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Beale Telecommunications and Telesis acknowledge the valuable contributions of

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The Boshe Group

RCI Victoria

who helped in the preparation of this report

Beale Telecommunications and Telesis also wish to acknowledge the contributions both verbal and written that were received from participants in the telecommunications industry, carriers, equipment suppliers, service providers rural communities and individuals throughout the State.

Commercial in Confidence

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WHEATBELT TELECOMMUNICATIONS PROJECT REPORT OUTLINE

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FOREWORD:

As is inevitable in a fast-moving and dynamic sector such as telecommunications this Project has been undertaken during a time of change. In particular a number of significant State and Federal Government decisions were announced or imminent as this work was proceeding. The Prime Minister's Industry Statement of November 1997 and the release of the first round of projects from the Regional Telecommunications Infrastructure Fund are important developments with significant implications for many of the issues raised in this report. The decision on changes to the satellite used to deliver television and radio services to much of the Wheatbelt and subsidies for users also has implications. At the State level a proposal for a major telecommunications infrastructure initiative from a major agency is pending.

Each of these will have potential impacts on the issues raised in this Report and the extent of these effects is not clear at the time of writing and is unlikely to be clarified in the short-term.

This Report has taken a region-wide perspective. Most of the recommendations and projects it proposes are from this point of view. Some district level suggestions are made but it seemed presumptuous to extend these too far given the relatively short amount of time we had in each centre. It has been our goal to produce a practical applicable document. In the current climate of constraint in public spending there is little value in proposing projects which need significant and ongoing support. We are more concerned here with highlighting gaps in enabling technologies and building peoples capacity to generate a self sustaining online future.

1.0 EXECUTIVE SUMMARY

Information has been a crucial part of communities since the beginning of time. The rise of the information economy and the information society have come about because information is playing an ever increasing part in developing products and services. Emerging technology is giving us the capabilities to move, store and reshape information on a scale as never before.

In parallel with these developments there have been major breakthroughs in worldwide information access. Modern telecommunications have the potential to remove distance factors which have traditionally placed rural communities at a disadvantage compared to their city counterparts in accessing and delivering information services. The need for modern world standard telecommunication is critical for the Wheatbelt Region's medium and long term viability.

The Wheatbelt region of Western Australia has a population of 70,000 and comprises an area of 155,000 sq km. The Region has experienced low population growth over the past decade. Expectations are that future growth will be strongest along the Region's coast and those areas adjoining Perth.

The primary economic activities of the region are agriculture, mining and fishing.

The aims and objectives of the Wheatbelt Telecommunications Needs Study were to:

- Raise the level of awareness of the implications of the changing telecommunications environment;
- Identify telecommunications infrastructure needs;
- Develop propositions to put to telecommunications carriers;
- Identify potential additional projects; and
- Develop a process to be followed in other regions to assist in the development of telecommunications plan.

The needs study and the application of its recommendations is just the first phase of a continual process to empower the Wheatbelt Region to become a leader in the rural information economy of the present and future.

The process used by the consultants for the project, drew heavily on the RCI Methodology which originated in CIRCIT. This methodology outlines a structured process that enables rural communities to progress autonomously, while moving down a path of continuous development.

The consultants believe that visibility and face-to-face discussions throughout the region were crucial to the success of the project. To this end, the project was structured around a significant commitment to time in the field. In all, the consultants travelled over 7000 km and spent 33 consultant days in towns within the region. Public meetings were held in eight centres and a total of 55 specialist meetings were conducted.

The public meetings provided the consultants with the opportunity to outline the current telecommunications infrastructure capability and the likely directions the industry will take in the future. The implications of deregulation and the Telecommunications Act of 1997 were viewed as being particularly relevant to rural communities. Public forums allowed rural communities to raise pertinent issues and voice any relevant concerns. As expected, issues varied between towns, however there were some consistent themes that were continually cited.

In consultation with the Wheatbelt Development Commission the consultants have suggested an Online Vision for the Wheatbelt Region which is consistent with it's strategic economic vision. This vision would be:

To seize global opportunities, offered through use of information technology and telecommunications, suited to the Wheatbelt's resources and skills which will maximise economic growth for the Region.

This vision recognises the importance of information technology and telecommunications to the future economic and social viability of the region. The consultants have made a number of recommendations which when implemented will significantly enhance the business and cultural environment of the region.

The recommendations can be classified broadly under the same focus areas defined in the region's "Online Vision". The Vision incorporates three key elements. These key elements are:

Seizing global opportunities

This implies that the Wheatbelt should become internationally competitive. To accomplish this goal will require world class infrastructure at internationally competitive prices.

In general the Wheatbelt is well served with telecommunications infrastructure though this fact is not widely recognised in the region. However, there remains a substantial disparity between rural town sites and locations more than 5km out of town. This variation manifests itself in bandwidth and service availability (eg. mobile phones).

With current technologies there is unlikely to be a quick or affordable solution to the out-of-town deficiencies. However, near world class infrastructure is available in most Wheatbelt towns and this potential is being under utilised.

Resources and skills suited to the Wheatbelt

This means that local skills should be state of the art and applications should be sensitive to local social, environmental, technical and economic conditions.

The productive use of new technologies is critically dependent on awareness and skills. Whilst there are pockets of excellence within the Wheatbelt region, a large proportion of the community lacks the skills and awareness to be considered internationally competitive. Recommendations concerning these issues are covered in the report. The Internet has the capability to overcome inequities created by distance so common in the country. Failure to grasp the opportunity, to equalise access to the Worldwide Web will have serious long term repercussions for rural Australia.

Maximising economic growth

This implies growth of existing regional markets and industries, expansion into new ones, and the retention of current business and investment.

The consultants prescribe an enhanced role for Telecentres throughout the Region. The Wheatbelt currently has around 20 Telecentres and with the recent RTIF grant of \$1.8 million, the number of Telecentres will more than double throughout Western Australia. The consultants believe that Telecentres must be the key to building the skills base of the region. Telecentre managers will require additional skills training to take on this advanced role. Specific recommendations include equipping all Telecentres with Internet access. Telecentres have the potential to become focal points of regional innovation in the information era.

The adoption of the recommendations in this report will enable Wheatbelt communities to grasp the immense opportunities of the information age to retain and create meaningful employment in the region. They also offer options to promote population stability and growth.

2. RECOMMENDATIONS

1. *It is recommended that Telstra be lobbied to advance the installation of modern digital switching equipment in Central South to bring this District into line with others in the Wheatbelt Region.*
2. *It is recommended that the Western Australian government investigate opportunities for establishing rural based carrier service providers and content service providers.*
3. *It is recommended that further initiatives be undertaken to continue technology awareness raising throughout the Region*
4. *It is recommended that a concerted effort be made to raise the level of computer skills throughout the Region.*
5. *It is recommended that the WDC facilitate the commissioning of an information skills audit for the Wheatbelt Region to ascertain the competitive advantages it possesses for the information economy.*
6. *It is recommended that the WDC target information business opportunities of greatest appeal to these rural technology investors.*
7. *It is recommended that Telecentres purchase bulk training from TAFE and other providers (at wholesale rates) and repackage programs for widespread, flexible and commercial delivery customised to suit local requirements.*
8. *It is recommended that rural users be made aware of the limitations of hand held mobiles and focus on vehicle mounted units for country use. This could be done using the rural press.*
9. *It is recommended that the WDC also formally request Telstra to establish a refundable bond approach to capital contributions when necessary for the establishment of mobile base stations.*

10. *It is recommended that the Western Australian Government investigate the possibility of RTIF or State sourced refundable bond funding for mobile base installation*
11. *It is recommended that the Australian Communications Authority, be encouraged to require digital mobile phones to be equipped with interoperable SIM cards which enable handsets to access any mobile phone network.*
12. *It is recommended that the State Government undertake market analysis of business opportunities in conjunction with experienced outsourcing companies and distributed work consultants to identify real information based opportunities for the Wheatbelt region.*
13. *It is recommended that the WDC champion the introduction of affordable Internet access for every Telecentre in the region.*
14. *It is recommended that a central, high traffic location, preferably in the main street, be considered as a high priority in funding decisions for future and existing Telecentres.*
15. *It is recommended that, wherever possible, Telecentres be strategically co-located with other community facilities to maximise use and amenity of existing resources.*
16. *It is recommended that negotiations with a large national ISP be established to try and promote a franchising of their product base to local ISP's who will live and work in the community.*
17. *It is recommended that in sparsely populated regional centres where no independent ISP can be attracted, the local Telecentre Manager be encouraged and trained to manage a POP under a franchising arrangement with an established ISP.*
18. *It is recommended that all Telecentres be equipped with Internet access and all Telecentre Managers become Internet ambassadors.*

19. *It is recommended that local business interests groups lobby the relevant Federal and State Government Ministers to ensure the managers of government departments with a local regional presence have the resources and autonomy to buy local Internet Services.*
20. *It is recommended that WDC should press for an extension of analogue satellite broadcasting if market penetration of digital decoders is incomplete when simultaneous broadcasting is scheduled to cease.*
21. *It is recommended that WDC ensure that there are sufficient quantities of the DOCAT satellite reception guide for regional distribution.*
22. *It is recommended that State Government should argue for additional low-powered radio narrow casting services where there is demand for a community orientated application.*
23. *It is recommended that the State Government should continue to monitor satellite Pay TV availability during this period of corporate instability and seek formal assurances from Galaxy about the continuation of regional services.*
24. *It is recommended that further detailed study of the issues and extent of interoperability between emergency services be commissioned and that applications for RTIF funding for compatible communications for country ambulances be considered.*
25. *It is recommended that the WDC in conjunction with the Avon Smart Community Group champion the progression of telecommunications based developments in the Avon valley.*

3. AIMS AND OBJECTIVES

The aims and objectives of the Wheatbelt Telecommunications Needs Study are to:

- raise the level of awareness of the implications of the changing telecommunications environment;
- identify telecommunications infrastructure needs;
- develop propositions to put to telecommunications carriers;
- identify potential additional projects; and
- develop a process to be followed in other regions to assist them in the development of telecommunications plans.

ONLINE VISION FOR THE WHEATBELT

To seize global opportunities, offered through use of information technology and telecommunications, suited to the Wheatbelt's resources and skills which will maximise economic growth in the region.

4. THE WIDER CONTEXT

4.1 INFORMATION ECONOMY

Information has been a foundation of communities since the beginning of time. The rise of the information economy or the information society has come about because information is playing an ever increasing part in developing products and services. Exciting new technology is enabling us to move, store and reshape it so much more easily.

In parallel with this information revolution have been unprecedented advances in telecommunication capabilities to deliver information to users. Modern telecommunications have the potential to remove the distance factors which have traditionally placed rural communities at a distinct disadvantage in accessing and delivering information services. The need for modern world standard telecommunications is critical for the Wheatbelt Region's medium to long term viability.

Recent developments in Precision Farming, which enable farmers to gather, store and manipulate information about the land they are working and the crop it produces, is a classic example of this change. Farmers have worked at the paddock level in assessing yields because gathering detailed land usage information was impractically time consuming, storing it massively complicated and identifying particular locations quickly and consistently virtually impossible. Using Precision Farming technologies along with the farming experience they have developed over the years offers the opportunity for farmers to greatly increase the efficiency of their cropping and harvesting methods. Productivity improvements from faster harvesting can be attributed to the Industrial Age. Improvements in yield gained through Precision Farming are developments of the Information Age.

4.1.1 Telecommunications

Over the past two decades technological advances in telecommunications have exploded with networks around the world graduating from a single bush track to four lane freeways, to use a transport example. An important part of this technology explosion has been the use of computer technologies to enhance and broaden the telecommunications possibilities which are now achievable.

The cost of bandwidth, the term for a network's carrying capacity, is plunging. Just as computer power has increased, prices have fallen over the past few decades. The availability of high bandwidth at reasonable prices is crucial to any community's online future. The table below provides an indication of the time taken to transmit files of varying sizes at different speeds. The first column of the table below gives the time taken to transmit a single A4 page using the standard facsimile format. The second provides the same information for a 1 MByte file. Typically a one megabyte file can contain either 250 A4 pages of text (80 characters/line, 50 lines only); or about 1.5 seconds of high quality television image and sound.

Transmission Speed	Av. time taken to send 1 A4 page	Av. time to send 1 MBytes file
2.4 kbps	100 sec	56 min
9.6 kbps	25 sec	14 min
14.4kbps	17 sec	10 min
28.8 kbps	9 sec	5 min
64 kbps	4 sec	2 min
128 kbps	2 sec	1 min
10 Mbits	24 milliseconds	1.25 sec

Most customers connected to digital exchanges and reasonably close to them can expect 28.8kbps performance or better, for those more distant from their exchange it can drop to 9.6kbps or lower.

4.1.2 Policy Changes

In response to the massive advances in technology governments around the world have begun to move out of telecommunications, to sell off government owned carriers and liberalise the Information Technology industries. They have done this for two reasons:

- the technology has made many geographic boundaries, and with them, the reach of a particular country's monopolistic telecommunication laws, increasingly irrelevant; and
- the recognition that an efficient telecommunications sector is an essential part of being an active participant in the Information Age and privatisation is considered to offer the best chance of achieving this efficiency.

Although Australia has chosen a mid-point on this path, in comparison to many other western countries, it *has* chosen to significantly lessen the role of the public sector in the telecommunications industry. For telecommunications users - particularly those customers who are "less attractive" by virtue of their spending power or location or both - this is a crucial change. Getting access to services will no longer be a issue of public policy, it will be a matter determined more by market forces.

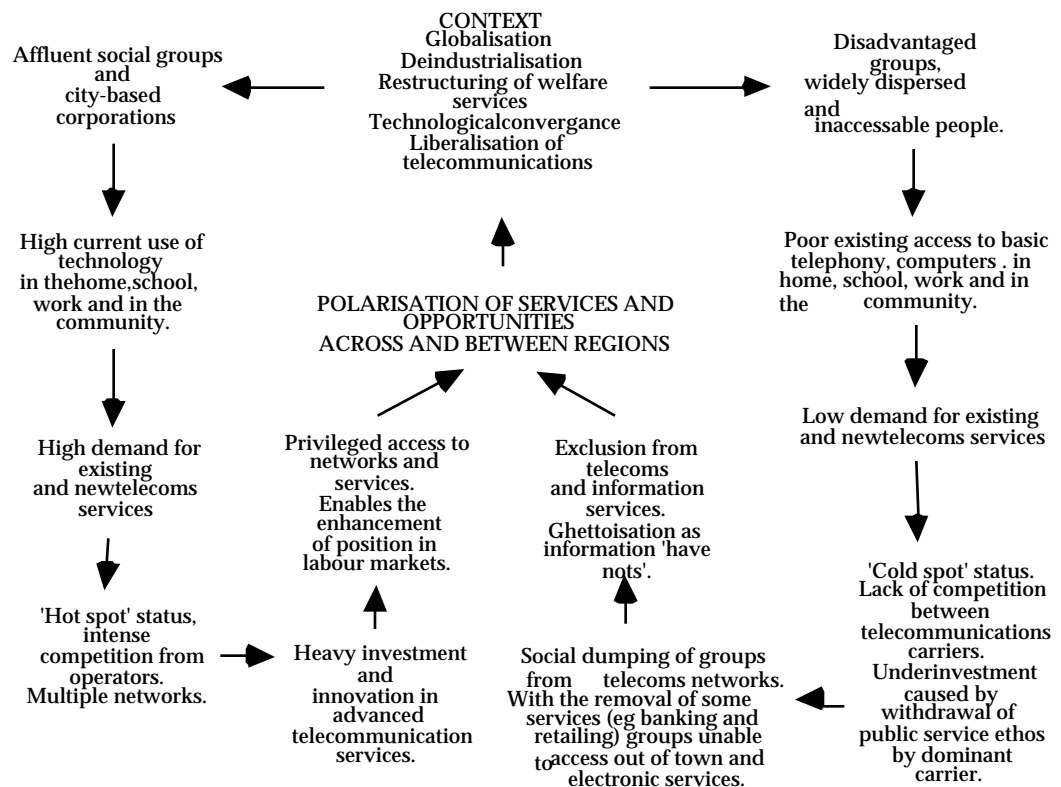
This alteration in the orientation of the industry requires a similar change in the approach taken by customers. Instead of lobbying government for improvements in services, users will need to develop propositions to put to telecommunication carriers, or to consider other alternatives to achieve the goals they want for their organisations or communities.

4.1.3 The Death of Distance or the Death of Rural Australia?

A great deal has been written about the effect these technologies could have in changing the way we deal with distance. Workers can "commute" electronically, many businesses and other organisations do not have to always look to the centre of the major cities to base their operations. Education and health services can be significantly improved by providing electronic delivery of expert assistance and advice.

On the other side of the coin expert skills do not have to be located in country towns - these skills can be accessed electronically from the city or a regional centre. The practice of the banks over the past few years in systematically down-grading many of their of country branches is a clear example of this trend.

So, just as an understanding of the changing dynamics and technology of the industry is important for all telecommunications users, it is even more critical for those in rural Australia, because it can just as easily be used to their advantage as it can be used to their disadvantage. An understanding of these economic and technical changes can assist regions to place themselves on the upward, left-hand side of this cycle rather than the declining right-hand spiral below.



5. METHODOLOGY

The approach taken for the Wheatbelt Telecommunications Project has been based on the Regional Communications Initiative (RCI) methodology developed by the Centre for International Research on Communications and Information Technologies (CIRCIT) in Melbourne. This is a community development process which has drawn on local and overseas experience to assist communities develop appropriate and sustainable regional telecommunications plans.

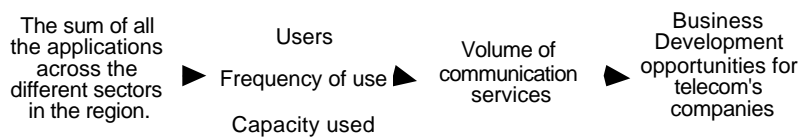
The RCI uses a multi-layered framework to work systematically with various groups and sectors within a region to build a picture of needs, the identification of applications which will meet those needs and the technologies required.

The Need <i>Which is addressed by:</i>	A specific need identified within the region - eg training for export needed by local agricultural machinery manufacturers.
The Application <i>Which is delivered by:</i>	The application addressing that need - eg remote delivery of an export training course.
The Service Delivery Mode <i>Which is transmitted by:</i>	The way the service is delivered to the users - eg by facsimile, audio conference, video conference or by interactive multimedia.
The Delivery Platform (infrastructure) <i>Which itself is built from:</i>	The network that links the user to the originator of the service, and carries the information from one to the other - eg the public switched telephone network.
The Component Technology	The various components that are used to build the layers above - eg loud speaking phones, facsimile machines, paper documents

from: *A Framework for Developing Regional Communications Initiatives*, RIRDC (Canberra) and CIRCIT (Melbourne), 1997, p.71

By working with communities and other organisations it is possible to build a clear picture of the existing and latent communication needs. By incorporating that information with an understanding of the technology which is in place along with some of the options likely to arise in the near future this process can provide the basic building blocks to draft a case to put before telecommunications companies or other capital funding bodies in support of enhancing infrastructure.

Aggregating Demand to Attract Investment



A crucial foundation stone to this approach is raising awareness of the potential applications of the technology. To understand where telecommunications can make a contribution to communities it is necessary to also have a grasp of the broad issues in the industry. From this point demand can be built.

Awareness raising extends beyond an understanding of the technology and the industry to the new online environment and how it is likely to affect particular sectors and areas. Earlier communications technologies, such as radio and television, operate as broadcasting media where communications is only in one direction. In this new online world the technology presents the opportunity for true two-way exchange of information.

The broadcasting model can be seen as an information product of the industrial age complete with the tremendous advantages enjoyed by the big (generally city-based) players because of their economies of scale. A communications network leads to a very different, far more interactive way of operating and with it many more opportunities for those on the periphery.

The RCI methodology calls for a comprehensive, seven stage process to carry this exercise through to completion. At the completion of these seven stages the community will have addressed the various requirements for building a regional communications infrastructure.

THE ISSUE	THE PROCESS
Managing the process	Building the Organisation
What does the region need?	Setting the (Online) Vision
What applications and services are required to meet regional needs?	Meeting the Needs Application identification. Propositions to take to infrastructure and service providers for response
What infrastructure is required to meet regional needs?	Choosing the Infrastructure Responses from infrastructure/service providers on technology, timing and cost options.
How to pay for it?	Engineering the Finance Assembling the public and private funds to finance the regional communications initiative.
Is it a viable solution?	Assessing feasibility “go/no go” decision.
The next step.	Implementation

The Wheatbelt Telecommunications Project has focussed on the first three of these steps. In the process of its field work public meetings have been held in eight

individuals throughout the Wheatbelt. The purpose of this program has been two-fold: to pass on information and raise awareness of the issues and to discuss with participants some of the elements which would go towards building an Online Vision for the Wheatbelt Region.

At the request of the Commission this vision has not been developed in the form of a statement but as a series of potential projects which could be pursued. These projects are listed with greater detail below at section 5. Each of these potential projects has been developed to meet particular needs and exploit opportunities identified by the group as it undertook its fieldwork and in subsequent discussions with various industry and community leaders.

It is very clear that by extending the awareness raising to other groups and having the opportunity to follow up a great deal more information could be gathered and imparted. In areas as rapidly changing and as complex as information and telecommunications technologies many communities encounter the double barrier of grasping how the technology can assist them and identifying the best strategy for achieving it. By meeting this information need a great deal of potential could be unleashed in many communities which would empower them to create their own Online plan.

6 TELECOMMUNICATION INFRASTRUCTURE

6.1 GENERAL

Over the past three years, there has been a major improvement in the general fixed telephony infrastructure servicing the Wheatbelt Region. This primary infrastructure, which is mainly provided by Telstra Corporation, has been largely replaced as part of Telstra's FMO (Future Mode of Operation) programme. This programme aims to replace all the analogue transmission and switching infrastructure by the year 2000.

In the past Telephony infrastructure has been designed primarily to provide a high quality voice service, with high-speed data requirements being serviced by specialised digital networks. These digital networks have previously had limited capacity in much of the Wheatbelt Region.

The provision of an all digital infrastructure allows many of the new services previously only available to city or large rural centre communities, to be extended to the majority of Wheatbelt Region communities. In particular, the ability to provide high speed data (up to 64kbps) or voice over the same circuits using optical fibre and digital radio transmission, has dramatically reduced the cost of providing telecommunications, especially data transmission. This latter improvement has been fundamental for the development and deployment of Internet services.

6.2 THE UNIVERSAL SERVICE OBLIGATION

While the modernisation and digitalisation of the telephone network in Australia has led to a very welcome and much needed improvement in quality, the Federal Government has been loathe to change the definition of the "Universal Service Obligation" standard which carriers are bound to provide to all Australians who apply for a telephone service. Despite the considerable debate and demands by many rural communities for a better deal in the country, the USO remains unchanged as a voice service of bandwidth 300-3400 Hz, providing a data transmission rate of 2400 BIT/sec. This data rate is totally inadequate for acceptable Internet transmission. Nevertheless, with the modernised telephone network, the majority of Wheatbelt Region customers will obtain much better than this with typical data rates of 19200 – 33600 BIT/sec being achievable where Telstra customers are located within 2 – 3 km of a telephone exchange. Outside these areas, data rates of 9600 – 19200 BIT/sec are more typical with the actual rate often being determined by the condition of the copper network connecting the customer to the exchange. When the copper network is in poor condition due to corrosion, line faults and noise on the circuits, data transmission becomes slow or impossible. Generally wet weather will aggravate this problem considerably as earth faults on the copper cables become more apparent. Despite complaints of slow data transmission speed, Telstra will often revert to the USO standard and claim that acceptable (by USO definition) communication is available. In truth, Telstra would prefer to replace all the old copper networks to remove these problems and reduce maintenance costs, but the cost of this exercise makes it unlikely to occur in the foreseeable future.

6.3 ISDN

As a means of ensuring a substantial improvement in digital transmission speed and quality for the majority of Australian telecommunication users, the Federal Government and Telstra Management agreed on a strategy to rapidly expand its ISDN (Integrated Services Digital Network). To facilitate this the 1997 Telecommunication Act (Section 66) requires Telstra to ensure that by 31 December 1998 at least 96% of the Australian population has access to a basic rate (64kbit/sec) ISDN telephone service. Telstra seems to have interpreted the 96% access to be measured at the telephone exchange point, thus bypassing the issue of the poor quality copper distribution to the customer. In reality, for a customer serviced with an average quality copper distribution network, the ISDN service will only operate satisfactorily within 4-5 Km of the telephone exchange.

This extension of ISDN was made possible largely by technological development and the adoption of the "ETSI" ISDN standard by the European equipment manufacturers who provide most of Australia's telephony switching infrastructure. Widespread deployment of ISDN within the Wheatbelt Region is now occurring under the Telstra product name of ONRAMP.

From the customer's perspective there is a key issue which differentiates the ONRAMP service from a now standard digital telephony service. Whereas in standard digital telephones the digital to analogue (speech) interface occurs in the telephone exchange, with ONRAMP this interface is moved right into the customer's business or home. This means that customers who are connected to ONRAMP have the copper connection to the exchange specially "conditioned" to remove sources of noise or degradation to the digital signal. From an Internet perspective, an ONRAMP customer can have a full of 64,000 BIT/sec service back to the local Internet Service Provider (ISP) who must then ensure that this quality and capacity is maintained by also using ONRAMP or equivalent digital circuits back to the wholesale service provider usually located in a capital city.

6.4 INTERNET INFRASTRUCTURE

The provision of Internet services across the Wheatbelt Region varies considerably. The presence of local Internet Service Providers (ISP's) operating within the Wheatbelt Region at the time of the field visits are mentioned in the district reports under Appendix 1 and 2. A more thorough discussion on Internet service can be found in Section 10. Not mentioned in the District Reports is the availability of Telstra's BigPond "Rural Connect Plan". While all Internet users spoken to in the Wheatbelt Region seem to be aware of this Telstra product, the consensus was that this service was too expensive for other than short connect time E-mail usage, and that the additional help facilities and time independent connection provided by most local ISP's made these services far more preferable. It is the consultants' view that time independent and data volume independent charges by local ISPs have a limited future due to the volume dependent charges levied by the wholesale service providers.

6.5 MORE INFRASTRUCTURE

The District Reports contain locations of the Telstra mobile coverage correct at the date of this report being issued. However, the provision of new mobile base stations is a continuous process. For commercial reasons Telstra is not able to release information on proposed installation sites more than three months in advance.

In all sites where Telstra provides an analogue mobile service, Optus have the capacity to resell this service under their own banner. In most cases, however, Optus have chosen not to market analogue mobiles in rural areas.

6.6 DISTRICT REPORTS

Due to the large geographic size of the Wheatbelt Region, it is useful to consider the deployment of telecommunication infrastructure under the recognised four district areas. Appendix 1 contains a complete list of all telephone exchange sites in the Wheatbelt Region plus details of digital operation, ISDN and mobile capability and Internet coverage. Appendix 2 contains summary infrastructure reports for the four districts within the Wheatbelt region.

As a general comment, the 221 telephone exchanges serving the Wheatbelt region are well supported with optical fibre cable or digital radio transmission systems servicing all but 3 of the exchanges and these will be converted to digital in 1997/98. Conversion to digital switching is also well advanced with all districts except the Central South which will have its remaining analogue switched lines replaced during 1997/98. The Central South District stands out in the region with a significant number of large analogue exchanges remaining in operation until 1998/99 according to Telstra's current installation schedule. ISDN infrastructure is also at a low level of availability (30%) compared to other Wheatbelt Districts (average 52%).

The effect of analogue switching will be marginal for some customers, however, remaining analogue switched customers will be denied access to the latest operational reliability and customer facilities offered by digital exchanges. Depending upon the maintenance condition of the analogue exchanges, analogue customers also may face the possibility of poor quality Internet connections.

Recommendation

- 1. It is recommended that Telstra be lobbied to advance the installation of modern digital switching equipment in the Central South to bring this District into line with others in the Wheatbelt Region.***

6.7 TELECOMMUNICATIONS ACT 1997

The Telecommunications Act of 1997 has created a new regulatory environment that offers rural communities the opportunity to do things differently. Subject to compliance with certain specified requirements the field of telecommunications is now open to all new comers.

The act provides for three categories of telecommunications companies; Carrier, Carriage Service Provider and Content Service Provider.

At the top end of the scale are Carriers (Telstra, Optus, Vodaphone and AAPT). Carriers, by definition, are allowed to own telecommunication infrastructure. They may also inter-connect with other carriers thus avoiding the necessity to always have their own physical infrastructure. Interconnect tariffs are typically well below wholesale rates.

At the next level are Carriage Service Providers. Carriage Service Providers do not own any transmission infrastructure (otherwise they would be classed as Carriers). They may however operate their own switches. Carriage service providers fall into two categories; switched Carriage Service Provider or non switched Carriage Service Provider. The former buys bulk transmission capacity from carriers and resells a telecommunications service direct to customers. It earns its profit from the margin between its purchase price and its selling price. The latter offers a range of carrier provided services direct to customers and handles service related issues such as billing, fault administration and help desk functions. It earns its profit by buying wholesale and selling retail. Both types of Carriage Service Provider are active in the Western Australian market place.

Content Service Providers provide telecommunications "content" and would include Internet service providers (Some internet service providers could also be categorised as carriage service providers).

6.7.1 Amalgamation

Typically Rural Communities are faced with disproportionately high telecommunications costs. This is particularly true in Western Australia where distances are great and rural communities are small. Many of the goods and services required by country residents necessitate calls outside their immediate area.

A number of options are available to rural communities to redress this inequity. However, the economics of these solutions are dependent on issues such as distance, traffic volumes and tariffs. In general terms, the established carriers in Australia have found rural telecommunications to be a marginal exercise; marginally profitable between large country centres and mostly unprofitable in remote localities. Despite this marginal scenario, there are opportunities for regional operators to provide profitable service under certain circumstances.

6.7.2 Opportunities

Opportunities exist to amalgamate traffic on medium density routes. The financial feasibility will depend on predicted costs and revenue. The collection of traffic from source can be a complex and expensive task. Collection from concentration points such as office blocks (ex PABX) may be cost efficient. However, collection from individuals and small business probably will not be cost efficient. Collection can be achieved by using owned and installed physical infrastructure (Carrier status), using Telstra National

connect (switched Carrier Service Provider status) or reselling carrier services with a margin (switchless Carrier Service Provider status).

Recommendation

2. ***It is recommended that the Western Australian government investigate opportunities for establishing rural based carrier service providers and content service providers.***

7. BARRIERS TO ADOPTING TECHNOLOGY

7.1 GENERAL

The consultancy process sought to assess the causes for particularly low penetration of computers and fax machines in some sections of the Wheatbelt Region (see Appendix 7). Interestingly, most communities with lower take up rates also were endowed with some of the best telecommunications infrastructure available within the region. It is also noteworthy that these areas were characterised by lower median incomes.

The lack of a perceived need for information age technology seemed to be a crucial factor in inhibiting local demand. Without practical, identifiable and obviously beneficial applications, it is unlikely that individuals would even consider investing the time and money necessary to equip themselves with state-of-the-art technology.

Financial barriers appeared to be real but not overwhelming. When regional people perceive the needs and inherent advantages of advanced telecommunications, then the moderate cost for computers and on-line access is not considered to be a major obstacle.

Skills and confidence (or the lack thereof) was cited increasingly as a major barrier to widespread adoption and use of information technology use. There appear to be two identifiable categories, those familiar with computers and those who are not. Generally, those attending the public meetings were familiar with computers and many had recent "on line" experience. Familiarity ranged from relatively low (Northam/Tammin) to very high (Moora) and is obviously not representative of these communities as a whole. This observation also is confirmed by the Boshe report (see Appendix).

At the specialist meetings there tended to be a wider cross section of computer experience ranging from very high levels of computer knowledge to those with little or no expertise in the field. This is not surprising, since specialist groups were selected by different criteria (Emergency Services, Agriculture, Tourism, Aboriginal interests, etc.).

The Public meetings were particularly valuable for identifying the obstacles facing the rest of the community. The three key barriers identified are listed and discussed below.

7.2 LACK OF INFRASTRUCTURE

Infrastructure barriers were considered to be far less significant now than they were 2 to 3 years ago. For instance, Telstra is well advanced in the conversion from analogue exchanges to digital exchanges and inter exchange capacity is rapidly being increased. ISDN capability is available in many medium to large centres in the region at a reasonable tariff. In addition, on line access is available from most phones through modem access. The consultants reached the view that many in the community believe there is a lack of infrastructure and that this perception often results in a failure to maximise the benefits available from the existing infrastructure.

7.3 HIGH COSTS

Costs were cited as a significant obstacle, but not in cases where a definite, useful need could be identified. However, advertising hype has tended to oversell equipment and undersell applications that address fundamental needs. For example, workshop participants quoted sales representatives who claimed Pentium 200 MMX machines to be the bare minimum requirement for typing, whereas even a 286 would suffice for this purpose.

7.4 LACK OF APPROPRIATE SKILLS

Lack of skills and associated confidence was considered by most groups to be a serious impediment to widespread adoption of information technology and its applications. Also, there was a lack of awareness by some, who did not even recognise the necessity to obtain basic skills. The awareness phase of this project went some way towards identifying skills-related issues, which at a basic level can be broken down as follows:

- Familiarisation
- What a computer is
- What it does (a program tailored to address these requirements also should include a “hands on” mouse and keyboard component), and
- Why it is important for the future?

The primary aim of this type of program should be to identify needs for information technology, applications and skills and to remove fear. It should include computer fundamentals such as starting up the machine, loading software, opening, closing and saving files as well as an Internet overview.

Training in computer operations should incorporate word processing, spreadsheets, viruses, windows and backups. Generally, training in most of these facets is already available to regional communities. However, lack of access, lack of promotion and limited flexibility obscure its availability to the local community.

Flexible familiarisation courses could be run by the local Telecentre, TAFE, BEC or shire in ways most appropriate to their client base. The intent being to introduce large sectors of the community to computers, their applications and to highlight their relevance to the future of rural Australia.

Recommendations

3. ***It is recommended that further initiatives be undertaken to continue technology awareness raising throughout the Region***
4. ***It is recommended that a concerted effort be made to raise computer skills throughout the region.***
5. ***It is recommended that the WDC facilitate the commissioning of an information skills audit for the Wheatbelt Region to ascertain the competitive advantages it has in the information economy.***

7.5 EXAMPLES OF NEEDS

The consultants believe that much of the push for technology adoption will come from professionals, such as Accountants and Farm Consultants, who interact with the rural sector.

7.5.1 Accounting

Most accounting practices now use one or other of the popular accounting packages and encourage their clients to use the same software. In exchange accountants will typically charge lower fees when client records are presented in compatible and readily useable formats. The savings to the client can be substantial and can readily justify the costs of hardware and software.

7.5.2 Precision Farming

Precision farming, the use of computers and satellite navigation to increase yield and productivity, is likely to have a major impact on the agricultural community. As precision farming spreads, so will the perceived need for computers and high tech software. Precision farming raises the prospect of substantially increasing wheat farmers' yields. The consultants have heard estimates ranging from 10-20% increases in yield over the next five to ten years. As the region's most significant industry, this agricultural change raises the prospect of new sources of investment funds.

Recommendation

6. ***It is recommended that the WDC target information business opportunities of greatest appeal to rural technology investors.***

7.6 TRAINING

7.6.1 TAFE Capabilities

The C. Y. O'Connor College offers a range of courses that cover the needs noted above (with the possible exception of the familiarisation units). Courses such as "Fundamentals of Computer Operations", a five hour course for \$19.50, are well structured and represent excellent value for money. However, lack of course planning, flexibility, limited promotion and access difficulties were continually quoted as discouraging the use of TAFE facilities. The requirement for a minimum course size (12 in most cases, 6 in some cases), for example, severely restricts availability, especially in the smaller rural localities.

7.6.2 Training Flexibility

Needs of rural communities will vary. Long travel times for outlying participants make half day or full day courses more attractive. Town-based individuals, on the other hand, indicated preference for 2 hour segments spread over multiple attendances. Farming representatives complained about the inflexibility of full semester courses that conflict with seeding and harvest times.

The need for further skills enhancement appears clear. The consultants consider the Telecentres and TAFE to be well equipped to provide delivery. However, substantial repackaging of course materials and delivery arrangements would ensure more widespread participation.

Recommendation

- 7. It is recommended that Telecentres purchase bulk training from TAFE and other providers (at wholesale rates) and repackage programs for widespread, flexible and commercial delivery customised to suit local requirements.***

8.0 MOBILE TECHNOLOGY

8.1 GENERAL

The growth in mobile phones in Australia over the past decade has been phenomenal. Analogue mobile phones (CMTS) were introduced into Australia in early 1987 and Digital mobiles were progressively introduced from the early 1990's. In this 10 year period the number of mobiles has grown to around 5 million Australia wide.

Telstra has an extensive analogue network throughout the nation. However the Federal Government has determined that Australia will move to a fully digital network and to this end the analogue service will end on 31 December 1999.

Telstra ceased further extension to the analogue network in 1995 and is concentrating its efforts on expanding its digital coverage. Optus and Vodaphone are similarly expanding their digital networks.

8.2 WHEATBELT

Mobile coverage in the wheat belt is almost exclusively restricted to Telstra.

Optus and Vodaphone have expressed very little interest in servicing Wheatbelt centres, preferring instead, with a few exceptions, to concentrate on Perth and the more heavily populated coastal strip south of Perth.

Optus has built a site at Katanning (with some coverage into the southern Wheatbelt) and Northam. Vodaphone have virtually no coverage in the Wheatbelt Region.

All three carriers only provide coverage using digital (GSM) mobile technology at new sites. The existing analogue mobile service (AMPS) has all been established by Telstra with Optus having reselling rights which they tend not to exercise in rural centres.

Telstra has more extensive coverage with around 16 base stations located throughout the Wheatbelt Region.

8.3 COVERAGE

Coverage from each base station is restricted to the immediate area surrounding the transmitting tower. Since field strength drops rapidly as distance from the base station increases, it is important to retain close proximity for reliable service.

Under favourable conditions car mounted mobiles will provide satisfactory service up to 35 km from a base station.

Favourable conditions include an unobstructed line of sight between the base station antenna and the mobile.

Hand held mobiles transmit at significantly lower power levels than car mounted and incorporate lower antenna gain than car mounted. Even under favourable conditions the range for hand held can be less than 5km.

In addition, the common practice of using a hand held inside a vehicle can further reduce the range; the steel of the car body acts as a barrier to radio frequency signals and severely reduces efficiency.

There is also another fundamental difference between analogue and digital mobile performance. In marginal areas analogue will continue to work but with degraded performance. In contrast, as signal strength drops, digital will continue to work with high clarity until error rates reach a predetermined threshold. As the error threshold is reached the link fails and the call is effectively terminated.

Traditionally base station coverage has been limited to a 35km radius (ideal conditions) due to software control in the base station. This has limited the capture area and hence financial viability of base station in more sparsely populated areas of the Wheatbelt. New software development by Telstra and LM Ericsson which extends the capture area to approximately 70kms radius (ideal conditions) is currently being trialed at York and so far is looking viable. Telstra hopes to deploy this new software at appropriate locations in WA within the next 12 months.

Unfortunately the additional equipment required at each base station plus the considerable licensing cost levied by the manufacturer to use the extended range software makes its use revenue neutral or slightly negative, so no advantage to the financial viability of site establishment is expected by Telstra.

Recommendation

8. ***It is recommended that rural users be made aware of the limitations of hand held mobiles and focus on vehicle mounted units for country use. This could be done using the rural press.***

8.4 BASE STATIONS

As the number of base stations increase the community becomes more accustomed to low powered mobiles providing satisfactory performance. This is especially true in the metropolitan area but is unlikely to eventuate in the country.

The metro area covers about 1000 sq km and is serviced by around 200 mobile transmitters (base stations). The wheat belt region covers 155,000 sq km and clearly will never have this sort of coverage. At best, the rural sector can expect continuous coverage (for car mounted) along main highways and coverage surrounding medium size towns.

In addition, coverage may be available for particular reasons outside these localities.

Telstra are in the process of investigating cheaper sources of base station equipment, however under the current price structure and applying Telstra's existing commercial

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guidelines, a significant number of Wheatbelt locations will not qualify for mobile base stations establishment unless all or partial funding is provided by the local community.

The sites in this category are listed below:

Bencubbin	Bruce Rock
Calingiri	Corrigin
Cuballing	Dalwallinu
Dowering	Darkan
Goomalling	Kondinin
Koorda	Kulin
Lake Grace	Mukinbudin
Narembeen	Nungarin
Quairading	Trayning
Wandering	Westonia
Wickepin	Wyalkatchem

It is considered that with this information some communities may wish to apply for RTIF funding to provide all or part of the necessary contribution required by Telstra to establish a base station with otherwise marginal financial returns (see Recommendation 9). Locations not mentioned above are still being reviewed by Telstra to determine their potential for fully supporting the \$250K - \$750K cost of base station establishment

8.4.1 Roll Out

The roll out of mobiles is dictated by commercial concerns. In general terms a carrier is concerned about return on investment, with the critical factors being expected revenue and size of investment. It costs a carrier around \$250,000 for the basic electronics of a base station. In addition costs can include a tower, air conditioned accommodation (for the electronics) and provision of 250 volt power. The cost can easily increase to \$750,000 where site works and access are difficult.

8.5 NEGOTIATIONS

Approaches to both Telstra and Optus indicate that some flexibility in installation priorities is possible. Both carriers have indicated that they will re assess any proposals where the investment cost can be reduced or the revenue increased.

An example is Wongan Hills, where the local community managed to bring forward analogue service by contributing to the initial installation. Digital service has recently been added, by Telstra without the need for further contributions.

8.5.1 Special Events

Lack of mobile coverage at special events such as field days (eg. Newdegate Field Day) was cited as a serious impediment to rural productivity and viability of the event itself.

It is our belief that flexible negotiations at a suitable level should resolve these issues. Telstra, in particular, appears ready to consider all proposals in commercial terms.

Following successful events elsewhere, Telstra is prepared to establish a temporary mobile base station for events such as the Newdegate Machinery Field Day at minimum cost by maximum community involvement. Items which the community can provide include transport of equipment from Perth to the site and return, erection of an 8 metre pole and the placement of aerials and cable feeders on the poles, mains power access etc. using these options the Newdegate project can be reduced in cost from the original Telstra quote of \$15,000 to a much lower cost depending upon the travel distance and attendance time of Telstra staff, required to link the base station to the Telstra network.

8.6 COMMERCIAL RISK

The Consultants received a wide range of comments from rural communities.

The issue of commercial risk (and financial exposure) were raised by a number of individuals. In general whilst local communities were prepared to consider a “once only” payment they were most reluctant to consider any arrangement that presented unquantifiable future financial commitments.

Under the existing arrangements, Regional Telecommunication Infrastructure Fund (RTIF) resourcing is made available to organisations or groups who can satisfy the criteria established under the guidelines of “Networking the Nation”. (These guidelines include the preparation of a business case which examines all costs and benefits associated with the project).

Successful funding applications often include the requirement for matching grants from the applicant or other associated groups but generally do not require repayment of the RTIF fund allocation. Whilst this process will satisfy most governance requirements, the amount of available funding under the scheme cannot hope to satisfy all the needs and the adoption of some form of fund leverage would further extend the use of scarce funding.

The consultants believe there are situations where commercially viable projects are suppressed due to insufficient or inadequate revenue data. The carriers are commercially driven and are concerned with both the absolute return on investment and the inherent risk of the project. In these situations, where revenue is uncertain, carriers are reluctant to carry the commercial risk and will seek out projects that have less risk. These lower risk projects are inevitably in the metropolitan and more densely populated areas.

The carriers are concerned with both the internal rate of return (absolute return on investment) and the inherent risk of the project. The internal rate of return is determined solely by the size of the initial investment and the timing and extent of the future revenue streams.

In the case of mobiles, the investment can be estimated with some accuracy and the project risk will be almost entirely related to the accuracy of revenue estimations. Future revenue is inherently more predictable in currently serviced areas, or localities adjacent to currently serviced areas. Rural and remote areas depend to a large extent on business derived from passing traffic. The uncertainty involved in estimating this passing trade is likely to be greater than estimating the business available from the local population. The

industries' experience with mobile phones has been one of extraordinary demand. The consultants believe that there are a growing number of cases where services are not being provided due to the project's rate of return falling short of

other city based sites. In these cases it is more an issue of maximisation of return and capital starvation than risk.

Telstra has demonstrated a preparedness to accept a financial contribution towards the establishment of mobile base stations when their business case analysis would normally have excluded a particular location on the basis that expected revenue failed to meet it's required hurdle rate for mobile investment. In at least one case where community contribution has occurred, Telstra has acknowledged that the subsequent call revenue exceeded their expectations.

The consultants have written to Telstra suggesting the establishment of a refundable bond approach rather than straight capital contribution, as a more equitable process for community contribution to base station costs. In this situation Telstra would refund part or all of the contribution, depending upon the achieved revenue measured some time after the base station commissioning. Although Telstra has not yet responded to this suggestion it is interesting to note that the Meekatharra Community has recently been reimbursed some of it's contribution after revenue analysis by Telstra indicated a higher than expected return.

Recommendation

- 9. It is recommended that the WDC also formally request Telstra to establish a refundable bond approach to capital contributions when necessary for the establishment of mobile base stations.***

8.7 RTIF BOND

It is suggested that a Nationally or State funded "Telecommunications Infrastructure Bond" (TIB) be established to underwrite some of the commercial risk associated with mobile base station infrastructure establishment in marginally economic locations.

The consultants believe that this form of risk underwriting coupled with the establishment of a refundable bond approach for Community contribution to telecommunications infrastructure (see section 8.6) would be of great benefit to mobile telecommunications expansion in rural regions throughout Australia.

An ideal way of resourcing the TIB would be to split the existing RTIF fund into two categories. The primary fund would be used for direct project support with no requirement for repayment as with the current scheme. The secondary fund would provide refundable bond capital for projects where there is a reasonable chance (business case justified) that some or all of the RTIF allocation can be repaid in two or three years and thus become available for reallocation to future projects.

The RTIF TIB should be National, though a trial in the Wheatbelt would be appropriate at locations where Telstra has indicated that fully funded commercial infrastructure investment will not occur.

Recommendation

10 It is recommended that the Western Australian Government investigate the possibility of RTIF or State sourced refundable bond funding for mobile base installation.

If this concept is acceptable, then funds be sought for locations where Telstra has indicated establishment will not occur but where the local Community believe other factors such as security, local business viability or higher revenue targets are achievable.

8.8 MOBILE PHONE NETWORK INTEROPERABILITY

Digital Mobile Phone handsets are all equipped with a SIM card which serves as the unit's unique "signature" and provides the necessary access details for the particular carriers network. The current digital mobile phone systems in use prevents a handset being used on other networks. Although this capacity is available for some users when they travel overseas, for instance, it is not possible to use any other network within Australia without manually changing the SIM card.

This network feature is clearly an important issue of market competitiveness for the carriers in the major population centres. For rural and remote Australia it is an impediment to improved mobile phone coverage. Under the current system there is little value in Optus or Vodafone building mobile base stations outside the major capital cities or regional centres unless they have a major client prepared to pay for network access from a remote site, such as a mining company.

If this technical constraint was removed to enable any digital mobile phone users to access any mobile phone network there would be significant incentive for the other two carriers to consider building infrastructure in these areas, even as stand-alone investments. Even if this function was restricted to designated base stations outside the main population centres and the SIM cards had encoded the capacity to default to their "home" network this facility could still provide a significant boost to the coverage of mobile infrastructure.

The situation may change in the future if new GSM software being produced in Europe is introduced into the Australia network. However as things stand, it is essential for a rural customer to select a mobile carrier who will provide the best overall radio coverage for their area of interest rather than just selecting on price alone.

Recommendation

11. It is recommended that the Australian Communications Authority require digital mobile phones to be equipped with interoperable SIM cards which enable handsets to access any mobile phone network.

8.9 SATELLITE MOBILES

8.9.1 Geostationary

The Wheatbelt Region currently has access to satellite communications through a number of satellites. The most useable are the Optus mobile satellite service and the Telstra Satcom service. Both of these services are from geostationary satellites which are located 36,000km above the Earth. These satellites are in stable orbit and since they complete an orbit of the earth every 24 hours they appear to be stationary from the earth station perspective.

The handsets are moderately large and are best suited to vehicle use though smaller units are available for data and messaging. The call costs are high and average around \$2.00 per min for moderate users. The units themselves sell for around \$4,000, but are becoming cheaper with increased volume.

8.9.2 Low Earth Orbit

Low Earth Orbit (LEO) satellites orbit the earth at an altitude of around 700km and represent a new concept in satellite communications. At such a low altitude they complete an orbit of the earth every 2 hours or so.

As far as mobile phones are concerned, the satellites function in a manner not dissimilar to an extremely tall cellular tower. Using advanced electronics, the satellites project tightly focussed beams at the earths surface. However, the base station is still 700km away and this presents some technical demands on signal strength.

Handsets for the LEO service will incorporate dual-mode capability that allows the handset to operate via the digital mobile (terrestrial) service whenever signal strength is adequate and revert to satellite service outside these areas.

The service will be available worldwide in 1999 with commercial trials commencing in late 1998.

8.9.3 LEO Tariffs

Retail tariffs are not available at this stage. However, it is reasonable to expect that usage charges will lie between current mobile and current satellite rates. Handset costs can be expected to be less than current satellite phones, but substantially above current digital mobile handsets.

8.10 CONCLUSION

Mobile coverage will continue to be a concern to rural communities. Due to low population density, there is still only one carrier providing coverage throughout the Wheatbelt Region. This is unlikely to change in the near term.

Main highways and medium size towns will continue to be the focus of the carriers attention. Rural communities should not expect to achieve significant hand held coverage.

Car mounted mobiles should continue to be the norm for satisfactory rural coverage and the opportunity to negotiate early installations of base stations, with or without RTIF funding support, should not be ignored.

9. DISTRIBUTED WORK

What Distributed Work means for the Company and/or Employee

For any company or organisation it is important that work be carried out efficiently and effectively. Before the advent of modern telecommunications the model of the average company centred around physical location with employees coming to a common location and working broadly similar hours and conditions of work.

Today distributed work, or the ability to work in locations physically remote from each other, becomes efficient in a modern telecommunications environment. Modern technology allows the same sort of efficiencies or, in some cases, efficiency improvements to occur in an environment of distributed work.

Whether a self-managed company or an employee, all of the activities of a normal business may be carried out as follows:

- Meetings can be conducted – through Teleconferencing, Video conferencing;
- A variety of data transmission activities can occur – Internet, E-mail –correspondence (to individuals and groups), facsimile, on-line data transmission;
- Electronic commerce, electronic trade – the Teleworked transaction eg. banking, stocks and shares, cattle sales etc
- Mobile telephony – radio, telephone, satellite;
- Message taking – call centres, message centres etc;
- Information searching – the Internet, online data bases;
- Record keeping – expenditure and time management, creating and storing documents/back-up;
- Automated tracking of business activity eg. telephony, faxes, etc
- Automated tracking of people and/or locations eg. beepers, GPS
- System Maintenance and error diagnosis, repair – on-line Help desks facilities

9.1 TELEWORKING

The conduct of these activities utilising telecommunications technology is called “Teleworking” and is a crucial component of any “on-line” organisation.

Modern telecommunications effectively allows one to maintain the appearance of a continuous workplace presence, independent of both location and time. This mode of working may eliminate overheads such as a dedicated receptionist, but allows participation in decision-making and information-sharing etc, and facilitates networking and sharing of multiple distributed workers and functions. At the same time it is possible to perform these functions in a controlled and quality manner. Distributed process application software is becoming increasingly available. Distributed system maintenance is also increasingly popular.

Modern technology allows the company or employee to work effectively just as though

location). There are however some technical pre-requirements e.g. all parties should have access to reliable telecommunications capable of transferring voice and data at speeds of at least 14.4kbps. Mobile telephony also is desirable. Theoretically if all

technology is in place there will be no differences in capability between locations. The primary stumbling blocks are cost and managerial reluctance. Obviously it is much more expensive to operate on distance call charges than it is at local call rates. This presents a real first stage problem for rural and remote regions to realise the opportunities Teleworking offers them.

The reluctance of some managers to re-engineer their organisations to integrate Teleworking has been a substantial impediment. A number of factors are contributing to breaking these attitudes down. They include:

9.2 SMALL OFFICE/ HOME OFFICE

Distributed working practices make it easier for a company or employee to work in small work units or to work from home. This concept of small working units with perhaps only one person involved is called SOHO or "small office home office". This mode of working is becoming increasingly popular and offers considerable potential for rural and remote areas provided the technological capability and costs factors are favourable.

Take the example of the consultancy group which was formed to carry out this Wheatbelt project. There are seven people involved, all working in their own SOHOs, from locations as diverse as Perth, Melbourne, and Kalgoorlie. Project management is carried out in one site and virtually all other communications are done remotely. The report has been prepared by e-mail on Internet according to agreed standards and with contributions by all parties utilising editing facilities which allow parties to track the source, dates and nature of changes as the report develops. This process has been affordable because access to Internet at this time is available for the cost of a local telephone call. All other communication costs outside of the Perth metropolitan area have been at STD rates. Wherever possible the Internet has been used.

There are a growing number of examples of this style of work in the Wheatbelt. The potential for the Region, particularly in the Avon Arc are significant.

9.3 DISTRIBUTED WORK AND THE CUSTOMER

From the point of view of customers, the real issue is one of access. Customers want information quickly and accurately and would be prepared to sacrifice personal contact for speedy and accurate responses. Personal access may become of lesser importance if accessibility and accuracy are provided quickly and efficiently. This is the thinking behind Call Centres.

The consultants have had informal discussions with leading outsourcing broking firms to ascertain market demand for Telework services from the regions. Their expectation is that this market will begin to develop in the very near future and they have expressed their interest in pursuing these opportunities.

Recommendation

- 12. It is recommended that the State Government undertake market analysis of business opportunities in conjunction with experienced outsourcing companies and distributed work consultants to identify real information based opportunities for the Wheatbelt region.***

9.4 CALL CENTRES

Call Centres concentrate all calls to an organisation or individual to one answering centre, redirecting and transferring calls on an as-needs and efficiency basis. For instance all calls to a bank might go to a central Call Centre where they are reviewed, interpreted and transferred appropriately e.g. service inquiries are re-routed to the local service centre. Westpac/ Challenge Bank organisation has done this for many of its services citing a major centre in Adelaide handling client calls from throughout Australia. The Call Centre is able to utilise a tracking system as a sophisticated market research tool to monitor the types of calls, complaints etc. Call Centres also lend themselves well to the effective use of free call numbers whereby customers are able to telephone the Call Centre free or at the price of a local call irrespective of where they might be located physically. Many Call Centres also use sophisticated traffic management software to keep waiting time to a minimum.

The consultants considered the viability of encouraging call centre establishment in the Wheatbelt Region. It was decided that although the concept has merit significant ongoing commitment by the WDC or a particular community group would be necessary to attract a suitable call centre client. This proposal should be reconsidered after the implementation and outcome of recommendation 12 is known.

9.5 TELECENTRES

9.5.1 The Role Of Telecentres

Background

The success of WA Telecentres has attracted national and international recognition. To build upon these achievements, it is crucial for Telecentres to play a central role in regional telecommunications planning and development.

Telecentres vary greatly throughout the Wheatbelt Region (as they do throughout the rest of the State) in terms of their function and scope. This variety reflects the evolution of WA Telecentres which have developed from different programs and in different timeframes to serve the unique needs of each community. Some Telecentres were created by grants from the Commonwealth Department of Primary Industry and Energy, while others started as TAFE WALINK centres, WESTLINK reception sites and grassroots community initiatives.

Given these diverse origins, the wide variation in technical facilities and differences in services offered from Telecentre to Telecentre is understandable. There is little uniformity in the extent, type and vintage of equipment. Also, Telecentres fulfil quite different functions in various communities. In order to continue to meet community-based needs successfully, some variations in technical facilities will always be necessary. However, a more consistent regional and statewide approach to funding, planning and coordinating Telecentres is necessary. The consolidation of the WA Telecentres Network in the Department of Commerce and Trade with its close links to regional development commissions already is a major step in the right direction.

9.5.2 Local Recognition As Shared Valuable Resources

Awareness of the current and future importance of Telecentres to regional communities was somewhat uneven throughout the region. Overall, knowledge and use of local Telecentres were stronger in towns than in surrounding areas. A pre-requisite for taking Telecentres to the next stage of development as the focus of local communications activities is to raise awareness of Telecentre services and capabilities. A Telecentre needs to be embraced as a valuable community shared resource, where facilities well beyond the private capacities of most individuals are at the disposal of the community as a whole. This 'shared resource' view is similar to the concept of aggregating demand for regional telecommunications infrastructure.

The 'shared resources' offered by Telecentres should include wide bandwidth Internet access, Westlink reception and two-way videoconferencing facilities adequate for group use. In this model, the community Telecentre becomes the local 'information shop' serving the needs of town residents as well as those from more outlying locations in the same manner as local retailers, banks, post offices and libraries. The primary client base of a Telecentre should include local businesses (including farmers), individual consumers and local offices of government agencies. Telecentres should become a meeting place, a focal point for local economic development with an IT and T focus, and offer access services such as electronic post office.

9.5.3 Services and Equipment

As Telecentres develop further, they should all be able to offer an integrated range of educational, enterprise, technology awareness and help desk functions fine-tuned to the needs of the communities they serve. Although there will always need to be room for flexibility to allow each Telecentre to be proactive in serving local needs and meeting local expectations, a consistent service/equipment formula probably is required throughout the region as well as the State. This type of formula should combine factors such as local population (townspeople plus surrounding areas), special social, cultural, demographic and economic needs, unique requirements of local industries as well as the extent of the community's geographical isolation. These elements could then be utilised to justify the extent of local Telecentre facilities.

The most important service priorities for any rural Telecentre should be basic Internet and Westlink facilities. Larger and/or more needy communities should be serious contenders for two-way group videoconferencing and more extensive online facilities based on a standardised and objective formula.

Recommendation

- 13. It is recommended that the WDC champion the introduction of affordable Internet access for every Telecentre in the region.***

9.5.4 Location

It is crucial for Telecentres to be visible, convenient to users and appear to complement other local essential services. Creative approaches to Telecentre location also can make these facilities less intimidating to people with little or no technological awareness. Placing Telecentres in close proximity to more 'neutral' community-based services such as libraries, schools and coffee shops can ensure that they do not become exclusive clubs.

Recommendations

- 14. It is recommended that a central, high traffic location, preferably in the main street, be considered as a high priority in funding decisions for future and existing Telecentres.***
- 15. It is recommended that, wherever possible, Telecentres be strategically co-located with other community facilities to maximise use and amenity of existing resources.***

10.0 ONLINE SERVICES

10.1 ENABLING TECHNOLOGIES - THE INTERNET

10.1.1 Background

For decades, technologists and futurists have been trying to predict when computers will become indispensable to our daily lives. Typical scenarios propose a central household or business information and management device providing access to all electronic media of audio, video, telephone and print media services. Within the Wheatbelt Region, the acceptance of this philosophy and the subsequent acceptance of its current manifestation using the Internet seem to vary across the region.

This is illustrated by analysis of the Boshe Telecommunication Survey Data for the Wheatbelt Region that shows considerable variance in the ownership and usage of computers and data modems within the four Wheatbelt Region districts. A summary of this data is presented in Appendix 7 and as an example of the variability, the use of computers for business varies from around 72% of business in Central East to 52.0% in Avon, 62% in Central Midlands and 61% in Central South. Home ownership of computers gives a different picture with 51% ownership in Central Midlands, 27% in Central South and 24% in Avon and Central East.

Despite this variability, virtually all community and business sector groups voiced the view that Internet access was essential to the longer term education and business viability of the Region.

10.1.2 Internet needs for Infrastructure

In theory, at least the Internet will operate on any reasonable voice quality telephone line. In practice, the use of older analogue transmission lines between telephone exchanges and to a lesser extent, the analogue switches themselves introduce levels of noise, crosstalk and electrical mismatch, which severely test the performance of data modems. This often result in the line data transmission rate being reduced to such an extent that practical use of the Internet is impossible due to the slow response times to requests particularly for information to the World Wide Web (WWW).

The Wheatbelt Region is in the fortunate position of having only 3 of its 221 telephone exchanges not already served by digital transmission systems. Analogue switching exchanges can, depending upon age and maintenance performance, also generate noise and mismatches leading to slow data transfer rates with Internet. Within the Wheatbelt Region, 24 exchanges are still wholly or partially analogue operation with some relatively large exchanges involved especially in the worst affected District of Central South (12 exchanges). Appendix 1 and 2 provides more details of the current telephone infrastructure in each district.

The quality of the local copper distribution network is also significant in the performance of data modems and hence Internet performance. This issue is discussed in

10.1.3 Requirements For A Good Local Internet Service Provider

The advantages of having a good local Internet Service Provider (ISP) cannot be overstated. Comments received from all community and business sector groups indicated a common theme that lack of skill and confidence is the major cause of reluctance to use personal computers and Internet.

The challenges in operating a good ISP business should not be underestimated. The company needs to have excellent promotion and marketing skills to build this new industry and provide strong customer support. In addition it must have strong technology skills on-call and solid business acumen to manage viability in a fast growing and volatile climate. Bringing this range and depth of skills together in a small business is likely to present significant challenges.

There was considerable local customer support for the approach of one ISP (Avon GlobalNet) who provided a tailored one-on-one training session for new Internet users as part of the service connection fee. This initial training and follow up support as required by the new user is considered essential to the widespread acceptance and use of Internet within the Region. This cannot be seen as a "luxury". It is an essential element in building demand.

10.1.4 National Internet Service Providers and Franchising

A number of larger city based ISPs were approached about their willingness to establish a regional presence. Most ISP's expressed a willingness to establish a local Point of Presence (POP) in larger regional centres provided a minimum customer base of 100 could be guaranteed. The larger national ISP's have some advantages as they generally maintain a good standard of modem access and speed and multiple digital circuit access back to the Internet Hub point where WWW access occurs. One national ISP (Ozemail) also provides a good level of miscellaneous product availability, such as stockmarket information, included in the base connect fee. The disadvantage of the large national ISP's is that they appear reluctant to franchise these products to a local reseller preferring instead to provide a remote help line (usually priced at local call charges) but no local face-to-face training or hands on support. This potentially limits opportunity for the establishment of a local reseller business in rural centres.

Some of the short-comings of the national and Perth ISPs can be overcome by them entering into franchise or agency agreements. For local ISPs forming alliances and greater investment in training will reap significant dividends.

NOTE: At the time of writing the RTIF had announced funding for two projects with significant implications for this issue. The South West WA REDO Internet project and the National Farmers Federation through its Farmwide subsidiary.

Both projects will greatly assist in overcoming this problem and are well aware of the dilemma mentioned above in linking service quality with a local presence.

Recommendation

- 16. It is recommended that negotiations with a large national ISP be established to try and promote a franchising of their product base to local ISP's who will live and work in the community.***

10.1.5 Role of Telecentres as Internet Service Providers

In locations where there is no existing local ISP or party interested in establishing a Point Of Presence, the Telecentre manager should be encouraged to establish this facility. The manager should also be able to answer questions most frequently asked by new Internet users who access Internet using the Telecentres computers. This has the advantage of better utilising the existing PC facilities available at the Telecentres and providing an ongoing revenue source to sustain their operation.

This approach is already in operation in some locations (e.g. Merredin) but more needs to be done to market the Internet and train the customers on how to use the WWW efficiently. Care must be taken not to subsidise the cost of establishing the POP from other Telecentre business revenue as this may prevent the considerable competitive value of a second operator starting in competition in the larger centres.

Due to the technical skill required to establish and operate a full ISP operation it is not recommended that Telecentre Managers generally adopt this role. However the marketing and operation of a local POP franchise is well within the capability of most Telecentre managers if suitable training is provided for them. The role however must be more an Internet ambassador than a technocrat.

Recommendations

- 17. It is recommended that in sparsely populated regional centres where no independent ISP can be attracted, the local Telecentre Manager be encouraged and trained to manage a POP under a franchising arrangement with an established ISP.***
- 18. It is recommended that all Telecentres be equipped with Internet access and all Telecentre Managers become Internet ambassadors.***

10.1.6 Internet Business Success

For the Internet to be successfully deployed in a regional centre, it is essential that the quality and speed of the service be maximised. In the past it was not uncommon within the industry for unscrupulous ISP's to under-provide on modems and / or the number of high speed transmission links connecting the POP to the Internet Hub (generally located in the City). From the customers perspective, this results in frustration in not being able to connect to a dial-up modem on demand and long delays in response time from the WWW due to overloaded transmission links.

Shire Councils (or local business groups) that become involved in encouraging the establishment of local ISP's should make it a condition of operating with ongoing Council support that a service level agreement be established and monitored. Such agreements, which are already available from some ISP's, will ensure service standards and hence customer satisfaction with Internet as a prime source of information supply to the community is maintained.

There is a significant financial benefit to the local ISP if Local and State Government Officers requiring Internet access use the local ISP rather than contract out to a National ISP.

There is a proposal in at least one Department (Education) that a whole of Department contract be established to provide Internet access to schools. In some cases this will result in considerable loss of revenue to a local ISP who may currently provide this service. While the establishment of a whole of Government / Department contract may result in the establishment of a local POP by the successful tenderer, a more likely outcome would be that a central POP (city based) location is established with a toll free number provided to the Government customers (eg schools) for access. Thus the local ISP and hence the community is deprived of the business income. This may even threaten the viability of some ISPs.

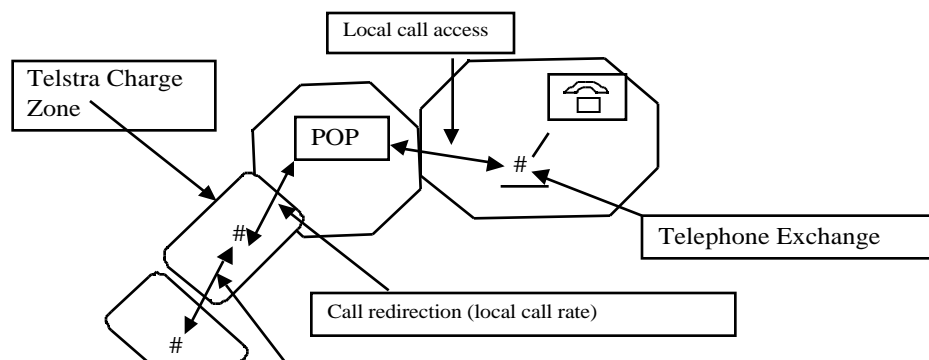
Recommendation

- 19. It is recommended that local business interests groups lobby the relevant Federal and State Government Ministers to ensure the managers of Government Departments with a local regional presence have the resources and autonomy to buy local Internet Services.***

10.1.7 The Internet and Local Call Areas

The business viability of local ISP's in a community is dependent on the customer capture area available. This capture area invariably equates to the local telephone call charge area. Telstra's policy on local call charges is to provide calls within its own and immediately adjacent charge zones at local untimed rate. Most ISP's extend this by employing the call redirection facility available with digital telephone exchanges. This means that a local charge call number can be established in one area and this call can then be redirected for the cost of a second untimed local call to a zone which contains the POP location.

Careful design of POP capture areas using this technique can maximise the number of potential customers and hence financial viability of establishing an ISP business.



10.2 BUSINESS ONLINE

Rural and regional users face geographic isolation and limited (as well as dwindling service delivery), and may therefore need to operate online to do business more quickly than their average city-based counterparts.

The issues in rural and remote areas are that businesses operate in so-called “thin” markets where market demand is scattered and diverse and it becomes difficult to sustain specialised services locally. Local choices are also constrained by this phenomenon and there is always a trade-off between availability of offerings, price and a potential service loss to the larger centres. International competitiveness, however, necessitates that all regions have access to the best of services available.

One of the new ways of doing business is through online transactions (or electronic commerce) and electronic trade. These two processes function similarly only differing in the extent of foreign transactions involved. Both processes involve interactive database facilities which can be part of the Internet or operate as separate networks.

10.2.1 Electronic Commerce

Electronic commerce takes many forms, perhaps the best known applications are:

- Banking;
- Insurance;
- Professional services – accounting, legal, management consulting;
- Government applications, e.g. licensing; and
- Buying and selling;

The majority of major Australian banks offer some sort of electronic banking whereby transactions can take place remotely. This trend is extending into virtually all areas of professional services such as accounting and legal services, insurance, government licensing, and so on. An increasing area of activity is that of buying and selling, advertising and sales transactions e.g. on-line sales catalogues with built-in transaction facilities (a modern version of the Sears Roebuck).

10.2.2 Electronic Trade (International trade)

On yet a more sophisticated level international trade transactions are available online involving currency exchange, export and import procedures etc.

10.2.3 Security

A commonly held concern with electronic transactions is that of security. In particular there are four areas of concern, namely:

- Integrity of data, integrity of the transaction;
- Theft and misuse of financial records e.g. credit cards;
- Program protection; and
- Surveillance and monitoring.

There are a multitude of techniques being used to increase security some of which are technical, (e.g. use of dedicated lines, virus checking programs, encryption, fire-walling, use of PIN numbers etc) as well as a multitude of normal commercial procedures (e.g. firm letters of credit, bank guarantees, trust accounts etc.). Generally however it is considered that security techniques are improving and the more use of the services by commercial entities the more secure the process becomes. Certainly the use of electronic trade and commerce is expanding exponentially. Its potential for rural and regional areas is even greater because of their inherent client base.

10.3 ELECTRONIC DELIVERY OF PUBLIC SERVICES

The next phases of public sector online innovation are already emerging. In the future the public will be able to access all local, State and Commonwealth Government services through a single Internet “window”. Also, all government transactions, (payments, fees, licence renewals, etc) will be able to be conducted online, following trends now being pioneered by the banking industry and being implemented by the Victorian and Tasmanian governments.

Variations on telecommuting and online interactions will inevitably be harnessed to deliver most types of government services to overcome distances and time constraints. These include telemedicine applications, multimedia distance education, electronically linked legal proceedings and consultations with caseworkers.

Regional communities whose telecommunications capacities are constrained by inadequate infrastructure and/or a lack of local communications facilities will pay a high price in terms of inadequate government services. In contrast, rural communities with state-of-the-art facilities and infrastructure will be able to enjoy a level of public sector servicing at least on a par with Perth. Two key areas of government telecommunications crucial to regional quality of life are cited below.

10.3.1 Primary and Secondary Education

In April 1997, The WA Ministry of Education announced its \$38 million program to increase the use of communications technology in schools. Implementation is already well under way. A key objective is to connect all schools to the Internet. Under this policy an additional 5,000 computers are being supplied for primary and secondary education. Satellite dishes are also being provided in order to extend the network to remote schools beyond the reach of ground-based telephone infrastructure. The initiative will give students throughout the State access to up-to-date worldwide information resources, expand distance education options and create new opportunities for teacher professional development.

A new departmental Internet site now links schools and provides quick access for parents, students, teachers and educational administrators to information about all departmental programs and policies. The Education Department website also links to major national and international educational databases such as EdNA, Education Network Australia.

10.3.2 Telehealth

Many innovative applications of telemedicine are already being utilised successfully in an ad hoc manner throughout the State by individual medical practitioners and agencies. These include health consultations by teleconference and the exchange of various types of medical imaging and other related data.

The WA Health Department has conducted extensive studies of existing and potential telehealth techniques. Wide community consultation also has been undertaken. Building on these research and outreach activities, the department has developed a plan to aggregate statewide demand for telecommunications infrastructure including substantial satellite capacity to support telehealth and telemedicine applications. This initiative is now awaiting formal government endorsement.

11. REGIONAL BROADCASTING

There are a wide range of broadcasting issues that will have implications for the Wheatbelt Region. However, most are being resolved through standard broadcasting regulatory and planning processes. The issues noted below arose during the project team's consultations throughout the region. These matters are not only topical, but ones where intervention by the Wheatbelt Development Commission (WDC) could help to shape positive outcomes.

11.1 DIGITAL CONVERSION OF SATELLITE TV SERVICES

There has been substantial interest throughout the region in the digitalisation and changes in satellite assignment for remote area television services. Dislocations and expenses associated with transition to digital statewide television are being addressed by Commonwealth equipment subsidies for private and community self-help receivers. Additional arrangements to reconcile ABC and GWN services on both satellites, thus removing the need to utilise a second satellite dish, are being undertaken by the Commonwealth and WA Governments. To make the transition to digital TV more appealing, the Commonwealth has agreed to add SBS TV, JJJ and the ABC's Parliamentary and News Service as part of the digital broadcasting services to be reticulated statewide by satellite.

Now that an equitable outcome, which should increase remote viewer and listener choices, seems to be at hand, it appears that only the matters of equipment supply and changeover remain to be resolved. In the past, when one television system has been replaced by another, periods of simulcasting in the old and new formats have continued for up to fifteen or twenty years to ensure that there is ample time for consumers to update their reception equipment. Digital and analog satellite simulcasting in Australia is not expected to extend beyond a couple of months in the case of changeover on the Optus satellite. Therefore, it is critical that new digital decoders are readily available and that there is sufficient time for them to be transported and installed correctly in remote areas before analog services are terminated. Otherwise, remote area residents will be cut off completely from all satellite radio and TV services. Since WA is a much smaller market than those in the Eastern States, it is not unreasonable to assume that Western Australia will be at the end of the supply line for new digital equipment, thus supplies of digital reception equipment to WA could be delayed.

Recommendation

- 20. It is recommended that Rural Communities should press for an extension of analogue satellite broadcasting if market penetration of digital decoders is incomplete when simultaneous broadcasting is scheduled to cease.***

The use of both Optus and PanAmSat satellites further complicates the issue of analog to digital conversion, making choices facing individual consumers and town self-help re-transmission sites particularly confusing. The Department of Commerce and Trade (DOCAT) has produced a short paper (attached as Appendix 6) outlining the issue and all of its ramifications.

Recommendation

21. *It is recommended that Rural Communities ensure that there are sufficient quantities of the DOCAT satellite reception guide for regional distribution.*

11.1.2 Low-Powered Radio Licences

According to the Australian Broadcasting Authority's (ABA) planning protocol, low powered radio narrowcast services are limited to one per market. In the event that this sole service is utilised for tourist radio or TAB services, rural communities are denied the capacity to broadcast local sporting, cultural and other events of community interest. There is no technical reason for this restriction, since most Wheatbelt communities have ample spectrum available for second and third low-powered radio services where there is demand. The basis for this limitation is simply planning symmetry with metropolitan areas and location such as the Bunbury area where FM channel congestion is a serious problem.

Recommendation

22. *It is recommended that Rural Communities should argue for additional low-powered radio narrowcasting services where there is demand for a community orientated application.*

11.1.3 Pay TV Services

Currently, much of the Wheatbelt Region is able to receive Galaxy Pay TV services, because much of the area fits within the footprint used to convey the signal from the Eastern States for re-transmission in Perth. As a result, Galaxy services in the Wheatbelt are not time-delayed for the Western Australian timezone.

Australis Media, the parent company of Galaxy is in severe financial difficulties at the time of writing and this situation could lead to a discontinuation of satellite Pay TV services. If this occurs, regional viewers may find themselves without access to the service at short notice and despite advance payment.

Recommendation

23. *It is recommended that the State Government should continue to monitor satellite Pay TV availability during this period of corporate instability and seek formal assurances from Galaxy about the continuation of regional services.*

11.1.4 Community TV Services (Hyden)

Interest in establishing a community television service was expressed in Hyden. There may be other Wheatbelt communities who also may wish to establish local TV services. A UHF frequency which could be utilised for community/educational TV is available in each regional market. Transmissions might not be received far outside townsites, since community TV licences may be limited to relatively low-powered operation. Currently, there is a 'freeze' on community television licences, that is, no new licences will be awarded until mid to late 1998. In the meantime, the Commonwealth will be determining whether or not a long term licensing regime will be adopted for community TV, or whether available frequencies will be used for other types of services.

11.4 EMERGENCY SERVICES

At the specialist meetings with the emergency services groups, a number of concerns were raised about the difficulties being experienced in communicating between groups. In particular, the difficulty in achieving seamless mobile contact between the Police, State Emergency Service, Bushfire Brigade, St John's Ambulance and the Shires. The St John's Ambulance, in particular, appeared to experience the greatest in-operability with other services.

The consultants attention was drawn to one of the emergency services whose vehicle was equipped with three radios (HF, VHF and UHF) plus the officer's personal mobile phone. Despite this proliferation of radio's the only compatible mobile communication with the ambulance was by mobile telephone; and this was only available in the town and close environments.

Clearly the safety issues alone make it imperative that country based emergency services have the ability to communicate amongst themselves. Bush fires and road accidents were cited as issues that regularly involve multiple emergency services.

Recommendation

- 24. It is recommended that further detailed study of the issues and extent of interoperability between emergency services be commissioned and that applications for RTIF funding for compatible communications for country ambulances be considered.***

12. YOUNG PEOPLE

The involvement of young people in many community activities is often seen as being an ideal, to get a full cross-section of the town involved, but seldom becomes reality.

The Online world is quite a different world to the one we are accustomed to and one in which increasing age is very often a handicap rather than an asset. This delineation is becoming more and more clear and increasingly important to confront. The stories of teenagers acting as guides to their parents in encouraging them through the hurdles of working with computers and then going Online have become so common as to be cliched.

We believe this more open attitude to encouraging young people to participate in building Online activity should be adopted at a community-wide level - the very special abilities many show should be acknowledged, encouraged and used far more actively than it generally is today. A community which is serious about building an Online future for itself can no more afford to ignore those under 25 than it can if it wishes to win a football premiership.

There are emerging opportunities for young people to become involved in the writing of software which can be independent of geographic location of the participants. This business opportunity is occurring in various parts of the world but requires a skilled resource base which would need to be established in the Wheatbelt region.

One teacher we spoke with in the course of our field work suggested that some of his more IT-able pupils should receive the in-service training currently reserved for his colleagues. As they learnt the skills more quickly than their adult teachers the trainers' time would be used more efficiently and the students would then pass the skills onto the teachers at a pace they could manage.

Given the relative lack of people trained to work with Information Technology and Telecommunications in country Western Australia, involving the under 25s makes good practical sense. The Rural Youth Online and Online Schools projects outlined in Section 12 are two proposals which could build on this capacity.

The following pages list a number of projects that were identified in the Wheatbelt Region and have been scoped out in basic detail.

13. PROJECTS

13.1 REGIONAL TELECOMMUNICATIONS MANAGER

Description:

The establishment of a position, probably within the WDC, to act as a liaison between the Perth-based telecommunications managers of government agencies and regional offices. The Regional Telecommunications Manager would also provide Councils and other appropriate organisations within the Wheatbelt with information regarding telecommunications technology and industry intelligence, in particular.

Rationale:

1. In the process of undertaking the fieldwork for this study consistent difficulties encountered by communities were the twin frustrations of gathering up to date information on existing and planned technical infrastructure and identifying the appropriate person within the industry who could assist in answering questions openly, reliably and expeditiously. This would be a primary function of the Regional Telecommunications Manager.

2. Various government agencies have established, and are establishing, high quality communication links between their various offices. This planning is generally done from an agency/Perth-centric perspective. The Regional Telecommunications Manager would serve as an informed participant in this planning to assist agencies in sharing links - where appropriate - and in helping structure these arrangements, wherever possible so that small organisations (such as Councils, small and medium sized businesses and community groups - eg Telecentres) could have the advantage of accessing these facilities.

13.2 REGIONAL AWARENESS RAISING

Description:

To develop a continuing program of awareness raising of Online technology and its implications. This project should not be drawn under the same heading as training; both are clearly complementary but they must be approached separately. While a trained person will understand how to operate in an Online position from a hands-on perspective he/she may have little idea of how the technology can be creatively applied.

The Prime Minister's recent Industry Statement identified awareness raising, particularly for business, as a priority area. It said the Government will establish a national promotional campaign aimed at increasing awareness of the benefits of being 'online', including a travelling 'Online Laboratory' which will demonstrate online services.

Rationale:

This program should build on the work which has already been undertaken in the Wheatbelt and contribute significantly to unleashing the interest and involvement of many individuals across the Region. Without an awareness program which runs broadly and deeply throughout the community any changes will inevitably be patchy and liable to be short-lived.

This program also has a crucial business element in building demand for services.

13.3 TELECOMMUNICATIONS INFRASTRUCTURE LEVERAGE

Description:

It is suggested that a fund to underwrite any commercial risk would allow a more rapid roll out of mobile phones. Resilient telecommunications are considered vital for safety reasons and a convincing case can be mounted when social costs are included.

The RTIF Bond Fund should be National though a trial in the Wheatbelt would be helpful.

Rationale:

The consultants believe that some form of risk underwriting would be beneficial and suggest a split of the fund into two categories. The primary fund would be used for direct project support with no requirement for repayment as with the current scheme. The secondary fund would provide refundable bond capital for projects where there is a reasonable chance that some or all of the RTIF allocation can be repaid in 2 or 3 years and thus become available for reallocation to future projects.

A typical example of this use would be to provide the capital required by a carrier as a bond which would be used as a guarantee of revenue return on investment to the carrier for an uncertain infrastructure investment.

The establishment of a refundable bond for projects instead of a permanent customer contribution would have benefits to both the carrier and the community.

13.4 WHEATBELT DEVELOPMENT COMMISSION EXTRANET

Description:

A network, based on Internet technology which links the WDC's offices (and board members) to enable the seamless sharing and exchange of files throughout the organisation, desktop video conferencing and equip field officers with laptops linked to digital mobile phones incorporated into the Extranet. This technical upgrade should encompass similar facilities for the WDC phone system to enable calls to be redirected to staffed offices to minimise the occasions clients' calls are taken by an answering

As a second phase Wheatbelt Councils could be invited to participate. This could greatly assist those Councils which share specialist staff as well as those which operate from more than one centre within their municipality.

Rationale:

The Extranet would contribute to the efficiency of the WDC (and later, Councils) by significantly improving intra-organisational communication, cutting on travelling time for meetings, making better use of resources by having the capacity to spread the workload more evenly and allow staff to deliver better service to their clients. It would also serve the very important function of raising the awareness and competency of Commission staff and board members to managing and working on distributed projects with the aid of these technologies.

From a regional point of view (as opposed to an organisational perspective) the Wheatbelt Extranet would serve as an excellent demonstration project which could be duplicated across many sectors in both the private and public arenas. It could also function as a testing ground for the State Government in re-engineering the operations of agencies' regional operations to make better use of telecommunications.

13.5 WHEATBELT ABORIGINAL ORGANISATIONS' EXTRANET

Description:

Operationally this project would function in the same way as the Wheatbelt Development Commission Extranet outlined above. It could be based around the Wheatbelt Aboriginal Corporation (centred in Northam) and the 16 Commonwealth Employment Development Programs (CEDP) it supports administratively across the region. At present salaries and other important operational details are all handled centrally in Northam for the 16 projects. The necessary documentation for this work is currently transferred by fax.

Six of the projects have purchased a PC to assist in administration (Bruce Rock, Moora, Mukinbudin, Quairading, Tammin and Wyalkatchem). By starting to put this group of towns Online and move toward increasing e-mail-based transfer of documents this Extranet could develop in a scalable way which enables those involved initially to develop it appropriately for their needs while also serving as a demonstration site for others in their community and other communities.

Rationale:

See Wheatbelt Development Commission/Wheatbelt Councils Extranet above.

13.6 FISHNET

Description:

An Internet site and integrated communications system for the fishing community. At its most basic the site would provide information - up to date weather and market prices for instance - for the state's professional fishing community. Taken to a higher level the site could include electronic trading for catches and be extended to include interactive information from fishing industry services.

With the involvement of the processors, FishNet could also include the capacity to distribute financial information confidentially to fishermen. To achieve this and to reach the widely distributed potential users would involve heavy dependence on wireless data communications.

The Federal Department of Industry, Science and Tourism through its AusIndustry program, has a number of funding schemes - particularly its Network Grants - which are designed to encourage the innovative utilisation of technology by industries.

Rationale:

This project would meet a range of the industry's communication needs to enhance efficiency and improve safety. The industry's relatively dispersed activity, conducted intensively over a concentrated period mean efficient communications can deliver significant benefits by compressing the time taken to distribute crucial information.

13.7 HIGH BANDWIDTH SERVICED OFFICES/RESORT OFFICES

Description:

This project involves the establishment of serviced offices specifically targeted at small companies working in the information industries or with heavy information needs. In addition to the usual facilities available in serviced offices this building will also be equipped with high bandwidth telecommunications links, access to which will be included as part of the room rental.

Resort Offices would include the same infrastructure but be targeted at the short-term, tourist market. They would be designed to enable workers to plan a holiday in a location which incorporated a few additional days during which time they would use the technology to Telework back to their main office.

Rationale:

1. The current pricing structure for broadband communications services is based on the assumption that the user is a large organisation. Those users wanting irregular access to this capacity are priced out of the market. By bringing a number of these users together in one location it is possible to aggregate their demand and by sharing the cost of the connection make it affordable for them.

2. Resort Offices provide a means for tourist destinations to significantly extend the length of visitors' stays beyond the traditional weekend and holiday periods. Aside from their potential benefit in tourist centres they will increasingly be seen as critical services to be provided to visiting information workers.

13.8 VIRTUAL HELP DESK

Description:

By using telecommunications and network software it is possible to perform a wide range of tasks with a computer on another machine located at a distance. This project proposes this technology be used to establish a service which offers fault-finding and trouble shooting computer servicing.

While servicing users in the Region would be the initial target group this service could be offered to assist people in the city also.

Rationale:

It provides a cost effective means of delivering expert assistance to users who are distant from face-to-face assistance. The isolation from expert help makes many country users an ideal first phase market but the difficulty and expense many city people have in solving their computer problems make this a business opportunity which could be exported from the country to the city.

13.9 PRECISION FARMING, DGPS AND COMMUNITY TV AND RADIO

Description:

An essential part of Precision Farming is for farmers to have the capacity to locate themselves precisely and quickly and easily return to any given point. The availability of locational data from Global Positioning Satellites (GPS) have been a revolutionary development in enabling this. At present the GPS systems have an in-built "corruption" to their software which alters the locational data from time to time.

As a result the original GPS signal does not provide sufficient accuracy for Precision Farming. The solution to this has been Differentiated GPS (DGPS) which most often compares the data from a fixed location with that coming from the satellite and whenever it "moves" the fixed unit sends a signal to the field units informing them of the change so they can adjust their settings accordingly.

Farmers are able to have all the elements necessary to operate DGPS on-farm but in an increasing number of areas it is also possible for them to subscribe to a DGPS signal which is broadcast to them using the surplus capacity on existing radio or television

For some communities this may present the opportunity to develop the basis to fund their own radio or even community television service. The local broadcaster would incorporate the DGPS in its signal which those farmers within range of the transmitter could subscribe to providing a cashflow for the station.

13.10 OPTIMAL POP LOCATION STUDY

Description:

This study would chart Telstra's local call zones across the Wheatbelt Region, matching this information with demographic data. By utilising the network's capacity to divert calls from one zone to neighbouring zones for a fixed fee (two local calls, 25 + 25 cents) the market reach for each POP can be maximised. It is designed to identify the best possible options for serving the marginal areas, away from the major centres.

Rationale:

Where Internet Access Providers operating in towns make an assessment of viability largely on the potential traffic to be generated within the town limits, this approach aims to work in the opposite direction, from the perspective of potential users in more remote areas. Although it is likely that the best location will be in the larger centres this process will reveal whether one call zone is preferable over a neighbouring one.

13.11 CALL CENTRE INDUSTRY ANALYSIS

Description:

The commissioning of a study of the global call centre industry detailing the industry's dynamics, its cost structures, the factors which determine locational decisions, and indicative investment requirements.

Rationale:

The opportunities for WA generally and regional WA in particular to exploit its timezone and make a substantial impact in the Call Centre market has been discussed regularly over the past few years. For many communities these apparently attractive opportunities are beyond them because the barriers to gaining enough information to make a judgement are too high. The complete document would form the basis for a community, in conjunction with investors, to make an initial assessment of whether or not to pursue a Call Centre and if so form the foundation stone of any proposition they may develop.

13.12 RURAL YOUTH ONLINE

Description:

An organisation which encourages and supports young people interested in communications technology to continue learning, to exchange information and to form links to facilitate joint projects. The group would function both as a conventional face-to-face organisation as well as Online. The final shape of the group would be determined by the interests of the participants, supporters and community needs and conditions.

Rationale:

See Young People in Current Issues above, section 12

13.13 ONLINE SCHOOL PROGRAM

Description:

The Wheatbelt Development Commission invite high schools in the Region to work with it in the development of an application for funding of school-based online projects. The first round might consist of a competitive process amongst schools to receive in-kind support from the Commission's staff in helping prepare the application. The Federal Department of Industry Science and Technology has been running a program to support these initiatives.

Although no details have been spelt out this was one area which was singled out for special comment in the Prime Minister's recent statement. (As funding is unlikely to succeed for nearby schools the Commission may have to restrict its support to two schools, each from separate sub-regions).

Rationale:

See Young People in Current Issues above, section 12.

13.14 MOBILE TELECENTRE/TRAINING UNIT ON WHEELS

Description:

A mobile unit, fitted out with networked computers and the capacity to "plug into" a variety of telecommunications sources. This vehicle would serve as a mobile training centre on some occasions or provide resort office or Telecentre functions at special events.

Rationale:

Having access to the appropriate equipment to perform training efficiently is not always possible, particularly in smaller centres. In addition to providing training in more isolated areas this mobile unit would also be invaluable as a means of delivering high level, specialised programs. Having a wider territory to cover it should be easier to sustain a case to have it fitted with more advanced equipment than many Telecentres are able to provide users.

The Mobile Telecentre/Training Unit on Wheels would also be a significant enhancement for various special events to provide modern communications and computing facilities.

13.15 CENTRE FOR THE APPLICATION OF COMMUNICATIONS TECHNOLOGIES TO RURAL AND REMOTE AREAS**Description:**

This Centre would act as a clearing house for information on communication technologies which are appropriate and affordable for users outside urban centres - it could well use the Kondinin Group as a role model for this work. As well as keeping a watch over the rapidly changing technologies it would also collate information about applications and innovative approaches to using and implementing communications.

The Centre would work with other research groups and communications companies to test technologies in particular settings. As a longer term goal it might also commission research, if funding was available.

Rationale:

The Wheatbelt region would be an ideal location for a Centre such as this as it has a wide variety of rural land uses (from intensive farming and fishing to pastoral and resource industry sites) while also being relatively close to the research facilities and industry experts in Perth.

13.16 FARMWIDE REGIONAL ACCESS NETWORK**Description:**

The National Farmers' Federation has been granted funding under the Federal Government's Regional Telecommunications Infrastructure Fund to significantly extend the availability of Internet access to the farming sector across Australia. A part of the NFF proposal is that it will not duplicate existing services.

Rationale:

At the time of writing the project manager was still consulting with various parts of her organisation and other interested organisations about the fine detail of how the funds should be spent. A decision on this plan is expected early in 1998.

The WDC and local farming groups should keep themselves informed of developments with this project to identify potential synergies.

13.17 INTERNET ACCESS FOR COMMUNITIES OF SOUTHERN WESTERN AUSTRALIA

As with the Farmwide project which received RTIF support this project also has significant implications for Wheatbelt residents and should be kept in mind as local projects are being developed. Having discussed the project with its proponents it is clear this initiative will address a considerable number of issues raised earlier with regard to delivering Internet access, particularly to those people living outside the major regional centres.

13.18 AVON SMART COMMUNITY

Description:

The Dow Digital report established the viability of the Avon Smart Community concept for the Avon Valley area.

Rationale:

The area has comparative advantages in life style, proximity to Perth and established educational facilities.

The area is an acknowledged Government sub regional centre and is well served by a high speed daily commuter train to Perth. Educational facilities include Curtin university (Muresk Campus), C Y O'Connor College of TAFE and the Australasian Hotel College.

The concept requires additional work and should be pursued as a special project.

Recommendation

- 25 ***It is recommended that the WDC in conjunction with the Avon Smart Community Group champion the progression of telecommunications based developments in the Avon valley.***

14. CONCLUSION

In the course of this study the consultants have worked to familiarise themselves, first hand, with the communications challenges facing the Wheatbelt Region. It has been our strongly held view that to undertake this task and complete it satisfactorily it was necessary to work to a program which stayed closely focussed on the aims and objectives of the Wheatbelt Development Commission and systematically build a picture and solutions of the opportunities. Following the Commission's aims and objective the consultants:

Awareness Raising

- Outlined the existing telecommunications infrastructure in the region and some of the planning of the carriers.
- Conducted eight public and 55 specialist meetings which comprised a comprehensive outline of the changing telecommunications environment, including the Telecommunications Act of 1997 as well as an overview of technology changes and case studies of innovative applications.

Identify telecommunications infrastructure needs

- Through the District Reports provided comprehensive detail of existing infrastructure.

Develop propositions to put to the carriers

- Have developed a framework to enable the development of propositions for telecommunications carriers including a number of innovative financing options.

Identify potential additional projects

- Have identified a wide range of potential projects which address skills and awareness deficiencies, business opportunities, establishing demonstration projects, strategies to optimise public sector telecommunications investments and shortcomings in infrastructure.

Develop a process to assist in other regions

- Through the partnership with Ci Limited have employed portions of the Regional Communications Initiative methodology where applicable. This has provided an appropriate framework in which to undertake the task of identifying the Wheatbelt's telecommunications needs.

Appendix 1

TELECOM INFRASTRUCTURE SUMMARY

All exchange information courtesy of Telstra Corporation

All exchange information courtesy of Telstra Corporation

All exchange information courtesy of Telstra Corporation

All exchange information courtesy of Telstra Corporation

All exchange information courtesy of Telstra Corporation

All exchange information courtesy of Telstra Corporation

Appendix 2

DISTRICT INFRASTRUCTURE AND VISIT REPORTS

1. Avon

The main regional centres in Avon are well serviced by dual optical fibre cables radiating from Perth and servicing York and Beverley to the south, Northam and Dowerin to the north and east towards Kalgoorlie via Bruce Rock, Merredin and Southern Cross. The centres of Cunderdin, Tammin and Kellerberrin are serviced by digital radio using the old Perth Adelaide microwave radio route. Telstra proposes to complete an optical fibre linking Northam to Merredin through these centres in 1998/99. Outside the main optical fibre routes, a mixture of optical spur cable and small and medium capacity digital microwave radio service all other centres in the district.

Avon District contains approximately 43 telephone exchanges that are serviced by a variety of switching equipment types. Only 2 locations contain all or part older analogue technology switches. For these, Telstra proposes the following replacement programme with digital switches.

Northam (part only)	1997/98
Tammin	1997/98

ISDN (OnRamp) infrastructure is in situ in 44% of telephone exchange locations.

Telstra Digital Mobile is operational at the centres of Bulgin Rock (servicing Meckering / Cunderdin), York, Toodyay, and Northam. New mobile extended range software is being trailed at York (ref para 8.3). Local Internet Service Providers (ISPs) service the Northam/Toodyay area (Avon Global Net) and York (ViaNet). The expansion of service to Telstra local charge districts surrounding the main POP (Point of Presence) locations is progressing.

2. Central East District

This District has regional centres at Bruce Rock, Merredin and Southern Cross serviced by optical fibre cable that extend as far north as Mukinbudin. Other centres are serviced by small and medium capacity digital microwave radio. Westonia exchange is the last remaining analogue exchange serviced by analogue transmission in the District. Telstra proposes to replace the analogue exchange and transmission with digital equipment in 1997/98.

The towns of Tammin, Kellerberrin and Doodlakine are currently serviced by digital radio, however Telstra propose to complete an optical fibre route through these centres linking Northam to Merredin in 1998/99.

Telstra has 58 telephone exchanges in the Central East District, 9 of which contain all or part analogue lines. Telstra's proposed replacement programmes is as follows:

Bencubbin	1997/98
Kellerberrin	1997/98
Koorda	1997/98
Merredin (part only)	1997/98
Marvel Lock	1997/98
Nungarin	1997/98
Southern Cross	1997/98
Trayning	1997/98
Westonia	1997/98

ISDN (OnRamp) infrastructure is currently installed in 50% of the telephone exchange locations.

Telstra Digital Mobile Base stations are located at Merredin and Southern Cross. Telstra aims to extend coverage along the Great Eastern Highway from Northam to at least Southern Cross when their resources allow, however no firm time frame exists.

Telstra and Optus have analogue mobile capability at Merredin, however only Telstra appears to market this facility which will be withdrawn under Federal Government direction in the year 2000.

A local Internet Service provider (Atlas Globalnet) is operated out of the Telecentre in Merredin and service is being slowly expanded to surrounding Telstra charge districts where local call charges apply using call redirection facilities.

3. *Central Midlands District*

The area of Central Midlands is generally well serviced with optical fibre cable infrastructure. Cables link Dongara to Perth via the Brand Highway and another route from Dongara passes through Carnamah and Moora, before heading east towards Dowerin and then Northam and Perth. A third cable from Geraldton passes through Mullewa before splitting north to Mt Magnet and south via Dalwallinu to Dowerin and Northam. All centres not specifically on the main Optical fibre route are connected via cable spurs of medium or small capacity digital microwave radio. The only centre with analogue transmission is Ballidu East, which is scheduled for digital replacement in 1997/98. Telstra has 54 telephone exchanges to service Central Midlands of which all but Badgingarra are digital technology.

Badgingarra is proposed for replacement in 1997/98. A small number of locations which have a digital switching service are also serviced by old technology line concentrator units which have dubious performance for Internet data transmission. Telstra hope to replace these units in 1998/99.

ISDN (OnRamp) capability is available in 63% of the District's 54 exchanges.

Telstra Digital Mobile covers the townsites of Gingin, Guilderton, Lancelin, Moora-Walebing, and Wongan Hills. All sites except Guilderton also have analogue mobile coverage but this service will be withdrawn by the year 2000.

The only local Internet Service Provider is located at Moora and Wongan Hills. Atlas GlobalNet provides service to these and surrounding centres where local call access charges are available either directly or via one redirect call option.

4. Central South District

Central South District is well serviced with north/south running arterial optical fibre cables on the eastern and western sides of the District. As with other Districts, optical fibre spur cable and small/medium capacity digital microwave radio systems interconnect some 66 telephone exchanges. Some 30% of these exchanges have ISDN infrastructure already installed. This is a somewhat lower proposition than other Districts in the Wheatbelt Region.

Central South District has the largest number (12) of analogue exchanges remaining in any Wheatbelt District. Telstra proposes the current digital exchange replacement programme shown below.

Narrogin (part only)	1998/99
Brookton	1997/98
Corrigin	1997/98
Darkan	1997/98
Dumbleyung	1998/99
Hyden	1998/99
Kondinin	1998/99
Kulin	1998/99
Newdegate	1998/99
Quindanning	1998/99
Wickepin	1998/99
Williams	1998/99

ISDN (OnRamp) infrastructure is currently installed in 30% of the 66 telephone exchange locations

Dumbleyung is the only location in Central South, which is still serviced with analogue transmission. This is scheduled for replacement concurrent with the modernisation of the telephone exchange in 1998 /99.

Telstra Digital Mobiles cover the centres of Pingelly/Brookton, Narrogin, Wagin and Williams. Analogue mobile coverage is also available at Wagin and Narrogin but this will be recovered by the year 2000. Vodaphone may establish coverage in Narrogin in the future.

Only Narrogin (Treko) and surrounding areas have a local Internet Service Provider. This maybe due to reluctance of ISPs to set up while there is still a relatively high proportion of analogue telephony operating in some parts of the District. However, Internet technology will operate at sites equipped with analogue switches although, depending upon the condition of the equipment, transmission, speeds may be lower than average.

VISIT REPORT

Northam	Visit 1	10 th , 11 th and 12 th November 1997
	Visit 2	25 th and 26 th November 1997

General Introduction

A total of fifteen meetings were held in Northam during the two visits. The first visit included a public meeting and eight specialist meetings. The specialist meetings included local business leaders, community leaders and local associations and committees. These included the Avon Catchment Network, Wheatbelt Area Consultative Committee, Business Enterprise Centre, CES and C Y O'Connor TAFE. The consultants also met with the local internet service provider (Avon Global Communications). A dinner was also held with a member of the Wheatbelt Development Commission.

An additional seven meetings were held on the return visit and included Sport and Recreation, Tourism and the Hotels College. In addition a number of follow up calls were made as a result of the earlier visits.

Public Meeting

The attendance at the public meeting exceeded 20 and was covered by the local Press (see article from the Northam Advocate in Appendix 5). Issues raised at the public meeting included costs, lack of skills and lack of infrastructure. The audience included a good cross section of computer literate members of the local community. As expected, those lacking computer literacy were unlikely to attend these meetings. The presentation included an outline of current infrastructure in the Northam area including ISDN and mobiles. Some discussion ensued concerning ISDN availability and digital mobile rollout. In particular concern was expressed about ISDN being limited to 5 km or less from the relevant telephone exchange.

The workshop considered the various barriers to technology adoption and felt that the skills barrier was perhaps the most significant.

Whilst lack of infrastructure and the costs of software and hardware were often sizeable barriers, the group considered that lack of familiarity and the necessary skills were the most important reasons for low adoption rates. The group also considered that large segments of the community did not see any relevance to joining the information age.

The specialist meeting pursued issues more directly related to that particular group. Addition discussions with the local internet service provider confirmed lack of skills as a major deterrent to higher adoption levels.

In particular the Avon Smart Valley concept raised in the Dow Digital report needs to be pursued in greater depth (see projects in section 13).

VISIT REPORT

Jurien	Visit 1	10 November 1997
	Visit 2	24 November 1997

General Introduction

A public meeting was held on the first visit which attracted approximately 12 people across a broad cross-section of the community. Representatives from the Shire, Hospitality, Rural Agencies, Chamber of Commerce, Police and representatives from the local Parliamentarian's office. Further meetings were held later in the day with representatives of the fishing industry and Fremantle Fishermens' Co-Op.

Public Meeting

The issue of mobile phones was raised by many of the groups attending. They emphasised the highly mobile nature of the work many people in the area are engaged in. The fishing industry in particular feels the lack of access to mobile phones. The two major needs it believes improved coverage could assist with are for boats visiting the region during the fishing season and to improve communications for trucks delivering valuable product to Perth. The majority of this journey is done outside the range of the mobile network.

Attempts have been made over the past few years, particularly by Council, to lobby Telstra for improved mobile services. This work had included undertaking feasibility studies to support this initiative. Up until now this has been unsuccessful.

Internet

Access to Internet services at local call rates have also not been possible due to the lack of a local ISP. Some time was spent discussing the structure of the local call zones between Jurien, Moora (which has an ISP) and surrounding areas. It was explained through the use of the capacity to redirect local calls from one zone to another users in adjacent zones could get untimed Internet access, although they would have to pay two local call fees.

It was subsequently discovered that at least one, possibly two groups are well advanced in their planning to establish an ISP in the area.

The group expressed frustration at keeping abreast of technological and industry changes. Many had also found it difficult to access information about particular services from the carriers, even when they knew what they wanted. This had been the experience of one of the aspiring ISPs and had significantly frustrated his decision to establish the service in the town.

A good Internet service was seen as being crucial to the burgeoning tourist and aquaculture industries. Tourist operators in the area are already offering e-mail access to visitors and getting a positive response to this. The idea of resort offices (see projects) has particular relevance and opportunity in this area, particularly with the construction of a new, more direct road to Perth.

Similarly aquaculture can be a significant user of improved communications services. One of the industry's most significant competitive advantages is being able to satisfy

market needs on demand, a goal which is heavily communications dependent, particularly for overseas markets.

Subsequent meetings with representatives from the fishing industry and the Fremantle Fishermens; Co-Op, which operates an important processing and receival point in the town underlined a number of these issues and provided good examples of the operational and safety benefits which could be expected to flow from improved communications. The value of the product being handled by the industry, the demands being made by customers and the significant revenue potential of being able to satisfy those demands point to the opportunities which can flow from better communications.

The second visit focussed mainly on providing further information on the issues which were raised during the first visit and speaking with an aspiring ISP.

VISIT REPORT

Narrogin	Visit 1	19 th , 20 th November, 1997
	Visit 2	28 th November, 1997

General Information

A public meeting and five other specialist meetings were held in Narrogin and district.

Access to appropriate information about the technologies and training programs was a consistent theme from the groups attending the public meeting. Representatives from several groups expressed frustration at the difficulty in gaining access to information delivered in a timely way which was tailored to suit their particular skill level and their needs.

An initiative by the local Chamber of Commerce, which has developed an Internet course specifically designed for its members, has been “swamped” with participants, according to the organisers. More general courses appear to have suffered from lack of patronage.

A good deal of time was spent discussing the involvement of young people with projects based around communications technology. The experience of Wagin Senior High School, which was represented by its Principal and four students, provided an object lesson in terms of the capacity to alter the traditional dividing lines between students and teachers to the benefit of all. (See Young People above.)

Specialist meetings with health and education workers conducted later underlined the crucial role these major agencies can play in assisting the communities in which they operate to gain access to essential infrastructure. At present the exciting initiatives being planned by a number of government agencies is largely occurring in Perth with a focus on the particular agencies’ needs with little apparent thought for shared use. While this makes logical sense from a corporate point of view it can mean that golden opportunities for some communities to gain access to services earlier than might otherwise be the case, will be forgone. (See Regional Telecommunications Manager above.)

A conversation with a number of women from the district underlined the impact changes to the delivery in government services were having, particularly with regard to social services. A number of service providers had closed their local offices forcing clients to travel to get advice or to make STD calls, or both. Either option is expensive and time consuming. Although some agencies have established 1800 numbers this is not universal. Others have established telephone queuing systems, which often result in even higher costs for STD callers.

They also felt there was a need for technology familiarisation courses for women who had been out of the workforce whilst raising a family and now wished to re-enter. There is a need to set up a less threatening environment in which they can gain the necessary skills and comfort with the new technology.

VISIT REPORT

Lake Grace/Hyden

Visit 21 November

General Information

Of all the districts visited in the Wheatbelt this area faces the greatest challenges due to the age of much of its network infrastructure and its widely dispersed population. The majority of the analogue exchanges are in the south eastern corner of the Wheatbelt and information provided by Telstra at the time of writing suggests that it will be one of the last areas to be converted across to digital technology. This reduces the services available to customers in the area and places particular demands on the quality of service received by those distant from their exchange.

As in many other areas access to mobile telephones is a major concern. The constraint of digital mobile cells, confining them to covering an area of approximately 25km radius, has significant impact in thinly populated areas such as this. Moves to extend this are seen as being very useful. (See Mobile Phones above.)

The potential impact of this situation has been graphically illustrated by the comments from a number of major exhibitors at the Newdegate Field Days. They have said they may have to reconsider their involvement in the event as they cannot afford to be out of contact from their other business commitments for so long.

Access to education and other government services was also an important issue raised. At present many children have to leave the district to complete their education and the prospect of having access to a greater range of choice, in both education and training, was seen as being a significant benefit.

A number of CEOs from Shires in the area were present. Some time was spent in discussing the pivotal role local government could play in acting as a lead user of this technology, both in encouraging the provision of the technical infrastructure and by providing an example of its applications to other groups. Councils in this area also cooperate extensively in sharing specialist staff which currently involves considerable travel and liaison to function. Significant organisational opportunities could be realised by implementing improved inter-Council communications, not to mention the lead-user and infrastructure facilitator roles mentioned earlier. (See also WDC/Councils ExtraNet outlined above.)

Hyden

The meeting in Hyden involved a small group at the Hyden Telecentre.

The transfer of GWN's television service to a different satellite and the hardship this will cause many was raised. (This issues is addressed in greater detail in the section on Regional Broadcasting above. This discussion was held before the federal government's announcement of assistance to users to purchase the necessary additional equipment.)

The possibility of gaining access to a frequency to operate a community television or radio service was also raised. (See Community Radio and Television in the projects section above.)

The frustrations the Telecentre has experienced in accessing suitable telecommunications facilities to enable it to go online were discussed. An opportunity to participate in a statewide telehealth pilot is in jeopardy due to this difficulty. Access to the Internet is seen generally as a logical and increasingly important service the Telecentre wishes to offer its clients and believes the town could greatly benefit from. At present there is no local ISP and none within fixed call range. The only feasible option available is Telstra's Big Pond Rural service. While this was seen as being practical for e-mail and other short-term use it was prohibitively expensive for heavy users.

As with most areas access to mobile phone coverage was a very important issue. The substantial tourist numbers visiting Wave Rock (estimated to be over 100,000 a year) and the growing importance of the mining region immediately to the east of Hyden were important additional reasons to justify the provision of a mobile service in the town. A survey had been undertaken amongst tourists visiting which has established that a substantial majority of those travelling through the district have mobile phones.

VISIT REPORTS

Moora	Visit 1	19 th and 20 th November 1997
	Visit 2	28 th November 1997

General

A total of ten meetings were held in the Moora area during the two visits (includes two meetings in Wongan Hills). The first visit included a public meeting and six specialist meetings, with the remaining three specialist meetings on the second visit. The specialist meetings included local business leaders, community leaders and local associations and committees. These included Emergency Services, Agricultural groups, Aboriginal groups (CEDP), Business Enterprise Centre, Telecentres in both Moora and Wongan Hills and the C Y O'Connor TAFE. A dinner was also held with a member of the Wheatbelt Development Commission.

Public Meeting

The attendance at the public meeting exceeded 40 and issues raised included costs, lack of skills and lack of infrastructure. The audience included an exceedingly good cross section of computer literate members of the local community. A quick poll of those present at the public meeting showed that close to 100% were comfortable with computers and more than 60% had recent "on line" experience. As was becoming the pattern, those lacking computer literacy were unlikely to attend these public meetings. The presentation included an outline of current infrastructure in the Moora, Wongan Hills and Dalwallinu areas including ISDN and Mobiles. Mobile coverage is very scant outside the immediate Moora and Wongan Hills area. Wongan Hills received advance installation of analogue mobiles after making a capital contribution to Telstra; they have since received digital service without the need for a further contribution.

Some discussion ensued concerning ISDN availability and digital mobile rollout. In particular concern was expressed about ISDN being limited to 5 km or less from the relevant telephone exchange.

The workshop considered the various barriers to technology adoption and felt that the skills barrier was perhaps the most significant. Whilst lack of infrastructure and the costs of software and hardware were often sizeable barriers, the group considered that lack of familiarity and the necessary skills were the most important reasons for low adoption rates. The group also considered that large segments of the community did not see any relevance to joining the information age.

The specialist meeting with the Agricultural group mentioned the frustration of inflexible training and the effective lack of options and this has been addressed elsewhere in this report. The Emergency Services group raised the issue of incompatible communications and this also has been addressed elsewhere in this report.

VISIT REPORTS

Tammin Visit 1 10th, November 1997

Attendance Varied between 14 and 20

General Introduction

Two meetings were held in Tammin. The first was a public meeting in the morning, attended by an audience that varied between 14 and 20. The public meeting was followed by a luncheon attended by a group representing farmers from the surrounding areas. The visit to Tammin concluded with a visit to the Telecentre and discussions with the Telecentre manager and the BEC manager.

Public Meeting

The presentation included an outline of current infrastructure in the Tammin and surrounding areas including ISDN and mobiles. Some discussion ensued concerning ISDN availability and digital mobile rollout. In particular concern was expressed about ISDN being limited to 5 km or less from the relevant telephone exchange and the absence of both analogue and digital mobile coverage in Tammin.

Issues raised at the public meeting included costs and lack of skills, and lack of infrastructure. The audience included a good cross section of the local community though "on line" familiarity was not assessed as particularly high. As in other areas, those lacking computer literacy were unlikely to attend these meetings.

The local Telecentre is well regarded by the community. However the facilities are minimal and the lack of internet access was considered serious.

The workshop considered the various barriers to technology adoption and felt that the skills barrier was perhaps the most significant. It was mentioned that some large communities of Plymouth Brethren had settled in the Cunderdin area. The Plymouth Brethren are limited in their ability to use information technology on religious grounds

The visit concluded with a meeting at the Tammin Telecentre.

VISIT REPORT

Merredin Visit 1 12th - 13th November 1997

General

Five meetings were held in Merredin - a public meeting, and specialist meetings with the Arts, Small Business, Agriculture and Seniors sectors. A dinner was also held with a member of the Wheatbelt Development Commission (WDC) Board and a representative of the Transport industry.

Peter Morris was in attendance for the 13 November along with Lance Sanderson and Annemie McAuliffe who stayed on for the 14 November. Mark South of the Merredin Office of the WDC accompanied the group and arranged the meetings. Peter Carrigg and Stephen Barry of the Eastern and Central Regional Development Organisation (ECRDO) came from Kalgoorlie to attend the public meeting.

Participants were representative of Merredin, Kellerberrin, Bencubbin, Doodlakine, Naremben, Mukinbudin, Beacon, and Bruce Rock.

Discussion with the groups and visits to the Telecentre resulted in useful information which has been collated under the following headings:

- Possibilities for Aggregating Demand
- Special Issues and/ or Problems
- Possible Projects
- Community Consultative Process

1. Possibilities for Aggregating Demand

The following areas were considered possibilities for an aggregated demand argument:

- Mobile telephony network - emergency services, farmers
- Young people
- Farmers (average telephone expenditure \$2,000 pa - over 150 farmers at Mt Marshall alone)
- Local, Federal and State Government - Shires, Westrail, Education, Health (Hospitals and Community Health), Agriculture, CAMS, Western Power (Kondinin, Southern Cross, Merredin), Wheatboard, Telecentre (Merredin and Southern Cross), Australia Post, WDC, Family and Children's Services, Justice, Police and Homeswest.
- Cooperatives (CBH), Elders, Wesfarmers, Marley's Transport
- Private sector - banks (Bankwest and Commonwealth), Flying School, mining companies (Southern Cross), Supa Value, Small Business Association, agricultural manufacturers etc.

Recommendation: an audit of the potential participants to be undertaken.

2. Special Issues and/ or Problems

Communications services are being removed from small towns before adequate replacement is found eg. regional radio; banks replaced by EFTPOS in the supermarkets when there is never any money to give customers.

In the absence of effective mobile communications, Marley's Transport used triple mode radio communications and through searching the channels was able to offer almost continuous contact with drivers throughout Australia.

Emergency services unable to speak to each other.

3. Possible Projects

On a rotating basis, 40 China Air pilots are resident in Merredin continuously. This is having an effect on the town, impacting on the sorts of services available eg. food, libraries and information services, rental video etc. There may be some possibility for undertaking innovative communication projects involving this group.

4. Community Consultative Process

A regional communication consultative committee exists in Merredin. Consideration could be given to activating this group and perhaps expanding its coverage to include National Farmers Federation zone coordinators (Jennie Walker and Jan Fuchsbichler). Dr Doug Albrecht of the Dryland Research Institute looked like he could be a good contributor also.

VISIT REPORT

Southern Cross

Visit 1

14th November 1997

General

Two meetings were held in Southern Cross - a public meeting, and a specialist meeting with the Mining sector.

Annemie McAuliffe was in attendance for the 15 November. Mark South and Debbie Morris of the Merredin Office of the WDC accompanied the group and arranged the meetings. Fiona Wiegall of the Goldfields Esperance Development Authority (GEDC) attended the meetings.

Participants were representative of Southern Cross, Marvel Loch, Moorine Rock, South Yilgarn, and Bodallin.

Discussion with the groups resulted in useful information which has been collated under the following headings:

Possibilities for Aggregating Demand
Special Issues and/ or Problems
Possible Projects
Community Consultative Process

1. Possibilities for Aggregating Demand

230 farming units in the region
600 people at Marvel Loch

Recommendation: More work to be done here to identify potential participants.

2. Special Issues and/ or Problems

The mobile tower installed in Southern Cross on an existing tower only nine months ago in the centre of town, because of line of sight problems, provides only 2 km coverage to the South (the direction of the mine sites) and 5 kms in other directions. Is there an option of relocating the tower?

No telephone service available at the railway station for the public and mobiles are unusable at that site.

Telecentre suffers from lack of ISDN as does the library LISWA connection. Internet is very slow. The Shire is about to go online to the department of Transport for licensing.

Emergency services cannot communicate. Police cannot always contact Kalgoorlie or Merredin. Ambulance cannot contact volunteers.

Telephones are sometimes a problem with line diversion occurring without

The school bus picks up from there each day and there is no real contact with the town if things go wrong.

The Shire paid for 2 TV decoders. GWN reception poor. Concern was expressed about the GWN decision to change satellites and the impact that would have for people using receivers dishes. Galaxy is popular.

Radio reception is poor. Receive PMFM 92.9, local 6MD, ABC from Geraldton and Albany, FM from Pilbara. There may be another radio license available for the region but it was thought this was held by NSW interests.

On the mine sites, except for Marvel Loch, there was felt to be sufficient telephone availability but data transmission was slow.

3. Possible Projects

Re-siting of the mobile tower to highest hill outside Southern Cross and linking in with new towers at Marvel Loch and Bullfinch would possibly give good overall coverage for the area.

Distance learning eg. MBA from Deacon University required Internet access.

Electronic commerce an attractive proposition for the towns.

4. Community Consultative Process

No communications consultative group is presently in operation in this region. There were some good people at the meetings Rossolo Patroni and Peter Capito, Cheryl and David Auld, David Pasini, and Russell Cole.

Southern Cross is engaged in harvesting in November and December and this is not a good time for consultations.

Appendix 3

WHEATBELT TELECOMMUNICATIONS PROJECT FIELDWORK SCHEDULE

WHEATBELT TELECOMMUNICATIONS PROJECT FIELDWORK SCHEDULE

MONDAY 10	TUESDAY 11	WEDNESDAY 12	THURSDAY 13	FRIDAY 14
Jurien -	-	Merredin -	Merredin -	Sthn Cross
Tammin	Northam	Northam/ York	-	-
17	18	19	20	21
		Narrogin	Narrogin/ Brookton/ Kondinin	Lake Grace/ Hyden
		Moora	Moora/ Wongan Hills	
24	25	26	27	28
Jurien		Merredin		Narrogin/ Pingelly
	Tammin	Northam		Moora

Appendix 4

COMMUNITY MEETING PRESENTATION PACK

Appendix 5

MEDIA COVERAGE

Appendix 5

Wheatbelt Telecommunications Project Media Coverage

ABC Radio Geraldton - Interview, morning program, 10 November

ABC Radio Albany - Interview, morning program, 10 November

"Rural Business and the Internet: both a threat and an opportunity" - *Northam Advocate*, 19 November, p.20

"WDC host technology" - *Narrogin Observer*, 26 November, p. 4

"Internet Access a Major Issue" - *The Wheatbelt Mercury*, 19 Nov., p.4

Westlink "Bridging the Gap" follow-up teleconference, 25 November

ABC Radio Geraldton - Interview, morning program, 2 December

ABC Radio Albany - Interview, morning program, 3 December

Appendix 6

SATELLITE RECEPTION EQUIPMENT

Appendix 7

COMMUNITY AUDIT ANALYSIS

Appendix 8

Median personal weekly income (Census 1996)

Local Government Area (LGA)	Median Income
CENTRAL MIDLANDS	
Dandaragan (S)	\$288
Moora (S)	\$324
Dalwallinu (S)	\$377
Wongan-Ballidu (S)	\$376
Victoria Plains (S)	\$322
Gingin (S)	\$232
Chittering (S)	\$246
Average	\$309
AVON	
Koorda (S)	\$337
Dowerin (S)	\$310
Wyalkatchem (S)	\$297
Goomalling (S)	\$297
Toodyay (S)	\$229
Northam (T)	\$262
Northam (S)	\$238
Cunderdin (S)	\$284
Tammin (S)	\$313
York (S)	\$263
Quairading (S)	\$332
Beverley (S)	\$233
Average	\$283

Appendix 8 (continued)

Median personal weekly income (Census 1996)

Local Government Area (LGA)	Median Income
CENTRAL EAST	
Yilgarn (S)	\$602
Mount Marshall (S)	\$341
Mukinbudin (S)	\$355
Trayning (S)	\$325
Nungarin (S)	\$313
Kellerberrin (S)	\$276
Merredin (S)	\$317
Bruce Rock (S)	\$365
Narembeen (S)	\$393
Westonia (S)	\$342
Average	\$363
CENTRAL SOUTH	
Kondinin (S)	\$417
Kulin (S)	\$385
Lake Grace (S)	\$436
Dumbleyung (S)	\$377
Wagin (S)	\$292
West Arthur (S)	\$316
Williams (S)	\$354
Narrogin (T)	\$270
Narrogin (S)	\$311
Wickepin (S)	\$322
Corrigin (S)	\$342
Brookton (S)	\$272
Wandering (S)	\$304
Cuballing (S)	\$250
Pingelly (S)	\$260
Average	\$327

Appendix 9

TELSTRA NETWORK SCHEMATIC