Methods for Vision Impaired Electors" (Nesci & Burton 2009)

1. Transparency

Testimony to the Federal JSCEM examining the 2007 Federal Election, from at least one computer expert's group raised concerns about the transparency of the 2007 AEC trials in comparison to the public access that is available to any voter who wishes to observe the paper balloting system. The electronic system, then, needs to be provided to the public in a way that matches the openness of the paper system. Indeed, this open approach has already led to better electronic voting schemes:

"Experts and all other interested parties are in fact encouraged to evaluate and criticise the scheme. The intent is to expose any flaws or weaknesses, and subsequently work towards improving the scheme. This is in contrast with the trend of most other poll station electronic voting systems, whose proprietors have claimed that it is necessary to keep the details secret for purposes of securing intellectual property".

Software independence means that no software failure of any kind (whether occurring through an act of fraud, omission or error) can affect the election outcome. This is a technically demanding requirement and its satisfaction is currently reliant on voter-verified paper ballot printing and computer-assisted voting rather than DRE voting which has been shown to be unable to provide software independence in its design. Voter-verification and a paper audit trail are not a requirement for REV, indeed the Venice Tribunal of the Council of Europe includes a requirement in its voting standards which asserts remote voters are to be left with no official indication of how they voted. Instead, adequate verification can be provided in a number of ways.

Another approach sees PCs used as computer assistants, printing a filled-in ballot, which the voter mails in (FAX-back ballots and post-back, military authenticated post-back registration). Presumably this approach could also be used to send the electronic version of the ballot via the Internet as a second channel.

As covered above, the NSWEC should seek to open its REV systems as much as possible and engage concerned IT experts to play a productive role in the system before it goes live. Part of a REV feasibility really needs to include expert scrutiny of the system and its provider at an early enough juncture so that any concerns can be properly addressed.

2. Scrutiny

Scrutiny of electronic voting systems is concerned with validating security claims since security of a REV system needs to guarantee privacy, secrecy, and other democratic outcomes of vote casting. We introduce the security concepts needed for the system design, testing, deployment, reporting and archive. All of the providers' claims about software security techniques require a number of audit processes to demonstrate their techniques have been implemented properly and that their system is used properly for the security design it implements. This second point arises from the fact that most major security incidents arise out of (human) misuse of (otherwise adequate) security systems.

The challenge then, is to demonstrate security features in a meaningful way to election specialists and party officials seeking to see an election process, as they know it. A new group who has emerged over the last ten years are domain experts such as Computer Scientists who are concerned about information security aspects of elections and typically want thorough technical access to new voting systems.

The UK Electoral Commission extended its notion of registered observers in the 2007 trials to include academics and community group members. Once registered, these observers were given (supervised) access to data centres and requested to see voting servers, early demonstrations of the systems used and reports and other information exchanged between the UK Government and providers. This registered observer model is probably the best model to follow since it results in proper identity management, exclusion of known troublemakers and an executed legal agreement for observers. The groups registered included those known to effectively oppose forms of electronic

voting, such as Open Rights Group (ORG). ORG sent members to observe servers and data centres in the 2007 UK trials and to request directly, or via Freedom of Information, all election related technical information. ORG published its own critical report on the 2007 UK trials.

In Australia, the Computing Research and Education Association (CORE) has submitted to JSCEM on the AEC 2007 trials that "[a home voting system that] provides evidence to voters that what they are asking the computer to do is in fact what the computer is doing for them ... is very difficult for REV—in fact, probably basically impossible" CORE does not have a targeted campaign against electronic voting as ORG does.

Electronic voting is not a form of automation that removes people from an important process – electronic voting is fundamentally different to the way e-banking has removed tellers from transactions, for example. Instead, some of the fundamental "choke points" in the vote-casting process are maintained in proper electronic voting design and in fact the process cannot proceed without various official actions (all of which can be observed) taking place in operation of the e-voting system.

The following list gives the processes which can be scrutinised by anyone, without security or privacy risks to the election:

- Observers can watch operators setting up the election. With the exception of the keying in of passwords, all of these operations can be designed to be observed without risk.

- Observers can read the operator manuals and the system manuals.

- Access to election technical set-up definition: All systems using the EML standard can furnish the set-up and content messages used to configure the system. This shows technical observers the "settings" which the NSWEC system has passed on to the REV system to configure and populate it.

- Demonstration systems: Any observer and any member of the public should access a freely available demonstration system that collects an actual test vote. In addition, it should be considered that any source codes specific to the demonstration system are made available along with testing documentation.

- Testing harnesses: Any software that is needed for testing (such as decryption tools), including dummy security keys. This allows a technical observer to go further and explore how their test vote was captured.

- Live system testing scripts and documentation. These scripts are used for acceptance of the live system. All of them should have been run and ultimately passed prior to observer access.

- System design documents, development information and standards used in development and testing.

- Some form of digital signatures should be offered so that scrutineers and hopefully also voters can validate the system they are using. There must be some form of version control and lock down to prove that audited systems are the ones that go on to run the live election.

- System artefacts: The process of votes being printed (if this approach is used) and the electoral roll audit (that the number of printed out votes matches the number of marked electoral register entries). That the number of system logins is greater than or equal to the number of votes emitted, and so on.

Information that should be withheld from the general public and only provided on request, after the election, includes:

- White hat penetration testing reports. These are the results of a "hired hacker" attempting to break in to the systems. The reason these are not made public initially is that such reports are always biased toward finding problems and generally they do find something to report. The risk is that their reporting language tends not to classify risks objectively, or that the write-up language causes unwarranted concern among the general public. For example, the Internet was designed as "an insecure medium" to allow open access (it is not the case that a new Internet user must

apply to the government for access). This, however, does not mean that highly secure transactions cannot take place across this insecure medium in the same way that eaves dropping cannot extract secrets from a properly encrypted conversation.

- System logs. The system logs are created as the exhaustive record of all actions taken by the computer system and its users during the election. Theoretically, the system logs do not capture vote content or voter identity. The reason these are not made public is that the logs inadvertently capture anecdotal information about voting activity. If we take an adversarial position, a trouble-maker may claim they voted at a specific time then claim that this is not reflected in the logs. The logs may need to be "scrubbed" or the order of log events randomly shuffled, or they may need to be truncated to ensure privacy and secrecy of voters before log data are released.

- System access. Any kind of technical access to systems, even by the auditors, has to be indirect and mediated by the NSWEC. This includes access to fail-over systems, data centres, back-up systems and so on. Once live systems are in place, not even developers can access the systems directly, even for remote monitoring.

- Personal information about contractors, NSWEC staff and auditors. This should be restricted and not available for the public, media or academic questioning, even informally so that all scrutiny should be mediated by the appropriate people at the NSWEC.

- Threat analysis. A description of the threats to the REV system will necessarily give manageable risks. On its own, the threat analysis should not contain any secrets since all secrets (PINs/VIN, encryption keys and similar) are managed in special ways to provide supervised access only. However, the threat analysis would do some of the leg work an attacker would otherwise have to do to rule out certain ways of attacking the system. In addition, the threat analysis is necessarily incomplete and its gaps inform the attacker where they should start their work.

- In addition to the scrutiny over the operators and the system, voters themselves should also be given the ability to confirm the inclusion of their vote. It is voter receipting, in fact, that provides a very important measure of system health.

Scrutiny may include development, testing and acceptance, as they occur. The NSWEC should consider if any part of acceptance testing might include academics or others. For example, new standards proposed for the Internet or its supporting software pass through a process of Request for Comment. This might form a good basis for engaging the oversight and analysis of academic experts, within the spirit of open systems.

An important feature of new REV systems is their ability to demonstrate that, for example, if there were some small anomalies, the system audit trail should be able to convincingly prove the limited scope of any problems. It is not sufficient for the system to "self-check" nor for the system to publish very simple reports showing "all is well" and "no errors". Such self-check reports can be easily produced fraudulently.

C. List of Potential Electronic Voting Vendors

Vendor/Offering	*Address*	*Comment*
Scytl (www.scytl.com) Internet voting and current VEC project	Tuset, 20, 1-7 08006 Barcelona Spain +34 934 230 324 scytl@scytl.com	Singapore office or via HP locally for VEC project **Responded to information request**
E1C (www.everyonecounts.com) eLect system for Internet voting including eLect Access for telephone voting	1804 Garnet Ave, #408 San Diego, CA 92109 United States +1 858.427.4673	Melbourne office recently closed **Responded to information request**
Dominion Voting Systems Corporation (www.dominionvoting.com) Internet voting and audio options	215 Spadina Ave, Suite 200, Toronto, Ontario, Canada M5T 2C7 +1 416 762 8683	No representation in this region and did not acknowledge our information request
OPT2VOTE Ltd (www.opt2vote.com) Internet & Telephone Voting	25D Bishop Street, L'Derry, Northern Ireland, BT48 6PR +44 (0)28 7137 1111	No representation in this region **Responded to information request**
Software Improvements (www.softimp.com.au) Electronic Voting and Counting System (eVACS®) solution – with Internet module	Unit 20, 16 National Circuit (National Press Club Building) Barton ACT 2600 (02) 6273 2055	Canberra based **Responded to information request**
Cybernetica AS (www.cyber.ee) Internet voting for Estonian elections	Akadeemia tee 21 12618 Tallinn Estonia +372 639 7991	No representation in this region **Responded to information request**
DRS Data Services Limited (www.drs.co.uk) Internet and phone channels come from partner Mi-Voice	1 Danbury Court, Linford Wood Milton Keynes, Buckinghamshire United Kingdom, MK14 6LR +44 1908 666088	No representation in this region *Partner (Mi-Voice) responded*
Mi-Voice (www.mi-voice.com) Partners with DRS	iMeta Technologies Limited Phi House, Enterprise Road Chilworth Science Park Southampton, SO16 7NS, UK +44 (0)845 241 4145	No representation in this region **Responded to information request**
Votenet Solutions (www.votenet.com) Phone and Internet voting	1420 K St NW, Suite 200 Washington, DC 20005 +1 202 737 2277	2 offices in USA only Did not acknowledge our information request

Vendor/Offering	Address	Comment
Indra Sistemas, S.A. (www.indra.es) Internet voting	Avda. Bruselas, 35 28108 Alcobendas Madrid, Spain Tel.: (+34) 91 480 50 00	Indra office in Philippines. (Sydney subsidiary: *Interscan Navigation Systems*) **Responded to information request**
Micromata GmbH (www.micromata.com) Polyas online voting system	Marie-Calm-Straße 1-5 34131 Kassel Germany +49 561 31 67 93 0	German base only Not included in our information request
Nedap Election Systems (www.election-systems.eu) Appears to be polling-place systems but no English on website!	P.O. Box 97 7140 AB Groenlo NEDERLAND +31 544 471 111	No representation in this region Not included in our information request
Safevote, Inc. (www.safevote.com) Internet voting – seem to be a very small operation from website	P. O. Box 9765 92169 San Diego CA +1 858 488 5400	No representation in this region Not included in our information request
True Ballot (www.trueballot.com) Phone and Internet ballots, but mostly union and association elections	Suite 750, 3 Bethesda Metro Center Bethesda, Maryland 20814 +1 301 656 9500	3 offices in USA only Not included in our information request
Intelivote Systems Inc. (www.intelivote.com) Phone and Internet voting	Dartmouth Nova Scotia, Canada +1 (902) 481-1156	Small and no news on website since 2007! Not included in our information request
ES&S Election Systems & Software (www.essvote.com)	11208 John Galt Blvd Omaha, NE 68137 +1 (800) 247-8683	ESS Europe in UK seems to have vanished from the web. Only have Canadian offices outside US Not included in our information request
Hart InterCivic (www.hartic.com) Voting machines and also claim Internet voting but this is hard to verify on website	15500 Wells Port Drive Austin, TX 78728 +1 512.252.6400	US only Not included in our information request
Smartmatic (www.smartmatic.com) Voting Machines	1001 Broken Sound Parkway Boca Raton, FL 33487 USA +1 561 8620747	Philippines offices are closest Not included in our information request
Sequoia Voting Systems (www.sequoiavote.com) Voting Machines (were part of Smartmatic but now separate)	Unit 9, 130 Doolittle Drive 94577 San Leandro CA +1 800 869 1936	No representation in this region Not included in our information request

Other Players in Electronic Voting – from various sources:

Organisations:

Electoral Reform Society
(www.electoral-reform.org.uk)
+44 20 7928 1622
Thomas Hare House
6 Chancel Street
London SE1 0UU
United Kingdom

Openevoting.org
(www.openevoting.org)
Open Source Software
Oberdorfstrasse 9/1/15, 1220 Vienna Austria

Vendors/consultants that appear not to have suitable solutions to investigate:

Experian Information Enterprises +33 493 957 635
 "Les Vaisseaux" – Bât. C Route des Dolines – BP 49
06901 Sophia Antipolis Cedex
France

Diebold Incorporated
(Sold election systems [as "Premier"] to ES&S)

Herodot Consulting & Software KG
(www.herodot.at)
+43 676 34 71 999
office@herodot.at
Software Margaretenstrasse 80/1/11
1050 Wien
Austria

Logica plc. (www.logica.com)
+44 20 7637 9111
Software 250 Brook Drive – Green Park
Reading RG2 6UA
United Kingdom

Singularity Solutions Inc.
(www.emailelection.com)
+1 253 200 1439
Software 3808 110th Ave. East,
Edgewood WA 98372
United States

SZTAKI Voting and Survey System
(wwwold.sztaki.hu/services/voting/)
P. O. Box 63.
1518 Budapest
Hungary

T-Systems Enterprise Services GmbH (www.t-systems.com)
+49 69 66531 0
info@t-systems.com
Software Mainzer Landstraße 50
60325 Frankfurt am Main
Germany

Unisys (www.unisys.com)
+49 6196 99 0
Hardware&Software Am Unisys Park 1
65843 Sulzbach
Germany

PNYKA Project (www.pnyka.cti.gr) Open source project for electronic voting
+30 210 7458000
stamatiu@ceid.upatras.gr
Software 14–18 Mesogeion Av.
115 27 Athens
Greece

Australian Election Company
(www.austelect.com)
Small, Queensland based consultancy

D. RFI Document

REQUEST FOR INFORMATION - NSW iVOTE SYSTEM

From: Mark Radcliffe
Sent: Monday, 19 April 2010 6:23 PM
To: [Addressee]
Cc: John Burnett

Attachments: I-Voting Reqts 160410.doc (66 KB)

The New South Wales Electoral Commission is currently investigating the feasibility of implementing "iVote" to meet the requirements of blind and vision impaired electors, other disabled and remote electors. This is expected to provide both telephone and Internet voting, and an overview of our requirements for the iVote system is attached.

We have identified your organisation as having capability in this area and are therefore interested in receiving the following information from you:

1.   Details on your product set and/or capability to address either part or all of the requirements set out in the attachment

2.   Capability of your organisation to deliver such a solution within the nominated timescales and within the New South Wales electoral environment

3.   Indicative costs for the provision of the proposed system and the pricing structures that might apply, including associated costs of professional services to support an implementation project.

4.   Any further information that you believe would be of value to us in determining the feasibility of providing Internet and telephone voting to the blind and vision impaired electors of NSW based on your products and capabilities.

It would be appreciated if you could provide responses to the above by 30 April 2010 (Please note that we would be pleased to receive information progressively up to this date).

We would appreciate if you could send a quick reply by email to confirm your receipt of this email.

Should you require any further clarification, please do not hesitate to contact either John Burnett or Mark Radcliffe (see contact details below).

Thanks,

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AUSTRALIA
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F: +61 2 9290 5991
E: john.burnett@elections.nsw.gov.au

Mark Radcliffe
NSW Electoral Commission
Level 25, 201 Kent Street
Sydney NSW 2000
Phone: (02) 9290 5907, Fax: (02) 9290 5991
Email: mark.radcliffe@elections.nsw.gov.au

DRAFT "iVote" Remote Electronic Voting System Requirements

Disclaimer:

> ***The purpose of this document*** *is to outline the high-level requirements for this system to assist potential technology vendors in providing relevant information to the New South Wales Electoral Commission (NSWEC). This will enable the Commission to prepare a feasibility report on this for parliament and to also determine the vendors that may be invited to tender for provision of the system if approved by Parliament.*
>
> *This is not a formal tender process at this stage and vendors reading these requirements are encouraged to focus on how your solutions will meet our primary objectives, regardless of variations from the processes outlined below.*
>
> *Please note that these requirements are a work in progress and an RFT, if issued, may differ from the requirements outlined below.*

The **NSW Electoral Commission** is seeking to establish an "Internet Voting" system that will provide the blind and vision impaired with a means to cast a secret vote, and may also be useful for other people with disabilities and remote electors (those living in rural areas who are a long way from a polling place). This system will operate in addition to the existing voting mechanisms such as postal voting, pre-poll voting and attending a polling place.

The system will provide the intended user base (ie. Blind and vision impaired, other disabled and remote electors) the ability to cast their vote from home or another location of their choosing. It is intended that they will make use of either their existing telephone, PC and Internet connection, along with any assistive technology and devices they usually use in conjunction with these services, to access the "iVote" system.

It is envisaged that the system shall comprise two access channels, namely:

- Telephone voting channel – utilising the public telephone network, and

- Internet voting channel – utilising the Internet.

The system will also need the ability to register electors to vote using the "iVote" system and allow them to use either channel from the one registration.

1. Registration

Users of the iVote system will be required to register prior to the election in addition to being on the electoral roll. The registration process will check that the elector is on the NSW electoral roll and will confirm that they are either vision impaired or otherwise disabled or are resident in a remote location within NSW. It will also provide authentication (such as a password or other token) to enable the registered elector to access the system and to cast a secret ballot.

A "two-factor" approach is preferred, for example where electors receive a unique identifying number ("iVote number") upon registering and would also select a "PIN Number" of their own choosing. These two pieces of information would be required to vote via either the Internet or telephone. For additional security the "iVote number" may be provided via a second channel by ringing back the elector or sending it via the post or some other mechanism.

There are likely to be various options for the registration process and the iVote system may not provide the entire process, but will at least need to support a suitable registration process. Any registration process should be accessible to the blind or those with low vision.

2. iVote System Features

2.1 Voting in a NSW State General Election (SGE)

New South Wales (NSW) is the most populous state in Australia with over seven million people. The Parliament of NSW is situated in Sydney and is the oldest parliament in Australia.

There are two ballot papers provided to each elector: one for the Legislative Assembly for the electoral district in which they reside and one for the Legislative Council. A brief overview is provided here and more detailed information is available on the NSWEC website: http://www.elections.nsw.gov.au/state_government_elections.

2.1.1 The Legislative Assembly (Lower House)

The Legislative Assembly consists of 93 members, each elected to represent an electoral district of New South Wales.

The method of voting for the Legislative Assembly is known as optional preferential.

2.1.2 The Legislative Council (Upper House)

The Legislative Council consists of 42 members serving for 8 years with half elected each 4 years.

The candidates for a Legislative Council election are the same for the whole state and the method of voting is known as optional preferential proportional representation.

Candidates appear in groups and electors may vote in one of two ways:

- "**Above the line**" - Vote by placing the number 1 in one of the group voting squares located above the thick black line on the ballot paper. This will record a first preference vote for the first candidate in that group with the second and subsequent preferences going to all other candidates in that group. The elector may then allocate preferences to more groups by putting the numbers 2, 3 etc. in other group voting squares.

- "**Below the line**" - When voting below the line, electors select the order of preferences by placing consecutive numbers beginning with the number 1 in the squares next to the names of candidates in order of their preference for them. Electors must vote for at least 15 candidates when voting below the line.

With 21 members to be elected, the most recent Legislative Council ballot paper had 324 candidates across 19 groups (20 columns including ungrouped candidates).

2.1.3 "Informal Vote"

Where a ballot paper is incorrectly marked it is deemed "informal" and not counted, this may occur if, for example, the Legislative Council ballot paper is marked for both groups and individual candidates (marked both "above the line" and "below the line").

2.1.4 Referenda

Occasionally a referendum will be held as part of a states general election and an additional ballot paper will require electors to indicate whether they approve or not. The last referendum was held in 1995.

2.2 Internet Voting

The Internet voting function is intended to take advantage of assistive technology employed by the vision-impaired, whilst also being usable by a remote elector without vision-impairment.

The web-based ballot papers, authentication, instructions and security shall need to be suitable for various screen-magnifier and screen-reader applications used by the vision impaired and also compatible with current and popular operating systems and web-browsers that may be found in

electors' homes. If the solution is not compatible with assistive software such as screen readers, it should provide its own comparable assistive features.

System Description

The Internet voting system shall provide the following functions:

- Access control and authentication – to ensure that only authorised electors can gain access to the system, using the credentials provided as part of the registration process.

- Provide easy to use on-screen (and audio) instructions on the operation of the system to enable an elector to cast their ballot for the Lower and Upper Houses as well as any relevant referenda.

- Standards based, such as WCAG. Providers are encouraged to describe other relevant standards they adhere to or are certified against in other countries.

- Simple and direct linear voting interface that guides the voter toward submitting a formal vote, but which can allow them also to quit at any time and start again if they wish or vote via another channel or revert to attendance or postal voting.

2.3 Telephone Voting

The Telephone voting function should use the public telephone network and a conventional telephone to enable voting via an IVR system similar to that employed for telephone banking and other automated phone services.

2.3.1 System Description

The telephone voting system shall provide the following functions:

- Access control and authentication – to ensure that only authorised electors can gain access to the system, using the credentials provided as part of the registration process. The provider may propose other technologies which make registration and authentication more accessible such as speaker recognition.

- Easy to use instructions on the operation of the system to enable an elector to cast their ballot for the Lower and Upper Houses as well as any relevant referenda entirely via the telephone keypad.

- Volume and speed controls to allow electors to adjust the speed and loudness of the audio they are listening to.

- Voting interface that waits for the voter and provides simple linear steps with neither too many instructions nor too many choices or nested loops.

- Standards based, such as VXML and others.

- Audio instructions using Australian pronunciations and accents.

- While not necessarily a requirement, any support for tele-text TTY users should be stated by potential suppliers.

2.4 Common Functions

The system design should simply and clearly demonstrate how it preserves the fundamental requirements of NSW State General Elections:

- Voter privacy
- Voter anonymity
- System availability
- Equity of access

- Free from influence on voters or votes
- One person one vote
- Open to scrutiny and audit

Provide a mechanism for identifying that an elector has lodged a ballot using the system.

Securely store the lodged ballots during the voting period and deliver them to the relevant vote counting process.

- In the case of the Lower House (LA) ballot, this will require the ballot to be printed in order that it may be subject to the normal scrutiny processes and included within the local count.

- In the case of the Upper House (LC), this will include an output file for transfer to the LC Counting Engine and printing for scrutiny purposes.

- In the case of referenda, the lodged referenda shall be printed for inclusion in the referenda count.

Facsimiles of the completed ballots shall be printed following the close of the polls at a central location. The NSWEC will despatch these ballots to the relevant counting location within each electoral District to be included into the manual ballot counting process.

The interface provides feedback and attempts to prevent errors that may result in an unintentional informal vote. Without influencing the voter, the interface needs to make it clear to the voter what the choices are and what choices the voter has made. The feedback mechanism needs to provide summary information such as, for example, "twelve candidates not chosen", rather than only listing the twelve non-chosen candidates by name.

The system should always let the voter know that their vote has been successful or unsuccessful. If the session is abandoned part-way through voting, it should be clear to the user that the vote has not been submitted. Any kind of failure, suspicious events, user time-outs and so on should alert the user so that it can be known at all times that the system is operational. Any error messages should clearly state to the user whether their vote has been recorded or discarded and if so, whether the voter can start over and get another blank set of ballots.

2.4.1 Voting Session

The system should provide the opportunity for the elector to complete all required ballots within a session.

As an indication of the time required; the Upper House ballot paper may take a blind person over 60 minutes to complete if they choose to vote "below the line".

Due to the amount of time required to complete a ballot paper, the system could also allow an elector to save a partially complete ballot paper and return to the Internet or phone later to complete the ballot and vote.

2.4.2 Recall and Recast Votes

A feature to counteract coercion may be included whereby an elector can vote again, replacing their prior vote.

2.4.3 Accessibility

The system should meet or exceed World Wide Web Consortium Accessibility Group (WCAG AA) or similar standards.

Vendors' experience in designing systems for use by the vision impaired and prior work with blind, vision impaired and other disability representative bodies is of interest to the NSWEC.

2.4.4 Pronunciation of Candidate Names

NSWEC will ensure correct pronunciation of candidate names and party names is provided as voice files. These will need to be used for Telephone system users and must be available to users of the

Internet system who are using a screen-reader to vote via the Internet. (Candidate names may not be consistently pronounced by the various screen-readers).

2.4.5 Multiple Language Support

The system should provide for foreign languages, including character-based such as Chinese and right-to-left languages such as Arabic.

2.4.6 Parallel Voting System

To the extent possible, the iVote system should mirror the normal postal voting processes associated with a NSW General Election, which starts five days after the candidate nominations close and runs for almost two weeks to the Election Day (4th Saturday in March).

2.4.7 EML and Modular Design

The NSWEC favours an EML-type modular-messaging system which implements some or all of these features:

- Modular design with clear separation of the parts of the system which must be trusted;

- Uses open protocols such as XML or EML such that communication between modules can be inspected;

- Uses common techniques and formats for security such as RSA and AES and not proprietary and undocumented methods for cryptographic primitives

- Provides interfaces to aide integration with NSWEC systems for provision of election configuration, emission of election outcomes and reporting of election states, errors and other dashboard information.

3. Security

Although usage will be limited to the target audience and many of these may still choose to vote at a polling place or by postal vote, the security of the system still must be commensurate with its use for the election of a State Government.

The NSWEC is interested in learning how individual vendors have addressed security and we would expect at least the following:

- Resistance to hacking of the server devices and/or a highly tamper-evident design

- In the case of home computer based voting, no information relating to a voting session shall remain on the computer once the session has been completed.

- Automatic measurement or assessment of the reliability of home computers.

- The system shall support scrutiny of the election process including possible deep audit by a NSWEC appointed auditor and/or specialist election scrutineers who may be members of the general public

- The iVote System shall be robust and secure to ensure a high level of availability during the period of voting period. There should be no single point of failure and no single storage locations in the system design. The system should not be part of any shared infrastructure.

- No indeterminate states and no silent failures

- Elegant handling of voters who attempt to use unsupported browsers.

- The iVote system shall employ modern security techniques to ensure reliable and accurate operation and a security-in-depth design is preferred.

- Protections against insider attacks and/or tamper evident features

- Protections from attacks via the user's device (virus etc.)

- Protections against various denial-of-service attacks or support for hardware and network protections that may be put in place in a web-hosting data-centre.

4.   NSWEC's Role

There are several tasks that will be undertaken by the NSWEC that vendors should be aware of and these are set out below.

4.1   Promotion

The NSWEC will be conducting a targeted advertising campaign to the intended user base in the period leading up to the next SGE.

4.2   Live support

A 24/7 help line, email or other mode of support will be provided by the NSWEC prior to and during the voting period.

5.   Implementation Timetable

The indicative implementation timetable is presented below:

- Award of contract: 13 August 2010

- System operational and available for acceptance testing: 17 December 2010

- System completely locked down and signed off: 18 February 2011

Periods of Operation:

- Demonstration system available for blind and vision impaired electors to experience and practise upon from 1 February 2011 onwards.

- iVote system open for registration and voting from 7 March 2011 through Election Day on 26 March 2011. May be open for registrations prior to this period.

- iVote system centrally delivers/prints votes for counting after the election closes at 6pm on 26 March 2011.

- The iVote system remains (minimally) functional and available for recounts, scrutiny and audit until the poll is declared for all the LA districts and the LC, this can be up to 40 days after Election Day.

E.   Indicative Implementation Plan

Task Name	Duration	Start	End
Tender Process PHASE	69d	Mon 17/05/10	Fri 20/08/10
Establish Tender Team	1d	Mon 17/05/10	Mon 17/05/10
Prepare for Tender	25d	Tue 18/05/10	Tue 22/06/10
Establish Tender Approach	2d	Tue 18/05/10	Wed 19/05/10
Establish Tender Governance	1d	Thu 20/05/10	Thu 20/05/10
Prepare Tender Evaluation Plan (High Level)	2d	Fri 21/05/10	Mon 24/05/10
Finalise Tender Evaluation Plan (Detailed Level)	20d	Tue 25/05/10	Tue 22/06/10
Prepare RFT document	10d	Wed 19/05/10	Tue 1/06/10
Release first draft for review	1d	Wed 19/05/10	Wed 19/05/10
Collate feedback from NSWEC & Procurement	5d	Thu 20/05/10	Wed 26/05/10
Release final draft for signoff	1d	Thu 27/05/10	Thu 27/05/10
NSWEC final review of RFT document	3d	Fri 28/05/10	Tue 1/06/10
NSWEC Sponsor sign off	0d	Tue 1/06/10	Tue 1/06/10
Distribute RFT	25d	Fri 28/05/10	Fri 2/07/10
Prepare Tender Release advisory email	0.5d	Fri 28/05/10	Fri 28/05/10
Load RFT on Website	0.5d	Wed 2/06/10	Wed 2/06/10
Advise list of Suppliers (email)	0.5d	Wed 2/06/10	Wed 2/06/10
RFT period (20d turnaround)	20d	Fri 4/06/10	Fri 2/07/10
Review RFT Responses	17d	Mon 5/07/10	Tue 27/07/10
Receipt Responses	1d	Mon 5/07/10	Mon 5/07/10
Evaluate responses (initial cull)	5d	Tue 6/07/10	Mon 12/07/10
Short list Suppliers	0d	Mon 12/07/10	Mon 12/07/10
Evaluate Short list responses (detailed)	10d	Tue 13/07/10	Mon 26/07/10
Collate assessments & recommend Vendors for consideration	1d	Tue 27/07/10	Tue 27/07/10
Select Vendor	15d	Wed 28/07/10	Tue 17/08/10
Select preferred Vendor	7d	Wed 28/07/10	Thu 5/08/10
Prepare Brief & secure Endorsement from Director IT	2d	Wed 28/07/10	Thu 29/07/10
Present Brief to Electoral Commissioner on Selection(s)	1d	Fri 30/07/10	Fri 30/07/10
Vendor(s) to present Solution	5d	Fri 30/07/10	Thu 5/08/10
Request Best and Final Offers (BAFO)	1d	Mon 2/08/10	Mon 2/08/10
Negotiate Contract	10d	Tue 3/08/10	Mon 16/08/10
Award contract	1d	Tue 17/08/10	Tue 17/08/10
Announce Results	1d	Wed 18/08/10	Wed 18/08/10
Provide Debrief to unsuccessful Vendors	2d	Thu 19/08/10	Fri 20/08/10
Pre-Project (Inception) PHASE	32d	Wed 2/06/10	Mon 19/07/10
System Guideline Development	7d	Wed 2/06/10	Fri 11/06/10
Guideline Drafts for Vendor	3d	Wed 2/06/10	Mon 7/06/10
Source information from Reference Groups	1d	Wed 2/06/10	Thu 3/06/10
Prepare Storyboard & Scripting for Registration	2d	Thu 3/06/10	Mon 7/06/10
Prepare Storyboard & Scripting for Internet Voting	2d	Thu 3/06/10	Mon 7/06/10
Prepare Storyboard & Scripting for Telephone Voting	2d	Thu 3/06/10	Mon 7/06/10
Conduct Risk Evaluation	2d	Thu 3/06/10	Mon 7/06/10
Guideline Communications Briefing	2d	Mon 7/06/10	Wed 9/06/10
Prepare for Briefing	1d	Mon 7/06/10	Tue 8/06/10
Conduct Briefing	1d	Tue 8/06/10	Wed 9/06/10
Update Guidelines (20% Development Time)	1d	Wed 9/06/10	Thu 10/06/10
Registration Storyboard & Scripts	1d	Wed 9/06/10	Thu 10/06/10
Internet Voting Storyboard & Scripts	1d	Wed 9/06/10	Thu 10/06/10
Telephone Voting Storyboard & Scripts	1d	Wed 9/06/10	Thu 10/06/10
Guideline Acceptance	1d	Thu 10/06/10	Fri 11/06/10
System Auditor Selection	20d	Fri 11/06/10	Mon 12/07/10

Task Name	Duration	Start	End
Identify potential Auditor organisations	2d	Fri 11/06/10	Wed 16/06/10
Specify Audit tasks & Distribute	1d	Wed 16/06/10	Thu 17/06/10
eg. Hack Attempts, Intrusion Testing, Code checks etc.	1d	Wed 16/06/10	Thu 17/06/10
Assess Auditor Quotes	5d	Thu 17/06/10	Thu 24/06/10
Select Auditor(s)	1d	Thu 24/06/10	Fri 25/06/10
Negotiate Contract	10d	Fri 25/06/10	Fri 9/07/10
Award Contract	1d	Fri 9/07/10	Mon 12/07/10
Call Centre Selection	23d	Wed 16/06/10	Mon 19/07/10
Identify potential organisations	2d	Wed 16/06/10	Fri 18/06/10
Specify tasks & obtain quotes	1d	Fri 18/06/10	Mon 21/06/10
eg.24x7 support during election etc	1d	Fri 18/06/10	Mon 21/06/10
Assess Call Centre Quotes	5d	Thu 24/06/10	Thu 1/07/10
Select Call Centre	1d	Thu 1/07/10	Fri 2/07/10
Negotiate Contract	10d	Fri 2/07/10	Fri 16/07/10
Award Contract	1d	Fri 16/07/10	Mon 19/07/10
Project Initiation PHASE	14d	Tue 3/08/10	Fri 20/08/10
Initiate Project	14d	Tue 3/08/10	Fri 20/08/10
Identify Project Team	1d	Tue 3/08/10	Tue 3/08/10
Draft Project Management Plan	5d	Wed 4/08/10	Tue 10/08/10
Revise Project Schedule	2d	Wed 18/08/10	Thu 19/08/10
Determine Project funding allocation / milestones	1d	Fri 20/08/10	Fri 20/08/10
Vendor Management (Planning) PHASE	30d	Wed 18/08/10	Tue 28/09/10
Assess System requirements	5d	Wed 18/08/10	Tue 24/08/10
Establish Support Arrangements	17d	Wed 25/08/10	Thu 16/09/10
Define Availability requirements	2d	Wed 25/08/10	Thu 26/08/10
Define Disaster Recovery requirements	2d	Fri 27/08/10	Mon 30/08/10
Define Election System Support requirements	2d	Tue 31/08/10	Wed 1/09/10
Negotiate Support Arrangements	10d	Thu 2/09/10	Wed 15/09/10
Arrangements (contract terms) Signoff	1d	Thu 16/09/10	Thu 16/09/10
Establish Hosting Platform	25d	Wed 25/08/10	Tue 28/09/10
Allocate Data Centre space	1d	Wed 25/08/10	Wed 25/08/10
Procure Hardware	25d	Wed 25/08/10	Tue 28/09/10
Procure Software	25d	Wed 25/08/10	Tue 28/09/10
Planning (Design) PHASE	33d	Wed 4/08/10	Fri 17/09/10
Refine Storyboards & Scripts	2d	Wed 4/08/10	Thu 5/08/10
Registration	2d	Wed 4/08/10	Thu 5/08/10
Internet Voting	2d	Wed 4/08/10	Thu 5/08/10
Telephone Voting	2d	Wed 4/08/10	Thu 5/08/10
Solution Design	20d	Fri 6/08/10	Thu 2/09/10
Registration	20d	Fri 6/08/10	Thu 2/09/10
Internet Voting	20d	Fri 6/08/10	Thu 2/09/10
Telephone Voting	20d	Fri 6/08/10	Thu 2/09/10
Vote Delivery	20d	Fri 6/08/10	Thu 2/09/10
Solution Design Review	6d	Fri 3/09/10	Fri 10/09/10
Release Draft Solution Design	1d	Fri 3/09/10	Fri 3/09/10
Client to review Solution Design & provide Feedback	5d	Mon 6/09/10	Fri 10/09/10
Update Design (20% of Design time)	4d	Mon 13/09/10	Thu 16/09/10
Registration	4d	Mon 13/09/10	Thu 16/09/10
Internet Voting	4d	Mon 13/09/10	Thu 16/09/10
Telephone Voting	4d	Mon 13/09/10	Thu 16/09/10
System Documentation	10d	Fri 3/09/10	Thu 16/09/10
Architecture / Network Design	10d	Fri 3/09/10	Thu 16/09/10

Task Name	Duration	Start	End
Solution Design Specifications	10d	Fri 3/09/10	Thu 16/09/10
Disaster Recovery Plan	10d	Fri 3/09/10	Thu 16/09/10
Design Acceptance	1d	Fri 17/09/10	Fri 17/09/10
Build Readiness Decision	0d	Fri 17/09/10	Fri 17/09/10
Execution (Build & Configure) PHASE	79d	Fri 17/09/10	Wed 19/01/11
Build Platform (Pre-production)	17d	Mon 20/09/10	Wed 13/10/10
Build Development Platform (Overseas - supplier dependant)	10d	Mon 20/09/10	Fri 1/10/10
Build Pre-Production Platform (Australia based)	10d	Wed 29/09/10	Wed 13/10/10
Build Demonstration Platform (Australia based)	10d	Wed 29/09/10	Wed 13/10/10
Configure System (Customisation) Pre-production	20d	Thu 14/10/10	Wed 10/11/10
Election Setup (Dummy Candidates etc)	15d	Thu 14/10/10	Wed 3/11/10
Registration	5d	Thu 4/11/10	Wed 10/11/10
Voter Credentials	15d	Thu 14/10/10	Wed 3/11/10
Authorisation Provider Service	5d	Thu 4/11/10	Wed 10/11/10
IVR System	15d	Thu 14/10/10	Wed 3/11/10
File Generation & Reporting	5d	Thu 14/10/10	Wed 20/10/10
Prepare FAT Test Plans (Pre-Production)	5d	Fri 17/09/10	Thu 23/09/10
Registration	5d	Fri 17/09/10	Thu 23/09/10
Internet Voting	5d	Fri 17/09/10	Thu 23/09/10
Telephone Voting	5d	Fri 17/09/10	Thu 23/09/10
Conduct initial FAT - 25% of Build Time	15d	Thu 11/11/10	Wed 1/12/10
DEMO Release Readiness Decision	0d	Wed 1/12/10	Wed 1/12/10
FAT Bug Fixing (20% of Build Time)	9d	Thu 2/12/10	Tue 14/12/10
Registration	9d	Thu 2/12/10	Tue 14/12/10
Internet Voting	9d	Thu 2/12/10	Tue 14/12/10
Telephone Voting	9d	Thu 2/12/10	Tue 14/12/10
Conduct FAT retest (following Bug Fixing - 25% of FAT Time)	3d	Wed 15/12/10	Fri 17/12/10
DEMO Release Readiness Decision	0d	Fri 17/12/10	Fri 17/12/10
Functionality Test Signoff	2d	Mon 20/12/10	Tue 21/12/10
Functionality Test Report	2d	Wed 22/12/10	Thu 23/12/10
Scalability & Performance Tuning (Pre-Production)	6d	Wed 22/12/10	Tue 11/01/11
Test and tune performance	4d	Wed 22/12/10	Fri 7/01/11
Performance report	2d	Mon 10/01/11	Tue 11/01/11
System Documentation	10d	Thu 6/01/11	Wed 19/01/11
System User Guide	10d	Thu 6/01/11	Wed 19/01/11
UAT Release Readiness Decision	0d	Tue 11/01/11	Tue 11/01/11
Experience User Testing (Demo System) PHASE	74d	Fri 24/09/10	Wed 19/01/11
Establish Election Support (HelpLine)	65d	Fri 24/09/10	Thu 6/01/11
Acquire Training and Support Capabilities	10d	Fri 24/09/10	Fri 8/10/10
Develop HelpLine Staff Training material (scripts)	5d	Mon 11/10/10	Fri 15/10/10
Deliver HelpLine Staff Training	3d	Mon 18/10/10	Wed 20/10/10
Provide access to Demo System (familiarisation)	1d	Thu 23/12/10	Thu 23/12/10
HelpLine Readiness Decision	1d	Thu 6/01/11	Thu 6/01/11
Establish Demo Environment (after initial FAT testing)	7d	Mon 20/12/10	Mon 10/01/11
Establish Demo platform	1d	Mon 20/12/10	Mon 20/12/10
Load & Configure Demo system	4d	Tue 21/12/10	Thu 6/01/11
Configure Printers & other auxiliaries	1d	Fri 7/01/11	Fri 7/01/11
Test Demo system	1d	Mon 10/01/11	Mon 10/01/11
Demo system Readiness Decision	0d	Mon 10/01/11	Mon 10/01/11
User Experience (using Demo system)	12d	Tue 21/12/10	Tue 18/01/11
Establish access to Demo environment	2d	Tue 21/12/10	Wed 22/12/10
Blind User Experience / Practice	10d	Thu 23/12/10	Tue 18/01/11
Vision Impaired Experience / Practice	10d	Thu 23/12/10	Tue 18/01/11

Task Name	Duration	Start	End
Scrutineers Experience / Practice	10d	Thu 23/12/10	Tue 18/01/11
EUT Test Signoff	1d	Wed 19/01/11	Wed 19/01/11
User Acceptance Testing (Pre-Production System) PHASE	98d	Fri 24/09/10	Tue 22/02/11
Pre-Production Readiness	2d	Mon 20/12/10	Tue 21/12/10
Establish access to Pre-Prod environment	2d	Mon 20/12/10	Tue 21/12/10
Verify Dummy Data loaded	1d	Mon 20/12/10	Mon 20/12/10
Verify system printers configured	0d	Mon 20/12/10	Mon 20/12/10
UAT Testing	96d	Fri 24/09/10	Fri 18/02/11
Prepare UAT Test Plans (following FAT Test Plans)	4d	Fri 24/09/10	Wed 29/09/10
Registration Test Plan (incl. Integration)	4d	Fri 24/09/10	Wed 29/09/10
Internet Voting Test Plan (incl. integration)	4d	Fri 24/09/10	Wed 29/09/10
Telephone Voting Test Plan (incl. integration)	4d	Fri 24/09/10	Wed 29/09/10
Conduct initial UAT - 25% of Build Time	15d	Wed 12/01/11	Tue 1/02/11
UAT Bug Fixing (20% of Build Time)	9d	Wed 2/02/11	Mon 14/02/11
Registration	9d	Wed 2/02/11	Mon 14/02/11
Internet Voting	9d	Wed 2/02/11	Mon 14/02/11
Telephone Voting	9d	Wed 2/02/11	Mon 14/02/11
Conduct reUAT (following Bug Fixing – 25% of UAT Time)	3d	Tue 15/02/11	Thu 17/02/11
UAT Test Signoff	1d	Fri 18/02/11	Fri 18/02/11
Launch Release Readiness Decision	1d	Mon 21/02/11	Mon 21/02/11
System Lockdown Decision	1d	Tue 22/02/11	Tue 22/02/11
Transition (Pre-Launch) PHASE	7.5d	Wed 23/02/11	Fri 4/03/11
Audit iVote System	7.5d	Wed 23/02/11	Fri 4/03/11
Prepare / Sign confidentiality agreements	1d	Wed 23/02/11	Wed 23/02/11
Conduct Security Audit	5d	Thu 24/02/11	Wed 2/03/11
Code & Hack Testing	5d	Thu 24/02/11	Wed 2/03/11
Intrusion Testing	5d	Thu 24/02/11	Wed 2/03/11
Address Audit findings	1d	Thu 3/03/11	Thu 3/03/11
ReTest Security	0.5d	Fri 4/03/11	Fri 4/03/11
Code & Hack Testing	0.5d	Fri 4/03/11	Fri 4/03/11
Intrusion Testing	0.5d	Fri 4/03/11	Fri 4/03/11
Auditor Security Signoff	0d	Fri 4/03/11	Fri 4/03/11
Election Setup (iVote System) PHASE	2d	Thu 10/03/11	Sun 13/03/11
Prepare & Upload Candidate List (DEADLINE 10th Mar)	0.5d	Thu 10/03/11	Thu 10/03/11
Upload Audio Files (DEADLINE 11th Mar)	0.5d	Fri 11/03/11	Fri 11/03/11
Shut down Demo System (DEADLINE 13th Mar)	0d	Sun 13/03/11	Sun 13/03/11
Election LIVE Dates (iVote Activities) PHASE	64d	Mon 21/02/11	Fri 20/05/11
Open for Registration	0d	Mon 21/02/11	Mon 21/02/11
Nominations Close (DEADLINE 9th Mar)	0d	Wed 9/03/11	Wed 9/03/11
Open for Voting (DEADLINE 14th Mar)	0d	Mon 14/03/11	Mon 14/03/11
Print Votes for counting (DEADLINE 26th Mar)	0d	Sat 26/03/11	Sat 26/03/11
Deliver Votes for counting (DEADLINE 27th Mar)	0d	Sun 27/03/11	Sun 27/03/11
Close System (DEADLINE 1st May)	0d	Sun 1/05/11	Sun 1/05/11
Close Project PHASE	64d	Tue 22/02/11	Fri 20/05/11
Commence Independent Election Review	62d	Tue 22/02/11	Wed 18/05/11
Prepare Survey questions	5d	Tue 22/02/11	Mon 28/02/11
Conduct Survey community groups	10d	Mon 2/05/11	Fri 13/05/11
Prepare Survey report	3d	Mon 16/05/11	Wed 18/05/11
Conduct Post-implementation analysis	1d	Thu 19/05/11	Thu 19/05/11
Conduct PIR meeting with Stakeholders	1d	Fri 20/05/11	Fri 20/05/11

Task Name	Duration	Start	End
Marketing Campaign PHASE	137.5d?	Wed 18/08/10	Fri 11/03/11
Prepare Media Communications Plan	5d	Wed 18/08/10	Tue 24/08/10
Internal General Announcement	6d	Wed 25/08/10	Wed 1/09/10
Prepare internal Brief on iVote system	3d	Wed 25/08/10	Fri 27/08/10
Review & Update Brief	1d	Mon 30/08/10	Mon 30/08/10
Approve Brief for Distribution	0d	Mon 30/08/10	Mon 30/08/10
Brief Polling Place Staff	1d	Tue 31/08/10	Tue 31/08/10
Brief RO Staff	1d	Wed 1/09/10	Wed 1/09/10
External Announcement/Publicity	45d?	Wed 25/08/10	Wed 27/10/10
TV Campaign (Regional)	18d	Wed 25/08/10	Fri 17/09/10
Select Media Org	1d	Wed 25/08/10	Wed 25/08/10
Create Campaign with Media Org	10d	Thu 26/08/10	Wed 8/09/10
Test Campaign & obtain feedback	1d	Thu 9/09/10	Thu 9/09/10
Update Campaign	2d	Fri 10/09/10	Mon 13/09/10
Campaign Approval for Launch	2d	Wed 15/09/10	Thu 16/09/10
Commence TV Campaign	1d	Fri 17/09/10	Fri 17/09/10
Newspaper Campaign	16d	Wed 25/08/10	Wed 15/09/10
Draft Print Copy	10d	Wed 25/08/10	Tue 7/09/10
Review Print Copy	2d	Wed 8/09/10	Thu 9/09/10
Update Print Copy	2d	Fri 10/09/10	Mon 13/09/10
Copy Approval for Print	1d	Tue 14/09/10	Tue 14/09/10
Distribute to News Media	1d	Wed 15/09/10	Wed 15/09/10
Radio Campaign	21d?	Mon 20/09/10	Tue 19/10/10
Draft Script Copy	1d	Mon 20/09/10	Mon 20/09/10
Review Script Copy	10d	Tue 21/09/10	Tue 5/10/10
Update Script Copy	3d	Wed 6/10/10	Fri 8/10/10
Script Approval for Recording	2d	Mon 11/10/10	Tue 12/10/10
Record Script	2d	Wed 13/10/10	Thu 14/10/10
QA Radio copy	1d?	Fri 15/10/10	Fri 15/10/10
Approval for Radio	1d?	Mon 18/10/10	Mon 18/10/10
Commence Radio Campaign	1d	Tue 19/10/10	Tue 19/10/10
Mailout Campaign	20d	Wed 25/08/10	Tue 21/09/10
Draft Mailout Copy	10d	Wed 25/08/10	Tue 7/09/10
Review Mailout Copy	2d	Fri 10/09/10	Mon 13/09/10
Update Mailout Copy	3d	Tue 14/09/10	Thu 16/09/10
Mailout Approval for Print	1d	Fri 17/09/10	Fri 17/09/10
Print Mailout (Brail & Large Print)	1d	Mon 20/09/10	Mon 20/09/10
Post Mailout (TARGET 1st Feb)	1d	Tue 21/09/10	Tue 21/09/10
Other Medium (TBC)	29d	Thu 16/09/10	Wed 27/10/10
NSWEC & other Govt Websites (TBC)	2d	Thu 16/09/10	Fri 17/09/10
Community Group channels (TBC)	6d	Wed 20/10/10	Wed 27/10/10
iVote Election System (Audio - Instructions)	6d	Wed 25/08/10	Wed 1/09/10
Book Recording Studio	1d	Wed 25/08/10	Wed 25/08/10
Book Voice Actor	1d	Thu 26/08/10	Thu 26/08/10
Prepare Instructions script for Actor	2d	Fri 27/08/10	Mon 30/08/10
Record Sound Files of Instructions (multi languages)	1d	Tue 31/08/10	Tue 31/08/10
QA Sound Files (pronunciation, audio quality etc)	0.5d	Wed 1/09/10	Wed 1/09/10
Re-Record Sound Files (20% redo)	0.5d	Wed 1/09/10	Wed 1/09/10
Audio Files Approved for Upload	0d	Wed 1/09/10	Wed 1/09/10
iVote Election System (Audio - Candidates)	132.5d	Wed 25/08/10	Fri 11/03/11
Book Recording Studio	1d	Wed 25/08/10	Wed 25/08/10
Book Voice Actor	1d	Thu 26/08/10	Thu 26/08/10
Prepare List of Candidates for Actor	0d	Wed 9/03/11	Wed 9/03/11
Record Sound Files of Candidates	0.5d	Thu 10/03/11	Thu 10/03/11

Task Name	Duration	Start	End
QA Sound Files (pronunciation, audio quality etc)	0.5d	Thu 10/03/11	Thu 10/03/11
Re-Record Sound Files (20% redo)	0.5d	Fri 11/03/11	Fri 11/03/11
Audio Files Approved for Upload (DEADLINE 11th Mar)	0d	Fri 11/03/11	Fri 11/03/11

F.   Potential Risks

Risk	Potential Impact - Likelihood	Mitigation
Proposed legislative changes are not passed by December 2010.	Project cancellation – Low/Moderate.	Legislative amendments which are specific for enabling the operation of the iVote system. It is understood that the proposed amendments are scheduled for the June session of Parliament by DPC. In the event of project cancellation, the project deliverables will be preserved for re-commencement of the project at a later date in preparation for a subsequent event.
Tender responses indicate that implementation timelines cannot be achieved.	Project cancellation – Low/Moderate.	Cancellation of project.
Project Development time escalations.	Project cancellation – Low/Moderate.	Implement appropriate project management team and disciplines to identify problems as soon as possible. Establish necessary project governance structure. Ensure contract provisions include adequate termination clauses for early termination of the project.
Unable to release RFT due to delay in approval from SCCB, via NSW Procurement.	Potential project delay – Low/Moderate.	NSWEC has complied fully with process in engaging with NSW Procurement and has submitted an application for an exemption under Clause 38 of the Public Sector Management (Goods and Services) Regulation 2000, and SCCB Delegation 16. NSWEC has the further option to invoke the 'emergency' provision in Clause 35 of the Public Sector Management (Goods & Services) Regulations 2000.
Tender responses indicate costs are higher than expected.	Potential project delay – Low.	The impact is relatively low given that these costs represent about 30% of overall budget. Contingency included within the project budget estimates. Clear requirements to be included with the requirements specification in RFT. Competitive tendering process proposed for procurement of the voting system software.

Risk	Potential Impact - Likelihood	Mitigation
Project Development cost escalations.	Project budget overrun – Low/Moderate.	Implement appropriate project management team and disciplines. Establish necessary project governance structure.
Project funding not approved.	Project cancellation – Low/Moderate.	Cancellation of project.
Insufficient resources available to NSWEC to manage the project.	Potential project delay – Low.	Key roles and resources have been identified. Alternate resource pools also identified.
Registration System not ready.	Potential delay to elector registration – Moderate.	A simple call centre approach to the registration process is proposed, minimising the level of automation available and providing the preferred approach
Failure of the Registration System	Potential delay to elector registration – Low/Moderate.	Identifying contingency plans to provide short term additional capacity.
Poor take-up of iVote service.	Higher cost/vote – Low/Moderate.	A focussed advertising and promotion campaign is proposed to maximise eligible elector take-up. Demonstration system will be made available before the system is in full operation. Close engagement with the stakeholder representative groups to assist with information dissemination.
High take-up of the iVote service.	Overload the system or registration process – Low.	Include user feedback capability during demonstration phase. Over-dimensioning systems where cost effective. Identifying contingency plans to provide short term additional capacity.
System not usable by proposed user groups	Low take-up – Low/Moderate	Engaging stakeholder representative groups in system specification Engaging accessibility and usability specialists during specification, design and implementation phases of the project. NSWEC is also participating in national standards development forums for blind and vision impaired voting systems with other electoral commissions around the country.