

**Digital conversion of self-help television
retransmission sites**

Discussion paper

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Digital Broadcasting
Department of Communications, Information Technology and the Arts
GPO Box 2154
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Introduction

The Australian Government is committed to ensuring that all Australians, irrespective of where they live, will be able to enjoy the benefits of digital television.

On 23 November 2006, the Government released *Ready, Get Set, Go Digital—A Digital Action Plan for Australia*. The Action Plan identifies the major tasks, processes and time frames necessary to drive digital take-up and achieve digital switch-over. It is available at www.digitalaustralia.gov.au

The Action Plan outlines a number of activities that will facilitate the switch-over to digital television. These activities will be undertaken by the Australian Communications and Media Authority (ACMA), the independent statutory authority responsible for planning and regulating broadcasting services, and Digital Australia, a dedicated digital switch-over body that will coordinate and oversee Australia's transition to digital television. When established, Digital Australia will operate within the Department of Communications, Information Technology and the Arts (DCITA).

Approximately 96 per cent of the population currently has access to at least one free-to-air digital television service. Some 85 per cent of Australians have access to all digital services intended for their area.

The Government is aware that a significant number of small communities in areas without sufficient access to free-to-air television reception operate retransmission facilities under self-help arrangements. This enables them to access free-to-air television services beyond the existing broadcaster-operated transmission networks.

Further to this, some households in these locations have gained approval from ACMA to install individual direct-to-home (DTH) satellite reception equipment, enabling them to access satellite-delivered remote area broadcasting services.

The Government is currently considering Australia's television reception issues and the best method of conversion for self-help retransmission sites. The Action Plan indicates a timeframe of 2007–2010 for this process. It also indicates that digital switch-over is expected to commence over the period 2010–2012.

ACMA has been tasked to analyse technical factors that could affect the timetable for digital switch-over. This includes considering whether switch-over should be rolled out nationally or on a region-by-region basis. After considering ACMA's advice the Government intends to announce a firm timetable for digital switch-over in Australia.

Scope

This discussion paper seeks comments from interested parties on the issues raised by the conversion of self-help retransmission sites. The public consultation process is being coordinated by DCITA.

This paper :

- identifies the number of current analogue self-help retransmission sites;
- considers the technical issues and options for the conversion of terrestrial self-help retransmission sites to digital;

- considers the option presented by the use of DTH satellite reception equipment; and
- discusses the possible timing for implementing the conversion of self-help retransmission sites.

Policy and regulatory framework

Schedule 4 to the *Broadcasting Services Act 1992* (the Act) currently includes a regulatory framework for the conversion to digital transmission of national and commercial television broadcaster-operated transmitters. However, the Act does not make provision for the conversion of analogue terrestrial self-help retransmission sites to digital. Policy and regulatory arrangements for the digital conversion of self-help community retransmission sites and DTH households mainly located in regional and remote areas of Australia, are yet to be decided.

There is currently no regulatory impediment to communities operating analogue self-help terrestrial retransmission facilities seeking to install digital transmitters of their own volition. However, installation of these transmitters should be done in consultation with ACMA.

Background

It is not feasible or cost effective for national and commercial broadcasters to establish terrestrial transmission sites for their television services to serve every part of their licence or coverage areas. This is particularly the case in regional and remote areas with many small and dispersed communities, and where topography may limit the effective range of transmitters. One option to improve analogue television reception for viewers in these areas has been to establish self-help retransmission facilities.

Reception of television services through self-help retransmission facilities

There are approximately 650 self-help retransmission facilities currently serving communities without sufficient access to free-to-air television reception. These facilities are located mainly in regional and remote areas of Australia (listed in Appendix A). These self-help retransmission facilities are designed to obtain, or to improve, analogue television reception in areas unable to obtain adequate reception from existing broadcaster-operated transmission sites. At some sites, there is a mix of self-help facilities to retransmit some services, and some broadcaster-operated transmitters.

The local council often operates the facility on behalf of the community. Remote Aboriginal communities operate some sites. In each case, the local community/authority is responsible for operating and maintaining the retransmission facilities and for meeting associated costs.

Three hundred of these self-help sites were established under the Government's \$35 million Television Black Spots Program (TVBSP), which closed on 30 June 2005, and the ongoing SBS Self-help Retransmission Scheme. The TVBSP also replaced obsolete equipment at a further 180 sites.

Metropolitan and regional self-help retransmission facilities

There are 186 self-help retransmission sites located in metropolitan and regional licence areas. Of these sites, 33 are located in metropolitan areas; 153 are located in regional licence areas. Self-help retransmission sites in metropolitan areas serve an estimated population of 100 000. Regional self-help retransmission sites serve an estimated population of 140 000.

Metropolitan and regional self-help retransmission sites have generally been established to ‘infill’ areas that the broadcasters’ signals fail to cover and ‘extend’ coverage to areas far removed from the broadcasters’ main transmission site. These sites receive off-air feeds from the analogue terrestrial transmitters of the local broadcasters.

Remote area analogue terrestrial self-help retransmission sites

There are 297 self-help analogue terrestrial retransmission sites in remote central and eastern Australia (RCEA) and 171 in regional/remote Western Australia. The estimated total population served by the self-help retransmission sites in the RCEA is 75 000. In regional/remote Western Australia, the self-help retransmission sites serve an estimated population of 60 000.

The remote area self-help retransmission sites have generally been established to ‘extend’ coverage to areas far removed from the broadcasters’ main terrestrial transmission sites. These sites are predominantly satellite-fed. They access the commercial television services provided by PRIME and WIN in regional/remote Western Australia, and Imparja and Southern Cross in remote central and eastern Australia. Imparja provides Nine Network programming with some Network Ten and Indigenous programming. Southern Cross provides Seven Network programming.

Many sites also retransmit satellite-delivered ABC and SBS services.

Reception of satellite-delivered television services through Direct-to-Home (DTH) equipment

Another option for viewers in regional or remote areas of Australia who have difficulty receiving adequate terrestrial television services is to install DTH equipment. This enables them to access the satellite-delivered remote area television services. The equipment includes the installation of a satellite reception dish and an authorised decoder and smartcard.

Satellite-delivered ABC and SBS television services are provided on a national basis and are thus freely available. Satellite-delivered WIN and GWN commercial television services are available to viewers residing in remote/regional Western Australia, and in the RCEA licence area Southern Cross and Imparja provide satellite-delivered commercial television services.

Viewers residing outside regional/remote Western Australia and the RCEA licence areas, who wish to access remote commercial satellite-delivered television services, require approval from ACMA to receive the relevant remote services.

Currently, approximately 74 000 households have DTH reception equipment to access satellite-delivered ABC, SBS and the remote commercial television services provided for the regional/remote Western Australia and the RCEA markets. Of these, 3000 have obtained approval from ACMA to access the remote satellite-delivered commercial services from outside a remote licence area. Local regional television services are not available on a DTH basis by satellite.

The number of DTH installations is understood to be increasing at the rate of about 220 per week.

DTH services do not need to be converted to digital in the same way that terrestrial services need to be converted. DTH services are transmitted in digital mode on the satellite. However, future decisions about digital transmission may impact on the nature of DTH decoders required. In addition, as discussed below, it may be cost-effective to convert some terrestrial services to DTH reception.

Satellite transmission arrangements

The remote area broadcasters currently use the Aurora platform on the Optus C1 satellite to provide their services to DTH viewers and self-help communities in remote areas. Alternative transmission arrangements currently apply for the distribution of some remote digital television services to broadcasters' transmission sites that are not DTH compatible.

The remote broadcasters are negotiating with Optus regarding long-term satellite transmission of their digital television services, with the intention of providing for satellite transmission of their digital services, distribution to self-help sites and DTH households.

Issues

Conversion of analogue self-help television retransmission facilities to digital

A threshold issue is whether it would be technically viable for local communities, Indigenous communities or local councils to operate and maintain digital retransmission facilities under self-help arrangements.

There are two broad potential options for the conversion of existing analogue self-help television retransmission facilities: the installation of individual digital transmitters or the installation of multiplexing equipment.

Individual digital transmitters

This option would require the installation of an individual digital transmitter and decoder for each television service required to be retransmitted in digital mode at a site. For example, if a site currently has four analogue transmitters for four analogue services, four digital transmitters would be installed. Self-help retransmission sites which already provide suitable basic infrastructure such as power, equipment housing, air-conditioning and antenna masts may be able to be incrementally upgraded to support digital transmissions.

Common incremental upgrades which may be required at individual sites include:

- a new digital antenna being installed on the existing mast;
- a new feeder cable from the antenna down to a combiner;
- new digital combiners;
- new digital transmitters;
- new satellite receivers (where the site accesses satellite-fed services); and
- installation of equipment in a new 19-inch rack.

The indicative total cost of converting all existing metropolitan and regional area self-help sites to digital is estimated to be \$25.7 million. This equates to an average of \$138 000 per site. A wider range of variables apply to remote area retransmission sites. Costs for converting remote area self-help sites to digital range from approximately \$125 000 to \$210 500. The total cost of converting all existing remote area self-help sites could be in the order of \$62.7 million.

Multiplexing equipment

Another potential conversion option is to install on-site multiplexing equipment at the self-help retransmission site. This would reduce the number of digital transmitters/decoders required at each site, although it is not clear whether overall conversion costs would be more or less for the use of individual transmitters.

Multiplexers combine digital transmissions received from different television services into a single unit. This option could, for example, involve multiplexing four broadcaster signals to be provided as a multichannel service using one terrestrial transmitter. Multiplexers require initial programming and may need to be re-programmed at intermittent times to suit the broadcaster services being multiplexed together.

Because of their greater technical sophistication, multiplexers have greater technical and other demands than do individual digital transmitters. For example, multiplexing equipment can be more susceptible to variations in temperature and the intrusion of dust. For these reasons, the operation and maintenance of multiplexing equipment may require more resources than the operation and maintenance of individual digital transmitters would. This option would also require the availability of technicians specifically trained in multiplexer operation and maintenance.

Multiplexers may, therefore, be beyond the capacity of most self-help groups to operate and maintain, unless they have substantial broadcaster support.

Comment is sought on the following issues:

Whether the use of individual digital transmitters for each service or the use of multiplexers, would be the most effective option for converting existing analogue self-help retransmission sites to digital in relation to:

- technical viability;
- costs of conversion, operation and maintenance; and
- any other options for the digital conversion of self-help television retransmission sites.

DTH reception of satellite television services

Another key issue is to determine the relative costs of converting existing self-help retransmission sites to digital transmission. This is compared with the installation of DTH facilities in individual households to access satellite-delivered remote digital television services.

The DTH option would require a household to convert from their current use of a domestic antenna system for terrestrial reception of television services and purchase DTH reception equipment. This comprises a satellite receiving dish, a smartcard and authorised decoder. The cost of these items is reducing. Currently, the total cost could be in the order of \$550 to \$1200 installed.

Where population numbers are below 500, reception of satellite-delivered digital television services through DTH equipment may prove to be a more economical option than converting existing analogue terrestrial retransmission facilities to digital terrestrial television reception.

Of the analogue terrestrial self-help retransmission sites in metropolitan and regional Australia, 80 serve populations of less than 500. However, conversion to DTH would mean that no local commercial television services would be available, as these services are not carried by satellite for DTH viewing. Viewers in central and eastern Australia would only have access to the two satellite-delivered remote commercial television services currently available. Rather than the three commercial television services currently accessed through terrestrial retransmission. In Western Australia, the broadcasters are scheduled to introduce a third satellite-delivered digital commercial service in 2008.

This is not an issue for communities in remote areas where the television services retransmitted by self-help sites are the relevant remote area services.

More than 80 per cent of the analogue terrestrial self-help retransmission sites in remote Australia serve communities with populations below 500. The Government may need to consider the costs and benefits of DTH conversion in such circumstances.

Non-cost factors would also need to be considered. Changes may occur from time to time in satellite transmission arrangements for remote television services arising from technological developments and/or changes in commercial arrangements. This may require the replacement of existing DTH reception equipment. There is an issue as to who would bear the costs of such changes over time.

Comment is sought on the following issue:

Whether the DTH option for viewers residing in remote areas of Australia where the population is less than 500 should be adopted, rather than converting existing self-help retransmission sites from analogue to digital.

Timing of Implementation

Metropolitan and regional self-help television retransmission sites

Metropolitan and regional self-help retransmission sites typically receive their analogue television signals by terrestrial feeds from broadcaster-operated terrestrial transmission sites. Arrangements for the operation of such sites in a digital environment will, therefore, need to be implemented prior to planned switch-off of the analogue television services feeding the self-help sites. The Action Plan currently anticipates analogue switch-off commencing over the period 2010–12. There is no impediment to these self-help retransmission sites converting to digital at any time, in consultation with ACMA, provided the self-help communities are prepared to meet the relevant conversion, operation and maintenance costs.

Within the deadline imposed by analogue switch-off, it may be advantageous to implement a digital conversion program for self-help sites in metropolitan and regional areas after the broadcasters have completed their digital television roll-out and ACMA is well advanced in its assessment of digital signal coverage.

The precise coverage of digital television in individual areas will not be known until the roll out of digital services is complete. In some circumstances, the digital signal has proven to be more robust than the analogue signal. For this reason, not all current self-help retransmission sites may be required if the coverage of the broadcasters' sites extends into the area not previously served by the analogue signals. On the other hand, it is possible that digital coverage may not exactly match analogue coverage, requiring the establishment of new self-help sites where such facilities do not currently exist.

Remote self-help television retransmission sites

Remote self-help retransmission sites typically receive their analogue services by satellite-feed. The DTH satellite feed currently serves a double purpose: providing a signal direct to the viewer through DTH equipment and providing the feed to analogue transmitters for existing analogue terrestrial retransmission at self-help sites. There is no immediate requirement to convert these self-help sites to digital as long as there is satellite delivery of the remote area analogue television services.

As indicated above, the remote area broadcasters are currently considering long-term arrangements for the satellite delivery of their digital television services. The Government considers that future satellite transmission arrangements should continue to permit access by DTH households to a full suite of remote television services intended for an area using a single satellite reception dish and decoder.

Final decisions regarding the digital conversion of satellite-fed self-help television retransmission sites is not possible until future satellite transmission arrangements for digital television are finalised.

Comment is sought on the following issue:

Any views regarding the timing of digital conversion of self-help retransmission sites.

Submissions

Submissions are invited from interested parties on the matters covered in this discussion paper. Submissions are also invited to address any other relevant issues that are not specifically addressed.

Submissions should be provided by Friday, 10 August 2007 in hard copy, addressed to:

The General Manager
Digital Broadcasting
Department of Communications, Information Technology and the Arts
GPO Box 2154
CANBERRA ACT 2601

Submissions, if possible, should also be provided electronically to

selfhelpcomments@dcita.gov.au

Electronic copies should be submitted in a format compatible with Microsoft Word 2003.

Further information on this review can be obtained from the Assistant Manager at the above email address, or by telephone 02 6271 1204 or facsimile 02 6234 3126.

Submissions will be made public on the DCITA website, unless otherwise specified. Persons providing submissions should clearly indicate whether any aspect of the submissions should not be made public. If no such indication is provided, it will be assumed that submissions can be published in full. Where confidentiality is requested, persons are encouraged to provide a public version of their submissions that can be made available at www.dcita.gov.au/digital_television

Self-help retransmission facilities by metropolitan, regional and remote areas

Identified metropolitan area sites (35 sites)

	Licence Area	Area Served
1	Adelaide	Angaston
2	Adelaide	Cape Jervis
3	Adelaide	Carrickalinga
4	Adelaide	Cudlee Creek
5	Adelaide	Eudunda
6	Adelaide	Golden Grove
7	Adelaide	Gumeracha
8	Adelaide	Lyndoch
9	Adelaide	Mannum
10	Adelaide	Myponga
11	Adelaide	Normanville
12	Adelaide	Peterhead
13	Adelaide	Swan Reach
14	Adelaide	Truro Grove
15	Adelaide	Yankalilla
16	Brisbane	Canungra
17	Brisbane	Conondale
18	Brisbane	Kooralbyn
19	Brisbane	Linville
20	Brisbane	Maroon
21	Brisbane	Mount Alford
22	Brisbane	Rathdowney
23	Brisbane	Somerset Dam
24	Brisbane	Toogoolawah
25	Melbourne	Geelong (Newtown)
26	Melbourne	Gisborne
27	Melbourne	Healesville
28	Melbourne	Monbulk
29	Melbourne	Rosebud
30	Sydney	Megalong
31	Sydney	Woronora
32	Perth	Lancelin
33	Perth	Maryville
34	Perth	Perth East
35	Perth	Seabird

Identified Regional area sites (151 sites)

	Licence Area	Area Served
1	Southern New South Wales (SNSW)	Adelong
2	Regional Queensland (RQLD)	Agnes Water
3	RQLD	Alligator Creek
4	Regional Victoria (RVIC)	Anglesea and Aireys Inlet
5	RVIC	Apollo Bay
6	Northern New South Wales (NNSW)	Armidale North
7	RQLD	Bancroft
8	Darwin, Remote Central and Eastern (REM C&E)	Batchelor
9	SNSW	Batlow
10	Spencer Gulf	Baxter
11	RQLD	Bell
12	RVIC	Bemm River
13	SNSW	Berridale
14	SNSW	Berry
15	Tasmania (TAS)	Blackstone (TAS)
16	RVIC	Blackwood
17	NNSW	Bolivia
18	NNSW	Bonny Hills
19	RVIC	Boolarra
20	NNSW	Booral
21	Spencer Gulf	Burra
22	SNSW	Burra Creek
23	RVIC	Buxton
24	RQLD	Byfield
25	NNSW	Byron Bay
26	SNSW	Capertee
27	SNSW	Captains Flat
28	RQLD	Cardwell
29	SNSW, REM C&E	Cobar
30	RVIC	Cohuna
31	SNSW	Conder
32	SNSW	Cootamundra
33	RQLD	Coppabella
34	RVIC	Cravensville
35	RQLD	Crows Nest
36	SNSW	Darbys Falls
37	RVIC	Dargo
38	RVIC	Dartmouth
39	Spencer Gulf	Davenport

40	TAS	Derby (Tas)
41	RQLD	Dingo Beach
42	TAS	Eaglehawk Neck
43	SNSW	Eastgrove
44	NNSW	Elizabeth Beach
45	RVIC	Eskdale
46	SNSW	Eugowra
47	RVIC	Falls Creek
48	RQLD	Flame Tree and Jubilee Pocket
49	RQLD	Flying Fish Point
50	NNSW	Forster
51	TAS	Forth
52	RVIC	Freeburgh/Smoko
53	RQLD	Glenden
54	SNSW	Gulgong
55	SNSW	Gundagai
56	SNSW	Gunning
57	TAS	Gunns Plains
58	RVIC	Harrietville
59	SNSW	Hartley
60	Murrumbidgee and Irrigation Area (MIA)	Hillston
61	TAS	Hillwood
62	RQLD	Horseshoe Bay
63	RVIC	Howqua
64	RVIC	Jamieson
65	RVIC	Jeeralang/Yinnar South
66	SNSW	Junee
67	SNSW	Kangaroo Valley
68	RQLD	Kelso
69	RVIC	Khancoban
70	MIA,REM C&E	Lake Cargelligo
71	NNSW	Lismore East
72	RQLD	Little Mulgrave
73	TAS	Little Swanport/Ravensdale
74	NNSW	Long Flat
75	RVIC	Lorne
76	NNSW	Maclean/Ashby
77	Remote Western Australia (REM WA), Perth, Southwest and Great Southern (SW&GS)	Mandurah
78	TAS	Maydena
79	TAS	Meander
80	Spencer Gulf	Melrose/Wilmington
81	SNSW	Merimbula
82	RQLD	Miriam Vale/Bororen
83	RVIC	Mitta Mitta

84	RVIC	Mitta Vale
85	TAS	Mole Creek
86	RQLD	Moonford
87	RQLD	Moranbah Town
88	RQLD	Mossman South
89	NNSW	Mount George
90	SNSW	Mount Kembla
91	RQLD	Mount Morgan
92	SNSW	Mudgee Town
93	NNSW	Mullumbimby Creek
94	SNSW,MIA	Narrandera
95	TAS	Neika/Leslie Vale
96	RQLD	Nelly Bay
97	NNSW	Nundle
98	SNSW	Oberon
99	NNSW	Ocean Shores
100	RVIC	Old Tallangatta
101	SNSW	Orange (Rosewood)
102	Spencer Gulf	Orroroo
103	TAS	Paloona
104	RQLD	Paluma
105	SYDNEY,NNSW	Patonga
106	SNSW	Peak Hill
107	TAS	Port Arthur
108	RVIC	Port Campbell
109	SNSW	Portland Town
110	Spencer Gulf	Quorn
111	RQLD	Redlynch
112	TAS	Ringarooma
113	RQLD	Rosedale
114	RQLD	Sarina
115	TAS	Sisters Beach
116	NNSW	Smiths Lake
117	RQLD	Speewah
118	TAS	St Helens
119	TAS	Stanley
120	NNSW	Stroud
121	SNSW	Talbingo
122	RVIC	Tallandoon
123	RVIC	Tallangatta East
124	RVIC	Tallangatta Valley
125	RVIC	Tawonga South
126	NNSW	Telegraph point
127	RQLD	Thangool
128	SNSW	Thredbo
129	RVIC	Tidal River
130	RQLD	Tieri

131	RQLD	Tin Can Bay
132	TAS	Tullah
133	SNSW	Tullamore
134	MIA	Tullibigeal
135	RQLD	Tully Heads
136	SNSW	Tumbarumba
137	Mildura	Underbool
138	TAS	Upper Derwent Valley
139	NNSW	Uralla
140	NNSW,REM C&E	Urbenville
141	RVIC,REM C&E	Walwa/Jingellic
142	NNSW	Warialda
143	RVIC	Warrnambool City
144	TAS	Wayatinah
145	SNSW	Wellington
146	TAS	Wilmot
147	SNSW,MIA	Wyalong
148	SNSW	Wyangala
149	RVIC	Wye River
150	RQLD	Yarrabah
151	RVIC	Yendon/Lal Lal

Identified Remote Area sites (297 sites in REM C&E and 171 sites in REM WA)

	Licence Area	Area Served
1	REM C&E	Adavale
2	REM C&E	Adelaide River
3	REM C&E	Ali Curung
4	REM C&E	Alice Springs North
5	REM C&E	Almaden
6	REM C&E	Alpha
7	REM C&E	Alyuen
8	REM C&E	Amata
9	REM C&E	Ampilatwatja
10	REM C&E	Anakie
11	REM C&E	Andamooka
12	REM C&E	Angurugu
13	REM C&E	Aramac
14	REM C&E	Areyonga
15	REM C&E	Arkaroola
16	REM C&E	Arlparra
17	REM C&E	Arnkawenyerr
18	REM C&E	Atheley
19	REM C&E	Atikirra
20	REM C&E	Augathella
21	REM C&E	Aurukun
22	REM C&E	Ayton
23	REM C&E	Badu Island
24	REM C&E	Balfours Well
25	REM C&E	Ballera
26	REM C&E	Bamaga
27	REM C&E	Barcaldine
28	REM C&E	Barton
29	REM C&E	Barunga
30	REM C&E	Bathurst Island
31	REM C&E	Bedourie
32	REM C&E	Beswick
33	REM C&E	Bickerton Island
34	REM C&E	Birdsville
35	REM C&E	Blackall
36	REM C&E	Bogantungan
37	REM C&E	Boigu Island
38	REM C&E	Bollon
39	REM C&E	Bookabie
40	REM C&E	Borrooloola

Licence Area	Area Served
REM WA	Albany
REM WA	Albany West
REM WA	Argyle
REM WA	Badgingarra
REM WA	Balgo
REM WA	Bamboo Creek
REM WA	Bayulu
REM WA	Beacon
REM WA	Beagle Bay
REM WA	Bencubbin
REM WA	Billiluna
REM WA	Blackstone
REM WA	Boddington
REM WA	Borden
REM WA	Bremer Bay
REM WA	Bremer Bay South
REM WA	Bridgetown
REM WA	Broads Dams
REM WA	Bruce Rock
REM WA	Burringurrah
REM WA	Camballin
REM WA	Carnamah
REM WA	Cervantes
REM WA	Christmas Island
REM WA	Coalmine Beach
REM WA	Cocos Islands (West Island)
REM WA	Condingup/Howick
REM WA	Coolgardie
REM WA	Coonana
REM WA	Coorow
REM WA	Coral Bay
REM WA	Cosmo Newberry
REM WA	Cue
REM WA	Curtin
REM WA	Dalwallinu
REM WA	Dampier
REM WA	Denham
REM WA	Denmark
REM WA	Djarindjin
REM WA	Dongara

41	REM C&E	Boulia
42	REM C&E	Bourke Town
43	REM C&E	Brewarrina
44	REM C&E	Brunette Downs
45	REM C&E	Buchan
46	REM C&E	Bulman
47	REM C&E	Burdekin Falls
48	REM C&E	Burketown
49	REM C&E	Camooweal
50	REM C&E	Canteen Creek
51	REM C&E	Cape Flattery Mine
52	REM C&E	Cattle Creek
53	REM C&E	Ceduna/Smoky Bay
54	REM C&E	Chandler
55	REM C&E	Chillagoe
56	REM C&E	Clairview
57	REM C&E	Cloncurry
58	REM C&E	Coen
59	REM C&E	Cooper Pedy
60	REM C&E	Cooinda
61	REM C&E	Cook
62	REM C&E	Copi Hollow
63	REM C&E	Cow Bay
64	REM C&E	Cracow
65	REM C&E	Croydon
66	REM C&E	Cumborah
67	REM C&E	Cunnamulla
68	REM C&E	Daguragu
69	REM C&E	Daintree Village
70	REM C&E	Dajarra
71	REM C&E	Daly River
72	REM C&E	Darnley Island
73	REM C&E	Dauan Island
74	REM C&E	Deepwater
75	REM C&E	Dirranbandi
76	REM C&E	Docker River
77	REM C&E	Doomadgee
78	REM C&E	Douglas Daly
79	REM C&E	East Alligator
80	REM C&E	Einsleigh
81	REM C&E	Elliott
82	REM C&E	Elliston
83	REM C&E	Eloise Mine
84	REM C&E	Emmaville
85	REM C&E	Engawala
86	REM C&E	Enngonia
87	REM C&E	Ensay

REM WA	Drake
REM WA	Eighty Mile Beach
REM WA	Eneabba
REM WA	Eucla
REM WA	Fishery Beach
REM WA	Fitzroy Crossing
REM WA	Forrest
REM WA	Gairdner
REM WA	Gascoyne Junction
REM WA	Gnowangerup
REM WA	Goodwyn
REM WA	Gracetown
REM WA	Green Head
REM WA	Halls Creek
REM WA	Honey Well Mine
REM WA	Hopetoun (WA)
REM WA	Hyden
REM WA	Jameson (Mantamaru)
REM WA	Jerramungup
REM WA	Jigalong
REM WA	Jundee Gold Mine
REM WA	Jurien
REM WA	Kalbarri
REM WA	Kalumburu
REM WA	Kambalda
REM WA	Karalundi
REM WA	Karilywara
REM WA	Karratha South
REM WA	Kellerberrin
REM WA	Kiwirrkurra
REM WA	Kojonup
REM WA	Kondinin
REM WA	Koorda
REM WA	Kulin
REM WA	Kununoppin
REM WA	Kununurra East
REM WA	La Grange
REM WA	Lake Grace
REM WA	Lake Gregory
REM WA	Lake King
REM WA	Laverton
REM WA	Learmonth
REM WA	Leeman
REM WA	Leinster
REM WA	Leonora
REM WA	Looma
REM WA	Marble Bar

88	REM C&E	Erlunda
89	REM C&E	Ernabella
90	REM C&E	Eromanga
91	REM C&E	Euabalong
92	REM C&E	Eulo
93	REM C&E	Finke
94	REM C&E	Flowerdale and Hazeldene
95	REM C&E	Forsayth
96	REM C&E	Fowlers Bay
97	REM C&E	Fregon
98	REM C&E	Galiwinku
99	REM C&E	Gapuwiyak
100	REM C&E	Georgetown
101	REM C&E	Glen Davis
102	REM C&E	Glendambo
103	REM C&E	Glengarry and Grawin
104	REM C&E	Goodooga
105	REM C&E	Greenvale
106	REM C&E	Groote Eylandt
107	REM C&E	Gunpowder
108	REM C&E	Gununa
109	REM C&E	Haasts Bluff
110	REM C&E	Harts Range
111	REM C&E	Hawker
112	REM C&E	Helen Springs
113	REM C&E	Hermannsburg
114	REM C&E	Hodgson Downs
115	REM C&E	Hope Vale
116	REM C&E	Hughenden
117	REM C&E	Hungerford
118	REM C&E	Iga Warta
119	REM C&E	Ilfracombe
120	REM C&E	Imangara
121	REM C&E	Imanpa
122	REM C&E	Indulkana
123	REM C&E	Injinoo
124	REM C&E	Injune
125	REM C&E	Isisford
126	REM C&E	Ivanhoe
127	REM C&E	Jabiru
128	REM C&E	Jackson Oil Field
129	REM C&E	Jericho
130	REM C&E	Jim Jim
131	REM C&E	Julia Creek
132	REM C&E	Jundah
133	REM C&E	Kalka

REM WA	Marvel Loch
REM WA	Meekatharra
REM WA	Menzies
REM WA	Merredin
REM WA	Mimbi
REM WA	Molloy Island
REM WA	Monkey Mia
REM WA	Mount Magnet
REM WA	Mount Margaret
REM WA	Mukinbudin
REM WA	Mullewa
REM WA	Munglinup
REM WA	Muradup
REM WA	Murchison
REM WA	Murrin Murrin
REM WA	Narembeen
REM WA	Newdegate
REM WA	Norseman
REM WA	North Rankin
REM WA	Northcliffe
REM WA	Nullagine
REM WA	Nungarin
REM WA	Nyabing
REM WA	Oldfield - Bedford Harbour
REM WA	Oldfield - Karranga
REM WA	One Arm Point
REM WA	Ongerup
REM WA	Onslow
REM WA	Oombulgurri
REM WA	Ora Banda
REM WA	Oriental Well
REM WA	Pallottine Mission
REM WA	Palm Springs Gold Mine
REM WA	Pannawonica
REM WA	Paraburdoo
REM WA	Pardoo
REM WA	Parnngurr
REM WA	Peaceful Bay
REM WA	Pingrup
REM WA	Prevelly
REM WA	Punmu
REM WA	Quinninup
REM WA	Ravensthorpe
REM WA	Rawlinna
REM WA	Roebourne
REM WA	Salmon Gums

134	REM C&E	Kalkaringi
135	REM C&E	Kandos
136	REM C&E	Kanpi
137	REM C&E	Karumba
138	REM C&E	Katherine Gorge
139	REM C&E	Kenmore Park
140	REM C&E	Kimba
141	REM C&E	Kings Canyon Resort
142	REM C&E	Kintore
143	REM C&E	Knocker Bay
144	REM C&E	Kowanyama
145	REM C&E	Kubin
146	REM C&E	Kulgera
147	REM C&E	Kurrajong
148	REM C&E	Lajamanu
149	REM C&E	Lake Nash
150	REM C&E	Lakeland Roadhouse
151	REM C&E	Laramba
152	REM C&E	Leigh Creek South
153	REM C&E	Lightning Ridge
154	REM C&E	Lockhart River
155	REM C&E	Longreach
156	REM C&E	Lord Howe Island North
157	REM C&E	Lord Howe Island South
158	REM C&E	Lyndhurst
159	REM C&E	Mabuiag Island
160	REM C&E	Manguri
161	REM C&E	Maningrida
162	REM C&E	Mannus
163	REM C&E	Mapoon
164	REM C&E	Maralinga
165	REM C&E	Marion Bay
166	REM C&E	Marla
167	REM C&E	Marree
168	REM C&E	Mary River
169	REM C&E	Mataranka
170	REM C&E	Maxwell Creek Forestry HQ
171	REM C&E	McArthur River
172	REM C&E	McArthur River Mine
173	REM C&E	Meandarra
174	REM C&E	Menindee
175	REM C&E	Mereenie
176	REM C&E	Milikapiti
177	REM C&E	Milingimbi
178	REM C&E	Mimili
179	REM C&E	Minjilang

REM WA	Sandstone
REM WA	Southern Cross
REM WA	Tambellup
REM WA	Telfer
REM WA	Tjirrkarli
REM WA	Tjukurla
REM WA	Tjuntjuntjara
REM WA	Tom Price
REM WA	Trayning
REM WA	Useless Loop
REM WA	Vlaming Head
REM WA	Waddi Bush Resort
REM WA	Walpole
REM WA	Wanarn
REM WA	Wangkatjunga
REM WA	Warakurna
REM WA	Warburton (WA)
REM WA	Warmun
REM WA	Warralong
REM WA	Wave Rock
REM WA	Weeli Wolli Creek
REM WA	Wellstead
REM WA	Westonia
REM WA	Wharton
REM WA	Wickham
REM WA	Wiluna
REM WA	Wingellina
REM WA	Woodie Woodie
REM WA	Wurreranginy Community
REM WA	Wyndham
REM WA	Yalgoo
REM WA	Yandearra
REM WA	Yandicoogina
REM WA	Yiyili
REM WA	Youngaleena
REM WA	Yulga Jinna
REM WA	Yungngora
REM WA	Zanthus

180	REM C&E	Mintabie
181	REM C&E	Moomba
182	REM C&E	Morven
183	REM C&E	Mount Hall
184	REM C&E	Mount Liebig
185	REM C&E	Mount Surprise
186	REM C&E	Mungallala
187	REM C&E	Murrayville
188	REM C&E	Muttaborra
189	REM C&E	Napranum
190	REM C&E	Nepabunna
191	REM C&E	New Mapoon
192	REM C&E	Ngukurr
193	REM C&E	Nhulunbuy
194	REM C&E	Normanton
195	REM C&E	Nturiya
196	REM C&E	Numbulwar
197	REM C&E	Nyapari
198	REM C&E	Nyirripi
199	REM C&E	Nymagee
200	REM C&E	Oak Valley
201	REM C&E	Oenpelli
202	REM C&E	Oodnadatta
203	REM C&E	Osborne Mines
204	REM C&E	Palumpa
205	REM C&E	Papunya
206	REM C&E	Parachilna
207	REM C&E	Penong
208	REM C&E	Pentland
209	REM C&E	Peppimenarti
210	REM C&E	Pine Creek
211	REM C&E	Pipalyatjara
212	REM C&E	Pmara Jutunta
213	REM C&E	Poochera
214	REM C&E	Pormpuraaw
215	REM C&E	Port Bremmer
216	REM C&E	Pularumpi
217	REM C&E	Quilpie
218	REM C&E	Ramingining
219	REM C&E	Rawnsley Park Station
220	REM C&E	Richmond
221	REM C&E	Robinson River
222	REM C&E	Rossville
223	REM C&E	Roxby Downs
224	REM C&E	Saibai Island
225	REM C&E	Santa Teresa
226	REM C&E	Sapphire/Rubyvale

227	REM C&E	Scherger
228	REM C&E	Seisia
229	REM C&E	Soakage Bore
230	REM C&E	South Alligator - Kakadu Resort
231	REM C&E	St Lawrence
232	REM C&E	St Pauls
233	REM C&E	Stanage Bay
234	REM C&E	Stephens Island
235	REM C&E	Stonehenge
236	REM C&E	Streaky Bay
237	REM C&E	Sue Island
238	REM C&E	Surat
239	REM C&E	Swifts Creek
240	REM C&E	Tambo
241	REM C&E	Tanami Mine
242	REM C&E	Tarcoola
243	REM C&E	Taroom
244	REM C&E	Thallon
245	REM C&E	Thargomindah
246	REM C&E	Thursday Island
247	REM C&E	Ti Tree
248	REM C&E	Timber Creek
249	REM C&E	Tindal
250	REM C&E	Tipperary
251	REM C&E	Titjikala
252	REM C&E	Tottenham
253	REM C&E	Uluru
254	REM C&E	Umagico
255	REM C&E	Umbakumba
256	REM C&E	Umuwa
257	REM C&E	Urapunga
258	REM C&E	Wadeye
259	REM C&E	Wallatina
260	REM C&E	Wallumbilla
261	REM C&E	Wandoan
262	REM C&E	Warrego
263	REM C&E	Warruwi
264	REM C&E	Watarru
265	REM C&E	Watinuma
266	REM C&E	Watson
267	REM C&E	Weilmoringle
268	REM C&E	Weipa
269	REM C&E	Werenbun
270	REM C&E	White Cliffs
271	REM C&E	William Creek
272	REM C&E	Willowra

273	REM C&E	Willows
274	REM C&E	Wilora
275	REM C&E	Windorah
276	REM C&E	Winton
277	REM C&E	Wirralie
278	REM C&E	Wirrulla
279	REM C&E	Woolwonga Mine
280	REM C&E	Woomera
281	REM C&E	Wudinna
282	REM C&E	Wudykapildiya
283	REM C&E	Wujal Wujal
284	REM C&E	Wurankuwu
285	REM C&E	Wyandra
286	REM C&E	Yalata
287	REM C&E	Yam Island
288	REM C&E	Yaraka
289	REM C&E	Yarralin
290	REM C&E	Yirrkala
291	REM C&E	Yorke Islands
292	REM C&E	Yowah
293	REM C&E	Yuelamu
294	REM C&E	Yuendumu
295	REM C&E	Yulara
296	REM C&E	Yuleba
297	REM C&E	Yunta