

# main roads

MARCH 1983





# main roads

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*Front cover: This dual carriageway section of Mona Vale Road at Terrey Hills was opened to traffic during December 1981. See article on p. 13.  
Back cover: The Pitt Street bridge over the F4—Western Freeway. An outline of this and other works in Sydney's Western Region appears on pp. 3-8.*

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## BEING RESPONSIBLE

As we progress through life we gain an increasing awareness of the inescapable nature of responsibility. In our early years we might be placed in charge of feeding the family pet or raking together leaves in the garden. As we get older, we may take on the obligations of a job, a spouse and children.

Perhaps the most significant thing about responsibility is that the more we have, the more people are directly affected by our actions.

In fact, if it weren't for the concept of people and organisations being responsible to each other, and for each other, society as we know it could not function.

The Department of Main Roads undertakes a position of responsibility to millions of people in this State.

It has a duty to the Minister and the Government to carry out the work arising from the Commissioner's responsibilities under the Main Roads Act.

It has an obligation to the roadusers of New South Wales to construct and maintain a safe and effective road system.

It is accountable to taxpayers and the Government for the manner in which revenue and grants are used.

It is charged with the well-being of over 9,000 direct employees and thousands of casual and contract employees.

Last but by no means least, it has a commitment to inform all those to whom it is responsible of its expenditure of funds and the individual works it is undertaking.

A large part of this onus to inform is discharged through the Main Roads Journal, which serves as a quarterly supplement to the Department's Annual Report. And it is in this way that we demonstrate the very nature of being responsible.

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# F4—WESTERN FREEWAY AND WESTERN REGION ROAD PROGRAMME

Sydney's Western Region has grown so dramatically in recent years that a need has arisen to develop an efficient transport system for the people in this area.

The Western Region Transport Improvement Programme has been designed by the State Government to meet this need by co-ordinating public transport and road development.

## F4—Western Freeway

The F4—Western Freeway is one of the key projects of this programme, and is also one of the major road developments in the State.

It is planned to extend from Concord to the lower Blue Mountains, as a vital communications corridor for community travel through this rapidly developing region.

Parramatta Road and the Great Western Highway have carried the flow of westward travel from Sydney since the earliest days of the colony. However, in recent years, traffic volumes on many sections have almost reached saturation point, particularly in peak periods. Extensive commercial development concentrated along the route has compounded the problem by mixing local shopping traffic and pedestrians with through traffic. This development has also made any further widening of Parramatta Road inappropriate because of the high cost of property adjustments and the severe disruption it would cause.

The far better alternative chosen by the Department of Main Roads has been to initiate a new freeway route, primarily for through movement. With no conflict from cross traffic, and with opposing lines of vehicles separated by a wide median, the new freeway brings safer, more rapid movement for public, commercial and private transport.

The F4 is being designed and built by the Department of Main Roads, with the valued assistance of consultants and the expertise of a variety of contractors.

Construction began on the first sections of the F4—Western Freeway in the late 1960s. By early 1974, 23.5 km between Emu Plains and Prospect had been completed and opened to traffic. But these were relatively straightforward sections to construct, passing through what were then still largely rural areas.

The first 5 km section from Regentville to Emu Plains (including a new bridge on the Nepean River) was opened in October 1971. The 14.5 km section from Eastern Creek to Regentville was opened in December 1972 and the 4 km section from Prospect to Eastern Creek was completed in April 1974.

In 1971, construction began on the eastern end of the freeway, which will run parallel to busy Parramatta Road, from Concord to Parramatta and then parallel to the Great Western Highway westward to Prospect. This additional freeway section will help relieve congestion by providing a separate route (and therefore faster journey times) for non-local road users and by allowing easier access for local commercial and residential traffic.

**Looking east towards Homebush: the F4 is one of the major road developments in the State.**

The first stage of construction on the eastern end was between Saleyards Creek, Homebush and James Ruse Drive (previously Berry Street), Granville. Work has continued on other sections since that time from mid-1977 to the end of 1978, to allow a concentration of funds and activity on other high priority projects in the Sydney region. Of these projects, the major task was to construct the Bondi Junction By-pass and to co-ordinate its opening with the completion of the Eastern Suburbs Railway.

The road pavement on the new F4 sections will be of continuously reinforced concrete. Increases in the size and volume of heavy vehicles combined with improved techniques in concrete road construction and the higher relative price of bitumen compared to cement have made concrete road construction a more economical proposition. Continuous reinforcing provides a more durable road surface and eliminates the regular transverse joints with the associated thudding characteristics of older concrete roads.

A texture surface finish on the freeway pavement will provide better tyre grip which will improve safety. In wet weather the risk of aquaplaning will be reduced







because of the improved run-off of rain-water from the road surface.

The 12 km length between Concord and Mays Hill is being developed in four sections.

*Section 1: Young Street, Concord to Melton Street, Auburn*

This 5.8 km section of the F4 was officially opened on 16 December 1982. Entry and exit points have been provided at Young Street/Sydney Street, North Strathfield; Silverwater Road, Silverwater; and Melton Street, Auburn. The Melton Street entry and exit are temporary and will be eliminated when Section 2 of the freeway is complete.

At North Strathfield, the freeway crosses Queen Street, the Main Northern Railway Line, Railway Street and George Street on a viaduct 366 m long and 20.5 m wide. The viaduct carries twin two-lane carriageways, with shoulders 1.95 m wide and comprises 12 spans of precast, prestressed concrete girders.

Bridges have been provided to carry the freeway over Underwood Road, Homebush; King Avenue, Lidcombe; and Hill Road, Lidcombe.

Particularly interesting is the design of the pedestrian overbridge at Pomeroy

Street, Homebush. It is a continuous two-span, cable-stayed, steel box girder bridge, 67.6 m long with a 30 metre high support tower. The bridge is the first of its type in New South Wales.

In contrast, there is a dramatically styled concrete footbridge at Melton Street, Auburn.

*Section 2: Melton Street, Auburn to James Ruse Drive, Granville*

The main feature of this 2.1 km section is the bridge over Duck River at Auburn. The 300.2 m long bridge consists of nine spans of precast, post-tensioned segmental girders.

Bridges will carry the freeway over Deniehy and Wentworth Streets, Granville, and an overbridge will carry Stubbs Street, Auburn over the freeway.

When this section is complete and open to traffic late in 1984, access will be available from James Ruse Drive and Silverwater Road.

*Section 3: James Ruse Drive, Granville to Church Street, Harris Park*

This 1.5 km section will be in viaduct for its full length. The design of the viaduct includes the crossing of the quadruplicated Western Railway Line at Harris Park.

Construction of this section will commence in mid-1983.

*Section 4: Church Street, Parramatta to Great Western Highway, Mays Hill*

Opened on 16 December 1982, this new section enables traffic to travel directly between Parramatta Road, at its junction with Woodville Road and the Great Western Highway, near Frances Street, Mays Hill. The new freeway length has reduced the congestion occurring along the previous route, which included two right-angle turns and a number of intersections in close proximity.

Construction of this 3 km section began in 1979. Heavy earthworkings in shale were involved during construction.

Crossings over the freeway are provided at Pitt and Coleman Streets, Mays Hill while Burnett Street, Merrylands passes under the freeway. A pedestrian bridge has been constructed at Franklin Street, Mays Hill and subways have been provided for pedestrians at Fox Street, Granville and Peggy Street, Mays Hill.

Access is available at Church Street, Parramatta and at the Great Western Highway, Mays Hill. In addition, eastbound traffic can enter at Burnett Street and westbound traffic can leave the freeway at Burnett and Coleman Streets.



**The cable-stayed steel box girder bridge at Pomeroy Street, Homebush is the first of its type in New South Wales.**

## **F4—WESTERN FREEWAY TRAFFIC ARRANGEMENTS**

### **Concord to Silverwater Section**

At the eastern end, westbound traffic wishing to join the freeway at Concord should turn right out of Parramatta Road into Young Street and then turn left onto the freeway. Traffic wishing to join the freeway from Concord Road should proceed south to Parramatta Road, turn right at the traffic signals, turn right again into Young Street and thence onto the F4.

Eastbound traffic on Parramatta Road wishing to join the freeway will be able to turn left at Young Street.

Traffic leaving the freeway at Concord will exit via a ramp leading into Sydney Street. There will be no right turn into Young Street, as Young Street is already one-way for northbound vehicles only.

Roadusers heading to the northern suburbs should turn left from Sydney Street into Concord Road. City-bound traffic should turn right into Concord Road (which is one-way southbound between Sydney Street and Parramatta Road) and then turn left into Parramatta Road.

At the western (Silverwater) end of this section of the F4, eastbound traffic can join the freeway by turning left out of Parramatta Road into Melton Street and then right from Melton Street onto the

freeway. Alternatively, traffic can turn left from Parramatta Road into Silverwater Road and then turn right out of Silverwater Road at the new traffic signals, installed near Deakin Street, and onto the freeway entry ramp. Traffic travelling south in Silverwater Road and wishing to join the freeway will, of course, also use this on-loading ramp.

Traffic leaving this section of the F4 can exit to Parramatta Road either via Melton Street or via Silverwater Road.

New traffic signals have been installed at the junction of the freeway off-loading ramp and Silverwater Road (opposite Adderley Street) and traffic will be able to turn north or south into Silverwater Road.

It should be noted that westbound traffic in Parramatta Road cannot turn right into Melton Street but can turn right into Silverwater Road.

The freeway connection via Melton Street is temporary only and will be discontinued when the freeway extension westward to James Ruse Drive, Granville is completed in 1984.

### **Parramatta to Mays Hill Section**

The traffic signals at the junction of Parramatta Road and Woodville Road have

## **F4 OPENING CEREMONY**

On Thursday, 16 December 1982 the Premier of New South Wales, the Hon. Neville Wran, officially opened two new sections of the F4—Western Freeway.

These were the 5.8 km section from Young Street, Concord to Melton Street, Auburn, and the 3 km section between Church Street, Parramatta and the Great Western Highway near Frances Street, Mays Hill. Total construction cost was around \$47 million.

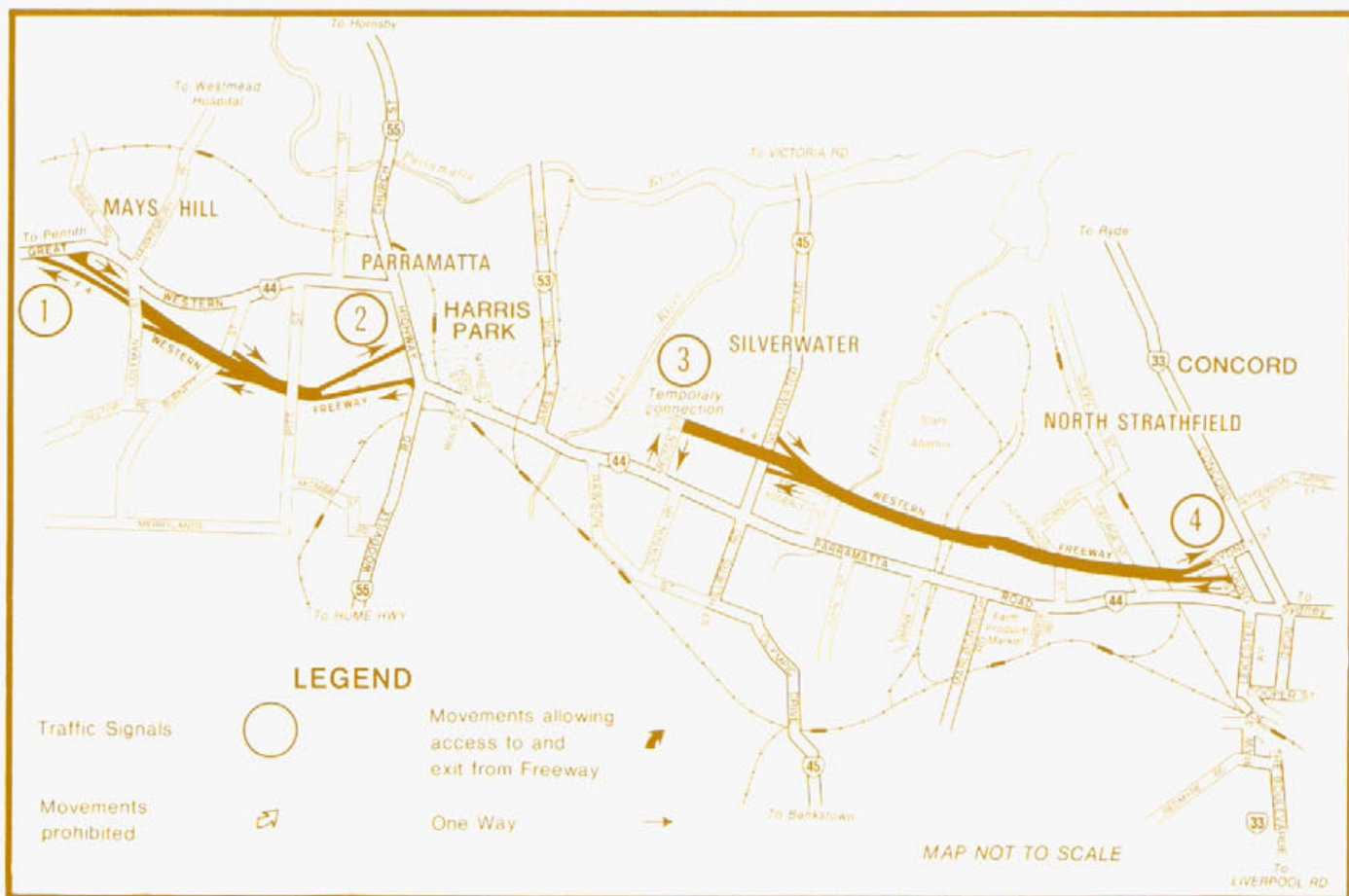
The opening ceremony took place on the eastern end of the Concord to Silverwater section of the freeway. After the playing of "Advance Australia Fair", the Commissioner for Main Roads, Mr. Bruce Loder, opened the proceedings. An address was then given by Mr. P. J. O'Neill, Member for the State Electorate of Burwood, who introduced the Hon. Paul Whelan, LL.B., M.P., Minister for Consumer Affairs and Minister for Roads. Mr. Whelan introduced the Hon. Neville Wran, Q.C., M.P., Premier of New South Wales, who, following his address, cut the ribbon and unveiled the memorial plaque.

Once the formal proceedings were concluded, the official party took part in a motorcade which followed the route of the new sections of freeway. They later joined other guests at the Wentworthville Leagues Club for refreshments. ●



**Between Hill Road and King Avenue at Lidcombe.**





been adjusted to provide access onto the freeway on-loading ramp from Parramatta Road and from Woodville Road. However, southbound traffic in Church Street will not be able to turn right onto the freeway at this junction.

Eastbound traffic will leave this freeway section via an off-loading ramp which junctions with Church Street, near Meehan Street. Traffic signals at this junction will allow right and left turn movements from the freeway into Church Street.

At the western (Mays Hill) end of this section, traffic can leave the freeway via an off-loading ramp leading to Coleman Street, where either right or left turns can be made. Freeway traffic wishing to proceed further west should continue on, to join the Great Western Highway in the vicinity of Frances Street.

Eastbound traffic on the Great Western Highway wishing to join this freeway section will turn right at the new traffic signals installed at Mays Hill. Westbound traffic on the highway will simply turn left onto the on-loading ramp. Traffic signals at the junctions of the Great Western Highway with Hawkesbury Road and Bridge Road will allow traffic to turn right into the highway and then left onto the freeway on-loading ramp. ●



**Sydney's Western Region  
Road Programme**

In December 1980, the State Government announced the adoption of its Western Region Transport Improvement Programme. The programme aims at providing Sydney's western region with an integrated transport system, involving bus, rail and road systems.

The Department of Main Roads has developed a five-year programme to implement the roadworks segment of the Transport Improvement Programme. This involves 41 projects to be carried out between 1982/83 and 1986/87 at a cost of \$115 million.

The programme will provide the Western Region with a fully functional arterial road system. The community will benefit in a variety of ways through:

- reduced travelling times and lower transport costs;
- improved safety and fewer road accidents;
- better communications for social and recreational activities; and,
- accelerated commercial development of the Western Region with increased local employment.

Substantial financial assistance will be provided where the roadworks are on roads normally funded by local councils. No council will be required to contribute more than 50% of the cost of an approved work on its local road system.

These major works, already under construction, have been identified by the Department as having first priority:

- the extension of the western arc of the Parramatta By-pass from Old Windsor Road to the Great Western Highway at Wentworthville (Project No. 15);
- the further development of a continuous four-lane route from the Great Western Highway at Wentworthville to the Hume Highway at Liverpool (Project No. 16).

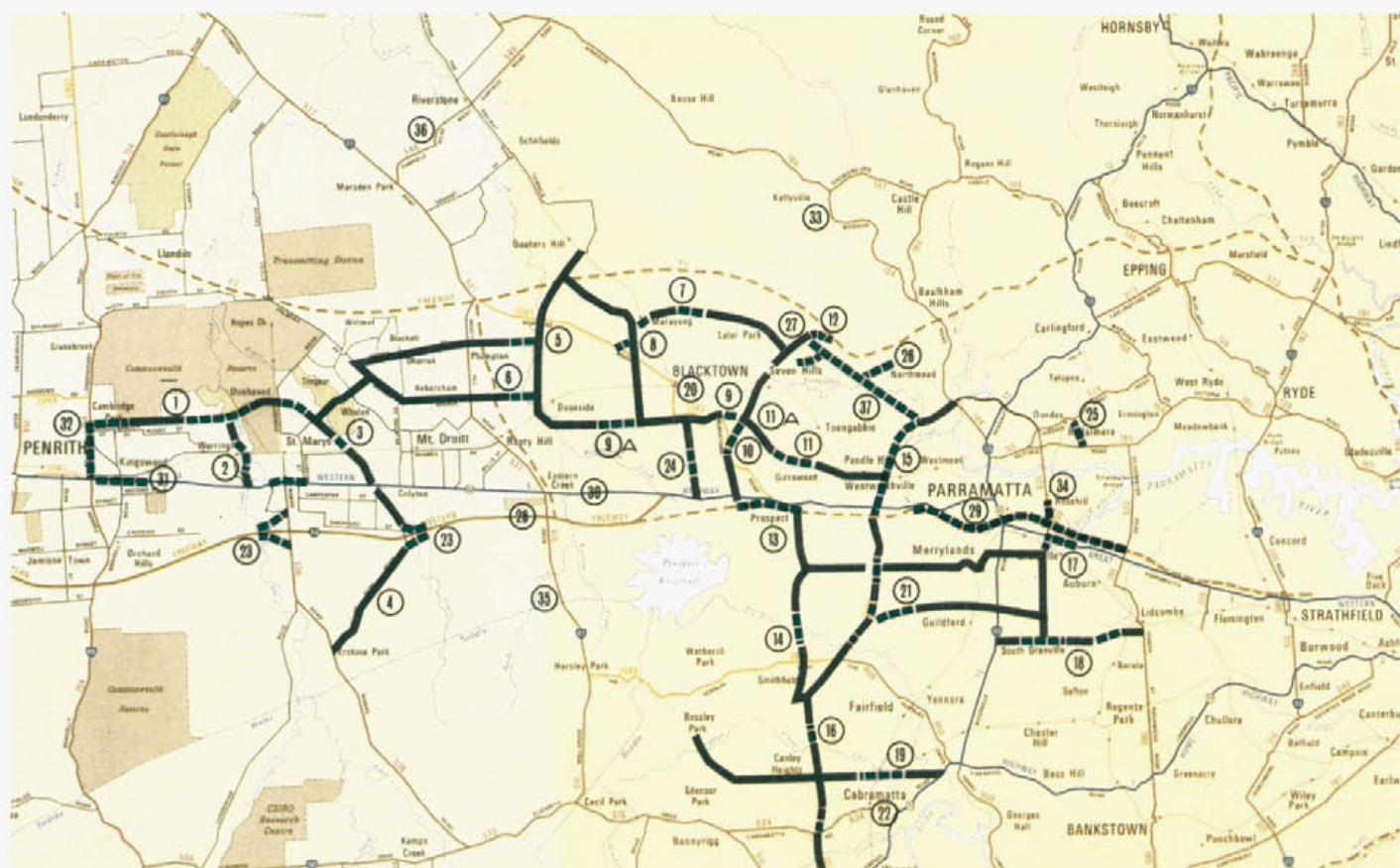
The full programme for roadworks in Sydney's Western Region as set out below can be located by project number on the accompanying map.

- 1 Completion of Dunheved Road, from Richmond Road, Cambridge Park to Boronia Road, North St. Marys. This project forms part of an east-west link between Penrith

- and St. Marys, north of the railway line.
- 2 Connection of Parkes Avenue, Werrington to Dunheved Road, Dunheved—and the construction of a new bridge over the railway line at Werrington, including approach roads to link Princess Street and Werrington Road. This work is well in hand by Council and the State Rail Authority.
- 3 Construction of a new railway overbridge and road connection to link Boronia Road, North St. Marys and Melbourne Street, Oxley Park.
- 4 Provision of an improved intersection of the Great Western Highway with Hewitt Street—Roper Road, south of the Highway, and Melbourne Street (relocated slightly to the east) at Oxley Park, north of the Highway, as well as upgrading Roper Road and Erskine Park Road.
- 5 Connection of Lamb Street, Plumpton, to Knox Road, Doonside, including a new bridge across Eastern Creek.
- 6 Connection of Woodstock Avenue, Rooty Hill, to Knox Road, Doonside, including a new bridge across Eastern Creek.
- 7 Construction of a new railway underpass at Marayong, with direct connection to Bowmans Road (to the east) and construction of a new road link to connect Bowmans Road with Vardys Road, Kings Langley.
- 8 Realignment of Davis Road and Lyton Street, Blacktown, at their intersections with Richmond Road.
- 9 Completion of Bungarabee Road, Blacktown, from Panorama Parade to Blacktown Road near Leabons Lane, Seven Hills.
- 9A Construction of Bungarabee Road, Blacktown, from Patrick Street to Balmoral Street and Lancaster Street to Jennifer Avenue.
- 10 Construction of a new road to link Seven Hills Road (at Leabons Lane, Seven Hills) with Blacktown Road.
- 11 Connection of Lucretia Road, Blacktown, to Gilba Road, Girra-ween, including bridging of creek.

- 11A Construction of Lucretia Road between Comelia Road and Metella Road.
- 12 Construction of a new road, partly within the F2—Castlereagh Freeway corridor, to link Abbott Road, Seven Hills, to Junction Road, Winston Hills, including a new bridge across Toongabbee Creek.
- 13 Construction of a new road on the future route of the F4—Western Freeway to link Greystanes Road, Greystanes, to Church Lane, Prospect.
- 14 Construction of a new road to link Gipps Road, Greystanes, and Has-sall Street, Smithfield, including a new bridge over Prospect Creek.
- 15 Extension of the Parramatta By-pass to provide a six-lane divided carriageway from Old Windsor Road to the Great Western Highway at Wentworthville.
- 16 Completion of a continuous four-lane route from the Great Western Highway at Wentworthville to the Hume Highway at Liverpool (generally along the route of Jersey Road, South Wentworthville; Betts Road, Merrylands West; Warren Road, Woodpark; Smithfield Road, Smithfield; Palmerston Road, Fairfield West; Cambridge Street, Can-ley Heights; and Joseph Street and Orange Grove Road, Cabramatta West).
- 17 Construction of a new railway over-bridge at Clyde to connect Berry Street to William and Clyde Streets, to alleviate congestion and accidents at the existing Bold Street overbridge.
- 18 Increase the capacity of the route via Rawson Road, Wellington Road and Vaughan Street at Auburn by improvements to the junctions of this route with Ferndell Street and Clyde Street, Granville; and with Park Road, Auburn.
- 19 Development of a new east-west route, possibly on Canley Vale Road and along Caroola Street and Lansdowne Road to the Hume Highway at Lansvale. This involves two new railway overbridges.
- 20 Development of an inner-centre by-pass of Blacktown by the construc-tion of a new road to link Roma





- 21 Development of a route between the Smithfield Industrial Area and Guildford Railway Station by extending Long Street, Smithfield to McCreddie Road, Guildford.
- 22 Construction of a new bridge to carry The Horsley Drive over the railway line and River Avenue at Carramar.
- 23 Construction of ramps at the bridge which carries Mamre Road over the F4—Western Freeway at St. Marys, to provide entry to the freeway for westbound traffic and exit from the freeway to Mamre Road for eastbound traffic. Construction of ramps at the bridge which carries Roper Road over the F4—Western Freeway at Colyton to provide entry to the freeway for eastbound traffic and exit from the freeway to Roper Road for westbound traffic.
- 24 Construction of Flushcombe Road between Julie Street and Lancelot Street, Blacktown.
- 25 Construction of a bridge over Subiaco Creek on Park Road, Dundas.
- 26 Construction of a bridge over Toongabbee Creek on Oakes Road, Old Toongabbee.
- 27 Construction of a bridge over Toongabbee Creek on Powers Road, Seven Hills.
- 28 Strengthening of the pavement of the F4—Western Freeway between Wallgrove Road, Eastern Creek and Russell Street, Emu Plains.
- 29
  - Construction of a 2.1 km section of the F4—Western Freeway between Melton Street, Auburn and James Ruse Drive, Granville;
  - Construction of a 1.5 km section of the F4—Western Freeway between James Ruse Drive, Granville and Church Street, Harris Park; and
  - Construction of a 3 km section of the F4—Western Freeway between Church Street, Harris Park and the Great Western Highway, Mays Hill.
- 30 Reconstruction of a section of damaged pavement on the Great Western Highway at Eastern Creek.
- 31 Reconstruction and widening of the Great Western Highway at Granville, St. Marys and Kingswood.
- 32 Construction of divided carriageways on Richmond Road (Main Road 154) at Penrith and widening at Cambridge Park.
- 33 Reconstruction and widening of Windsor Road (Main Road 184) at Northmead, Castle Hill and Kellyville.
- 34 Elimination of railway level crossing on James Ruse Drive (Main Road 309), Granville by the provision of a bridge over the Clyde-Carlingford Line, with improved approach roads and reconstruction southwards to the junction with Parramatta Road.
- 35 Reconstruction of Wallgrove Road (Main Road 515) from Elizabeth Drive, Cecil Park to The Horsley Drive, Horsley Park, to improve alignment and grading between Elizabeth Drive and The Horsley Drive, Horsley Park.
- 36 Reconstruction of Garfield Road (Main Road 546) at Riverstone from Carlton Road to McCulloch Street.
- 37 Construction of bridges over Toongabbee Creek at Pyes Crossing and Johnstons Bridge on Old Windsor Road and extensive improvements southwards to connect with the Parramatta By-pass. These improvements will eliminate low-level crossings where a number of fatalities have occurred during flash floodings. ●



# NEW CROSSING OF MERIMBULA LAKE

Merimbula is situated on the Princes Highway 70 km from the Victorian border. The lake provides an attractive setting for holiday-makers and residents.

The Princes Highway was proclaimed in 1928 and today is one of the four main arterial highways radiating from Sydney. Since the railway does not extend along the coast south of Nowra, the Highway acts as the main feeder for traffic between the south coast and Sydney.

By 1940 the Princes Highway had been reconstructed and provided with a bituminous surface from Sydney to Batemans Bay. By 1950 the section to Moruya had been completed, and the full length to the Victorian border was finished in the mid 1960s.

The town of Merimbula, originally a cattle run, developed as a port in the 1850s. In 1868 a flour mill was established which brought much prosperity to the district. The old wharf, which still stands today, was built in 1901, and seven years later the old Merimbula Lake Bridge was erected.

This bridge is a single-lane five span timber beam structure with an overall length of 46.6 m. It is supported by closely spaced piers, making it difficult for small boats to negotiate. In 1955 a footway was attached to the northern side of the bridge at a cost of £1,298. Extensive

repairs were undertaken in 1968 at a cost of \$15,132 involving the replacement of girders, decking and resheeting.

After more than 70 years of service, and with the increase in traffic in the area, a decision was made to replace the original structure. A tender from McDougall-Ireland Pty. Ltd. for \$796,000 was accepted by the Department.

The new three-span 66 m long bridge has a two-lane carriageway width of 9.2 m between kerbs with footways on each side.

The superstructure has a cast-in-place reinforced concrete deck on precast prestressed concrete girders. Each girder is 22 m long and has a mass of 18 t. Each pier is supported on three 1 m diameter reinforced concrete piles socketed 2 m into mudstone approximately 7 m below the bed level of the lake. The abutments are an anchor beam type box construction in reinforced concrete.

There is provision for a 2.3 m clearance above mean high water ordinary spring tide. The clearance under the central span of the new bridge will always be at least 1 m greater than that provided by the old structure.

Construction of four-lane approaches to the new bridge was undertaken by the

Department's own work force. Work on the project started in 1979 when rock for

the new causeway was placed as a working area for the new bridge. Fill above the rock was obtained by widening the cuttings immediately north of the town. The final cost of the approaches is around \$900,000.

Relocation of water supply and sewerage lines was carried out by Bega Valley Shire Council, while the Illawarra County Council installed underground power and overhead lighting on the new bridge and its approaches.

On Friday, 3 December 1982, the Minister for Consumer Affairs and Minister for Roads, the Hon. Paul Whelan, officially opened the new bridge over Merimbula Lake. The proceedings were opened by Mr. Bruce Loder, Commissioner for Main Roads, and addresses were given by Councillor R. H. Taylor, President of the Bega Valley Shire, Mr. M. E. Sainsbury, M.P., Member for the Federal Electorate of Eden-Monaro, and Mr. J. E. Akister, M.P., Member for the State Electorate of Monaro.

The Hon. Paul Whelan declared the bridge open by cutting a ribbon and unveiling a commemorative plaque. ●

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**Old and new contrasted at Merimbula. The new 66m long structure is an important improvement for this major South Coast route.**

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# IN PRAISE OF A DOG'S LIFE

## The Australian Cattle Dog

Dogs played an important part in the early days of Australian settlement. The crops and livestock of the first settlers were often destroyed by kangaroos and dingoes, and dogs such as greyhounds and Scottish deerhounds were useful in keeping their numbers down.

When pastoralists began to move out from the land around Sydney to more fertile areas, there was a marked increase in cattle-raising. Beyond the cultivated land around settlers' homesteads, the country was an unfenced wilderness, where the cattle strayed as soon as the edible grasses and shrubs near the homesteads had been eaten. Dogs were needed to bring them home through the bush, and settlers began to search for a type that would be suitable for the work.

The dogs first tried were brought from England, and were of the old Smithfield breed known as the black bob-tail. But they proved to be not sufficiently active, and too heavy-set and thick-coated for the climate. A cross between the Smithfield and the dingo proved to be unsuccessful, as were later experiments with the Scottish collie, the Russian sheepdog and the bull terrier. Most of these crosses produced progeny that were severe biters, unsuitable for herding.

It was not until 1840 that a better result was obtained by Thomas Simpson Hall. A grazier from Dartbrook in the Upper Hunter, Hall knew that the need for good working dogs was imperative. He imported from Scotland a pair of smooth-haired blue merles (a cross between a Scottish collie and an Italian greyhound). They were good workers but barked and headed, so Hall crossed their progeny with the dingo, producing silent, tireless workers that became known as Hall's Heelers. These dogs were in much demand for station work and became indispensable to the owners of large cattle runs, where one dog could do the work of six men at mustering time and during long overland stock movements.



**The dog on the tucker box: arguably Australia's most famous canine.**

This dog is the greatest worker of cattle known, and its ability to carry out any task in a willing and tireless manner has proven it to be irreplaceable to man. Because it has the ability to adapt to working conditions of other countries, the cattle dog is now one of Australia's more unusual exports. It can be found in U.S.A., Canada, New Guinea, New Zealand, Switzerland, New Caledonia, Sweden, South Africa, the Netherlands and U.K.

On 14 August 1976, the Blue Heeler Bridge across Kindon Ponds between Muswellbrook and Scone was officially opened by the then Minister for Local Government and Planning, Mr. Harry Jensen. In 1979 a bronze plaque was placed there which reads:

*"This plaque presented by the Australian Cattle Dog Society of New South Wales commemorates Thomas S. Hall of Dartbrook who in 1840 in this area carried out his breeding experiments with the native dog, the dingo, and a pair of smooth coated blue merle collies. These dogs known as Hall's Heelers became the foundation of today's breed—The Australian Cattle Dog."*

### Dog on the Tucker Box

*"There's a track winding back  
To an old-fashioned shack,  
Along the road to Gundagai."*

These first few lines of a famous old-time song undoubtedly refer to the Hume Highway as it was in pioneer days. It was first known as the Great Southern Road, but was renamed the Hume Highway in 1928. The name was adopted as a tribute to Hamilton Hume who, with William Hovell, led the first exploration party overland to Port Phillip in Victoria. The route which he took is largely followed by the Highway today.

In the 1870s, Jack and Harry Bagust decided to make a pure breed of the dogs,



and to correct their faults. Aided by other enthusiasts, they put a Dalmatian cross through them to give them a love of guarding horses and personal property and to produce blue speckles in the coat instead of a mottled effect. Then a cross of black and tan kelpie was put through them to give them the instinct for heading-in livestock.

By 1890, careful breeding had eliminated dogs that did not possess all the required qualities. In 1902 Robert Kaleski and Alex Davis, who had also taken up breeding the Heelers, drew up standards for the cattle dog which were endorsed by the Cattle and Sheep Dog Club of Australia, the Kennel Club of Australia and the Kennel Club of New South Wales. The breed first became known as the Australian Heeler and then as the Australian Cattle Dog.

In 1980, the breed made an exclusive social register when it became the 125th breed of dog to be recognised by the American Kennel Club.

The Australian Cattle Dog is marked and coloured like no other. The face and ears are black or red, with a tan spot over each brown eye and a white stripe down the middle of the forehead. The body is a dark blue, evenly speckled with a lighter blue and with perhaps a black saddle or spot on the tail-butt. The tail and under part of the body are a lighter blue, the legs from feet to elbow and hock are red-speckled.

The town of Gundagai was laid out on an area of land which was originally a station of the same name. Early settlement was located on the flat northern bank of the Murrumbidgee River. In 1852, the river flooded this flat to a depth of about 5 metres, destroying the town and drowning 89 inhabitants. Consequently, settlement was transferred to higher ground overlooking each bank.

Gundagai is situated on an old bullock wagon and droving route. It became a

natural gathering place for teamsters, whose work and tribulations inspired Jack Moses to write "Nine Miles from Gundagai", verses that caught the imagination of the public.

On 28 November 1932, a monument was unveiled by the Prime Minister, J. A. Lyons, near Gundagai as a tribute to the pioneers. Today, most Australians know the story of the legendary Dog on the Tucker Box, the faithful kelpie-cross who is said to have died alongside his

master's food pack while awaiting his return.

The townsfolk of Gundagai staged a 50th Anniversary Festival last November to commemorate the erection of the famous statue. Many families brought their faithful pets along to join in the week-long celebrations. Gundagai dogs really had their day, as they competed in the "Best Tucker Box Pose" contest.

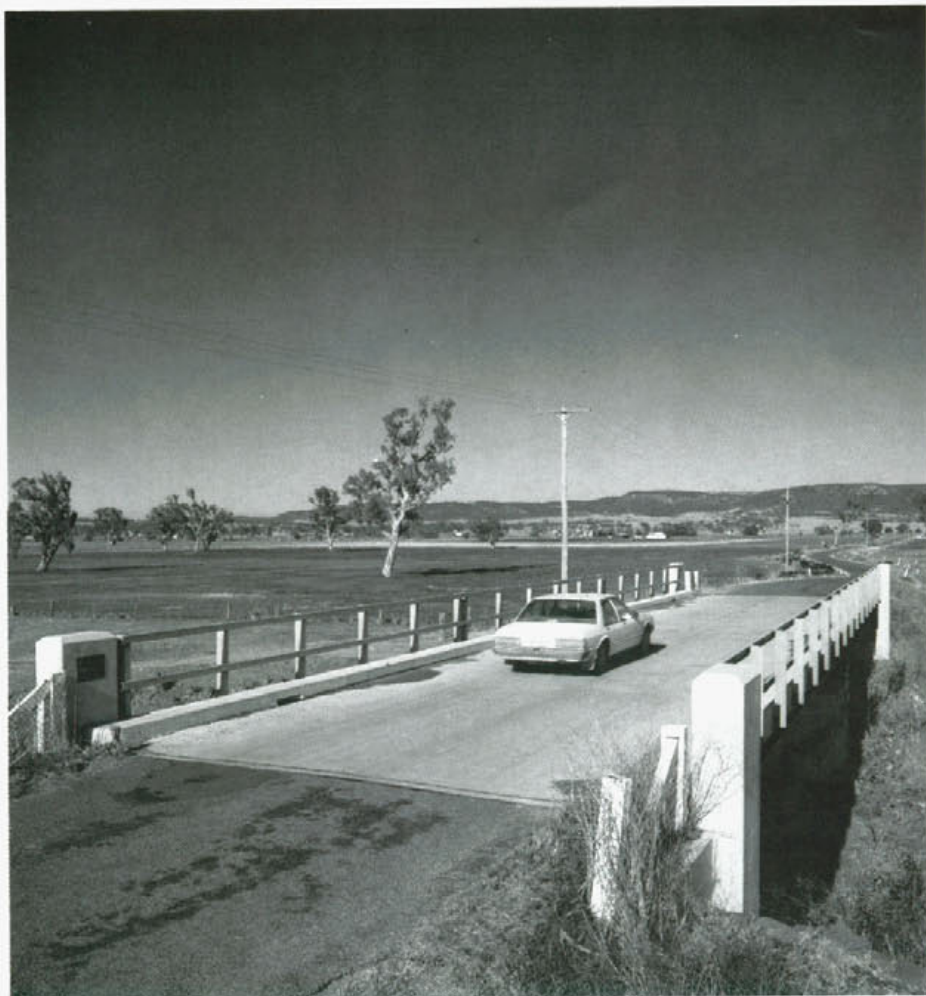
Pioneers of the Area will always be remembered by these words inscribed on the base of the monument:

*"Earth's self upholds this monument  
To conquerors who won her when  
Wooring was dangerous, and now  
Are gathered unto her again."* ●

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**The Blue Heeler bridge crosses Kindon Ponds near the home of the Australian Cattle Dog.**

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## NEW MINISTER FOR ROADS APPOINTED

**THE HON. R. F. JACKSON, M.P.**  
**Minister for Corrective Services**  
**and Minister for Roads**



On Tuesday, 1 February 1983, The Hon. R. F. Jackson, M.P., Minister for Corrective Services, was sworn in to the

additional portfolio of Minister for Roads. From this date, the Hon. P. Whelan, LL.B., M.P. was assigned the portfolios of Minister for Water Resources and Forestry.

Rex Frederick Jackson was born on 7 October 1928 at Wagga Wagga in southern New South Wales.

Up until the age of 13, he lived at Harefield, approximately 40 kilometres from Wagga Wagga, where his father worked as a fettler with the railways.

The family moved to Waterfall, near Sydney, in 1942 when his father was transferred to a new job.

Mr. Jackson was orphaned at 15. He began working for one of Sydney's largest printing firms of the time where he soon proved to be a proficient administrator.

On 9 July 1955, Mr. Jackson was elected to the N.S.W. Legislative Assembly as the

member for Bulli and on 13 February 1971 to the seat of Heathcote which he has held since.

Mr. Jackson became Minister for Youth and Community Services on 14 May 1976. He held this portfolio until 2 October 1981, when he was sworn in as Minister for Corrective Services.

His Parliamentary career has also encompassed serving on Select Committees inquiring into the Coal Industry and drought problems and relief.

Mr. Jackson is patron or office-bearer in over 100 organisations, including chairman of the Royal National Park Advisory Committee.

He and his wife, Irene, were married on 5 November 1949 and live at Helensburgh.

The Department welcomes Mr. Jackson to his new position and looks forward to a long and valuable relationship. ●

## BEATING THE OVERWEIGHT PROBLEM

A new portable electronic weighing device known as a dynamic axle load weigher, is currently under trial use by the Department of Main Roads. This weighing device permits the ready screening out of overloaded vehicles from those vehicles loaded within allowable limits. While the device has been extensively tested in the USA, this is the first application of a portable device of this nature in Australia.

### Setting up

The dynamic axle load weigher is transported in a box trailer drawn by a normal motor vehicle. On site the device can be set up by two Weight of Loads Officers and be operational within 10 minutes.

Site selection is important with preferred sites having good sight in both directions and the ability to park a number of heavy vehicles adjacent—a disused section or

road adjoining the main carriageway is ideal.

### Benefits

The dynamic axle load weigher can process more than 150 trucks per hour without delaying them for any appreciable time. This not only permits the Department to check a large number of trucks for compliance with axle load limits in a short period, but also provides minimum delay to those commercial vehicles complying with axle load limits.

The portability of the device and the speedy setting up enables the Department's Weight of Loads Inspectors to more readily check vehicles for overloading on main roads throughout New South Wales. This is of particular significance where fixed weighbridges are not conveniently located to checking operations. ●



**More than 150 trucks each hour can be screened by the dynamic axle load weigher.**



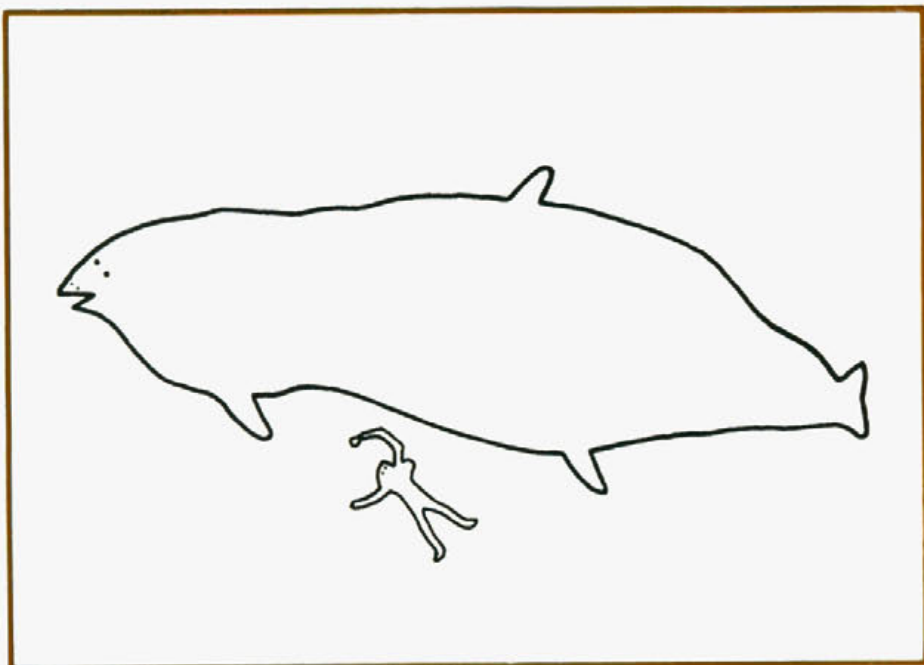
## ABORIGINAL ART TO BE PRESERVED

The Sydney district has at least 2000 Aboriginal rock carving sites, and many of these are located in bushland north of Mona Vale Road. Subjects for the carvings include mythological beings and spirits, mammals, birds, reptiles and fish.

It is thought that the carvings were made by first drawing or scratching an outline on the stone and then incising the design with a pointed hard stone tool—an extremely laborious job.

One such Aboriginal carving was originally in the path of the proposed extension of dual carriageways on Mona Vale Road east of Terrey Hills. However, knowing the value of the carving, the Department will now divert the roadway. The one kilometre long diversion will add about \$40,000 to the cost of the work, but the carving saved is invaluable. It is one of the largest in the Sydney district.

The subject (pictured below) is a whale, 10 metres long, and below it is a man wielding a club. The whale also appears to have a man's head in its mouth. One of the best examples of Aboriginal rock carving art, it will be preserved even more safely than before between the two carriageways of Mona Vale Road. ●



## WORK CONTINUES ON MONA VALE ROAD

Mona Vale Road (Main Road 162) forms part of State Route 33, a circumferential ring road joining Mona Vale to Blakehurst via Pymble, Ryde, Strathfield, Wiley Park and Hurstville.

As many Sydneysiders know, Mona Vale Road is a popular route, and especially so when travelling to and from the beaches of the northern peninsula. Its up-grading has meant a marked improvement in travelling conditions, particularly during the beachward and homeward peaks on any summer weekend.

Six lane construction of Mona Vale Road between Highlands Avenue, Pymble and Richmond Avenue, North St. Ives, was completed during the 1978-79 financial year. Dual carriageway from Richmond Avenue to Forest Way (Main Road 529), Terrey Hills, was opened to traffic during August 1980. Work has now been completed on the construction of dual carriageway from Forest Way to Cooyong Road at Terrey Hills. ●



## 100 YEAR OLD SURVEY MARK FOUND

During the reconstruction of this route, a survey party investigating the definition of road boundaries of Forest Way and Mona Vale Road made an interesting discovery.

At the first angle of Forest Way south of Mona Vale Road, the party located the widening boundary marks on the western side of the road. These were noted on Plan No. 293111 and referred to as "Old Rock Mark fd.". After the rock surface was cleared of debris, a very old survey mark (pictured) known as a drill hole and wings was found.

A copy of Plan of Portion 64 shows that the mark had its centenary in August 1982. According to the plan, the mark defines the western road boundary angle of Forest Way, the Parish boundaries between Narrabeen and Manly Cove, and the northern boundary of the "Sydney Population Reserve" at that time. ●



# PARRAMATTA'S OTHER ROAD

## A proposal for prisoners

A controversial suggestion was put forward by the Hon. J. R. Lee, M.L.A., Minister for Justice in the Bavin Government in February 1929, when the question of using prison labour on roadworks was discussed with the Main Roads Board.

The scheme was not to apply to criminals but rather to men such as those detained for non-payment of maintenance to their wives and whose families frequently had to be supported by the State.

The proposal was to allow prisoners to repay their debts by earning more than nine shillings a week gaol pay and to relieve overcrowding in the prisons. This was particularly true of Long Bay, where more than 300 short-sentence men had "nothing to do but knit socks".

Payment of about three pounds a week was envisaged, which was about half the basic wage. The money was to go to the men's wives. Lee suggested that the men work on roads which under ordinary circumstances would probably not be constructed for many years. The Prisons Department were to supply the necessary wardens to take charge of the prisoners when not working. An engineer was to oversee the actual work of construction.

## Controversy continued

Reports of similar instances of prisoners working on roads in the United States of

America were studied by the Board during its investigations. It was left to the Minister for Justice to initiate any further action aimed at implementing this increasingly contentious scheme.

It was almost inevitable that such a proposal would lend itself to parody by the press and before long lively headlines appeared, including one which read: *Back to the Days of 'Convict' Road Gangs—Work for Defaulting Hubbies*. On a more serious note another newspaper warned of strong opposition from Labor members, under pressure from the Unions and concluded that the probable political consequences of such a move made it too dangerous for consideration.

About a year after his original suggestion, Lee developed the idea of building a new 40 kilometre road around the foreshores of the Hawkesbury River and Cowan Creek from Brooklyn to Bobbin Head. Because of the difficulty in finding sufficient level ground for a camp, Lee purchased the two old destroyers *HMAS Swan* and *HMAS Parramatta* (which were waiting to be broken up) with the intention of converting them into floating camps. These were to accommodate 50 to 100 men in separate compartments.

The hulls were to be moored adjacent to the work and launches provided to take the men from ship to shore. The men

would be on an honour system. Any breach of regulations would bring an instant return to gaol. Even fishing and swimming would be allowed during off-duty hours.

The President of Ku-ring-gai Chase Trust, who resigned when the Trust first rejected the idea, claimed that the proposed road presented no engineering difficulties. "Not a penny need be spent except for explosives and labour. When it is completed the whole world could not show anything like it". The Board must have been rather annoyed at the later newspaper comment which said: "The prisoners would be better employed on roadworks than in loafing around the gaols. The roads constructed by the convicts in the old days were far better than those built these days."

Cabinet approved the idea and voted funds to put it into operation, but the United Labourers' Union protested about the introduction of prison labour in competition with regular road-workers. The whole scheme then lapsed and the determination of its proponents came to naught when the Bavin Government failed to gain re-election in November 1930. The only visual reminder that remained was the rusting hull of *HMAS Parramatta*, Australia's first destroyer, aground on a bank of the Hawkesbury River near Bar Point.

## Home at last

Yet the *HMAS Parramatta*, the first commissioned warship to serve in the Royal Australian Navy, has finally found a home. A memorial at Queens Wharf Park, Parramatta, now pays tribute to all three vessels which have held the name.

The memorial was unveiled on 13 June, 1981 by Admiral Sir Victor Smith of the RAN. Also at the ceremony were the Mayor of Parramatta, Alderman Stan Dickson and officials of the Australian Naval Historical Society. Parramatta Council joined forces with the society to design and construct the memorial, which aptly is on the banks of the Parramatta River. ●

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***HMAS Parramatta . . . now at rest on the banks of the Parramatta River.***

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# A MAJOR DEVIATION OF TRUNK ROAD 55 AROUND WINDAMERE DAM

During December 1982, a 15 km length of Trunk Road 55 from 22.5 to 37.5 km south of Mudgee was opened to traffic. This section of the route forms a deviation around the site of Windamere Dam, currently being constructed by the Water Resources Commission.

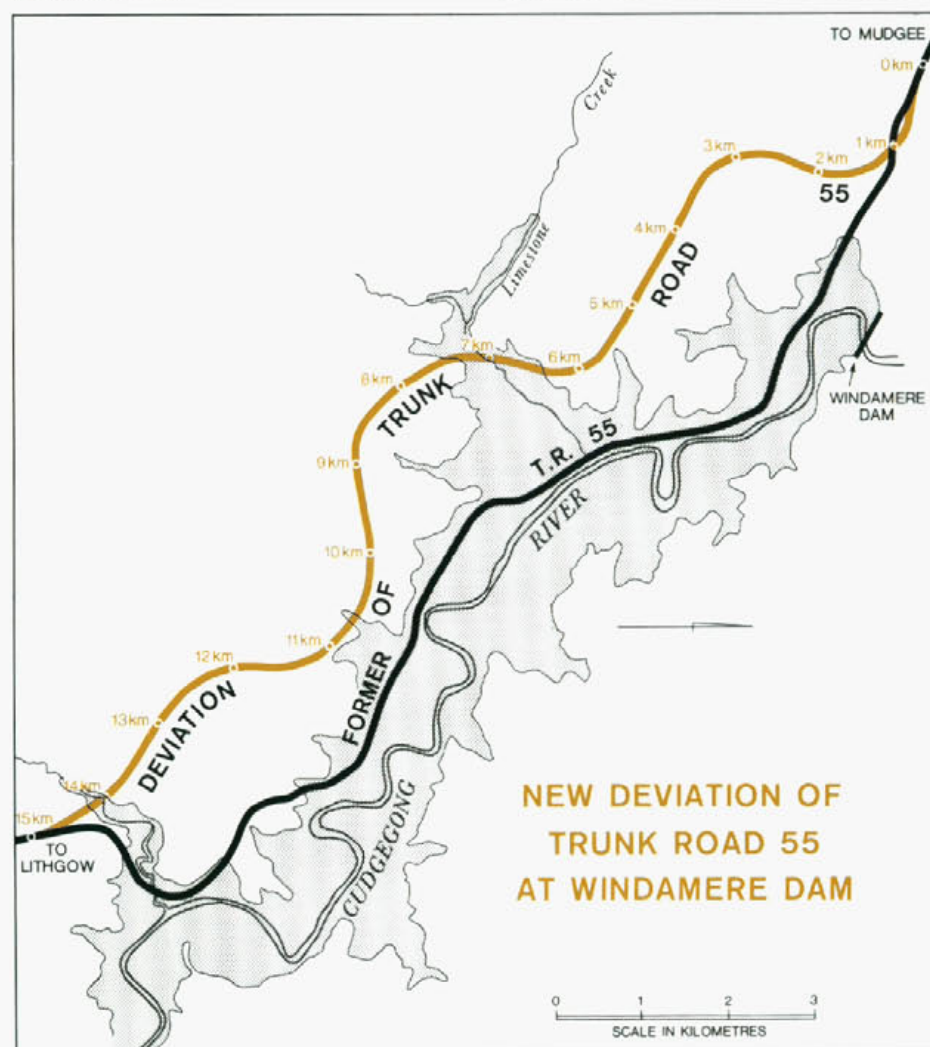
The dam will cross the Cudgegong River which has its source in the Great Dividing Range near Mt. Coricudgy. The river flows west to the Village of Cudgegong (on Trunk Road 55), then north-west to Mudgee and further to its confluence with the Macquarie River at the Burrendong Dam.

The countryside through which the river passes is mainly agricultural and pastoral. Mudgee, at the centre of the region, is becoming known as a fine grape-growing district.

Settlers arrived in the district from Bathurst in 1822, one year after Lawson's initial exploration. Gold was discovered at Lawsons Creek near Mudgee in the 1850s, and rich deposits were found in the 1860s near Home Rule and in 1870 at Gulgong. The only settlement to be affected by the construction of the dam is Cudgegong, which also grew during the gold rush period. At the time it was acquired by the Water Resources Commission, Cudgegong consisted of four houses, a church, hotel and store. St. James Church, built in 1863, is to be re-erected in nearby Rylstone.

## Windamere Dam Act

Assent was given to the Windamere Dam Act on 27 November 1970. The Act provides for the construction of a dam







across the Cudgegong River 22 km south of Mudgee to store a capacity of approximately 350 000 megalitres. The provision to relocate roads, where necessary, was also specified.

Water storage is required to provide regulated flow for the irrigation of about 9000 hectares in the river valley as well as to augment town water supplies.

The estimated cost as stated under the Act was \$12,000,000.

Land acquisition commenced in July 1973 and was completed within two years. In all, sixty buildings were removed, with 17 839 hectares of private land and 637 hectares of Crown Land being acquired. Acquisition costs exceeded \$4,000,000.

### Dam construction

The dam will comprise an earth and rock fill embankment 70 m high with a crest length of 850 m, containing some 1.7 million cubic metres of fill material.

An open unlined spillway will be located in a saddle formation on the former route of Trunk Road 55. The spillway will be capable of handling flood discharges of 415 000 megalitres per day. A concrete lined diversion tunnel, 3.5 m in diameter and 200 m long, will also be provided.

Construction of the dam by Abignano Pty. Ltd. is well under way. Storage is expected to commence in September 1983. All work is scheduled for completion by June 1984. The project's total cost is currently estimated at \$50,000,000.

### Relocation of Trunk Road 55

The dam project necessitated the relocation of a 15 km section of Trunk Road 55 which will eventually be inundated over its entire length. Design of the deviation was carried out by the Department of Main Roads in conjunction with the Design Branch of the then Water Conservation and Irrigation Commission.

Three routes were considered, varying in length from 15 to 41 kilometres. The shortest route was chosen. It generally traverses the hills to the west of the dam storage area, but crosses an arm of it at Limestone Creek. The new route is 500 m shorter than the old route, and includes 6.8 km of slow vehicle lanes.

**1. A cutting at 10.3 km; altogether some 1 721 900 m<sup>3</sup> of earthworks were involved in the work. 2. Limestone Creek is crossed by a fill designed with an impervious core. 3. The completed roadway was opened to traffic on 8 December 1982.**

Quantities of material used in the deviation include:

earthworks	1 721 900 m <sup>3</sup>
topsoil	115 000 m <sup>3</sup>
fencing	26.6 km
subsoil drains	14.9 km
sub-base	27 400 m <sup>3</sup>
base	34 700 m <sup>3</sup>
seal	132 950 m <sup>2</sup>
guardrail	12.8 km
concrete culverts	968 m
steel multi-plate culverts	1 555 m

### Design features

Pavement for the deviation generally consisted of a 100 mm thick sub-base, a 150 mm base and a two coat bitumen/two coat aggregate running surface. Paving gravels were predominantly granite although some talus material, mainly quartzite pebbles, was also used.

The largest fill on the work, at Limestone Creek, contains more than 500 000 m<sup>3</sup> of rock and is 28 metres high. The highest fill is 30 m and the deepest cut is 23 m.

Limestone Creek is crossed by a fill designed with an impervious core. Equalization of levels under normal flow conditions is achieved by using a single steel multi-plate culvert 2.4 m in diameter. An overflow channel has been cut through rock adjacent to the creek and the road crosses it on a 20 m long concrete plank bridge.

Eleven steel multi-plate culverts have been provided, ranging in diameter from 1.5 m to 6 m. The largest structure is an eight cell culvert 45.5 m long and 3 m in diameter, located at the southern end of the work at Cudgegong Creek. This replaces a timber structure on the former route which was being supported by Bailey bridging.

### Construction and finance

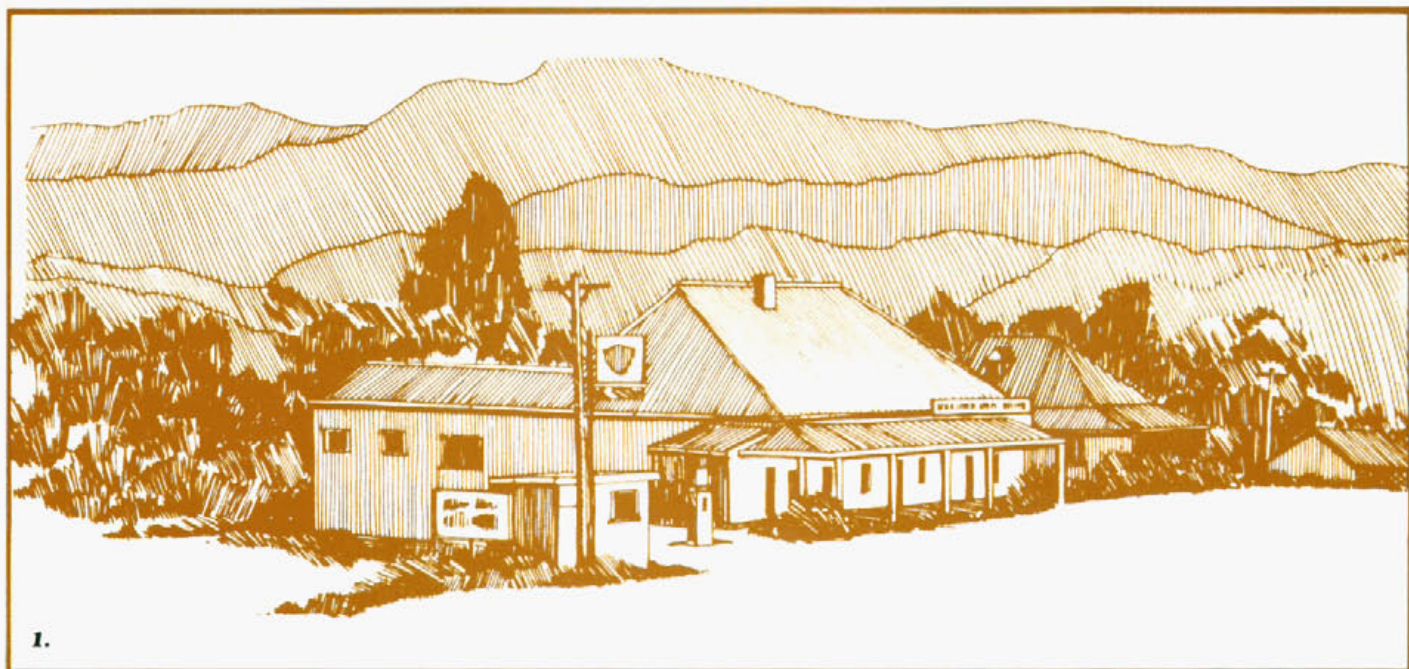
Construction of the deviation commenced in July 1974. The work was carried out in stages with either local Councils or contractors undertaking construction. Work by Councils was spread over a number of years, and that by the contractors over a matter of months.

Contractors spent approximately \$6,600,000 in 1982, which included the cost of hiring a large fleet of earthmoving equipment.

Soils testing was carried out by Water Resources Commission staff. Check testing was performed regularly by the Department.







The cost of the deviation is being jointly met by the Water Resources Commission and the Department. With the total cost in the vicinity of \$13,000,000, the Department's share will be just over \$3,000,000, a proportion agreed to after an assessment was made of the residual pavement life of the replaced section of road.

Opened to the public on 8 December 1982, this deviation represents a major improvement to the State's road network.

### Acknowledgment

The Department gratefully acknowledges the assistance of the Water Resources Commission for material made available for this article. ●



**1. The Cudgong Hotel: making way to quench another type of thirst. 2. The downstream face of the 3000mm multi-plate culverts at Cudgong Creek. 3. Limestone Creek embankment, looking towards Mudgee. A large fleet of earth-moving equipment was engaged for the work.**



## PROFILE OF CAR AVAILABILITY AND USE IN SYDNEY

Personal travel in modern society is dominated by the car. Its importance to all income and employment groups within society is demonstrated in this profile of car ownership and use in Sydney. The profile was prepared by Mr. G. R. Carr, the Department's Transport Economist, using various sources of data but mainly that from a travel survey of Sydney households carried out by the State Transport Study Group in 1981.

Figure 1 - HOUSEHOLD CAR AVAILABILITY BY HOUSEHOLD INCOME : SYDNEY 1978

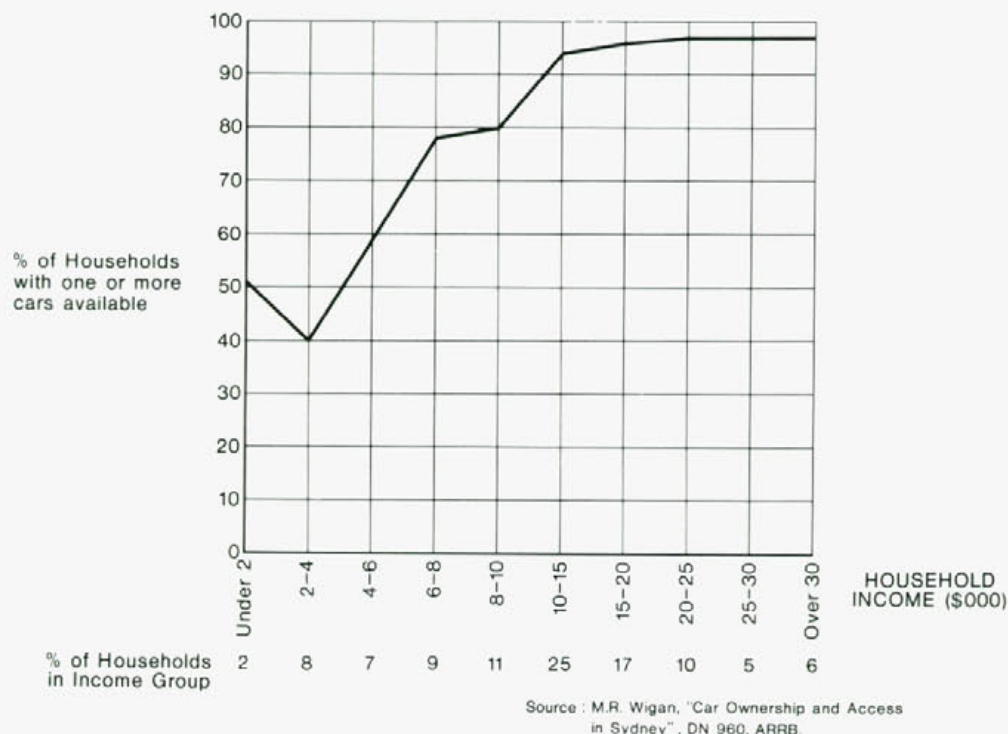
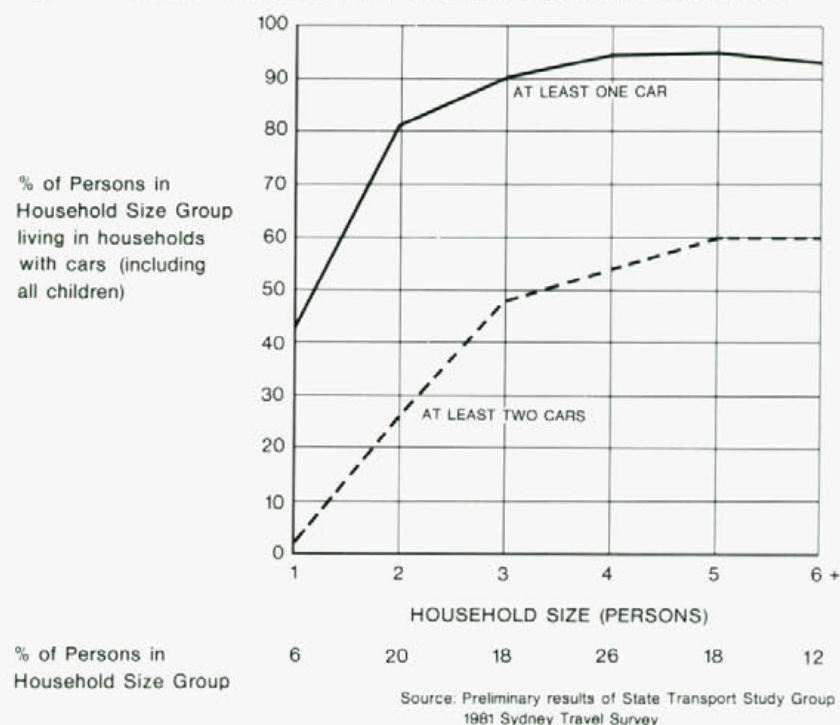


Figure 2 - CAR AVAILABILITY BY HOUSEHOLD SIZE: SYDNEY, 1981



Car availability patterns vary according to household composition and the individual needs and incomes of its members.

The distribution of the 80% with car households according to household income and household size is illustrated here.

The composition of Sydney's households with cars is such that 88% of persons live in households where there is at least one car available while 46% of persons live in multi-car households.

Car availability by household size is illustrated here.

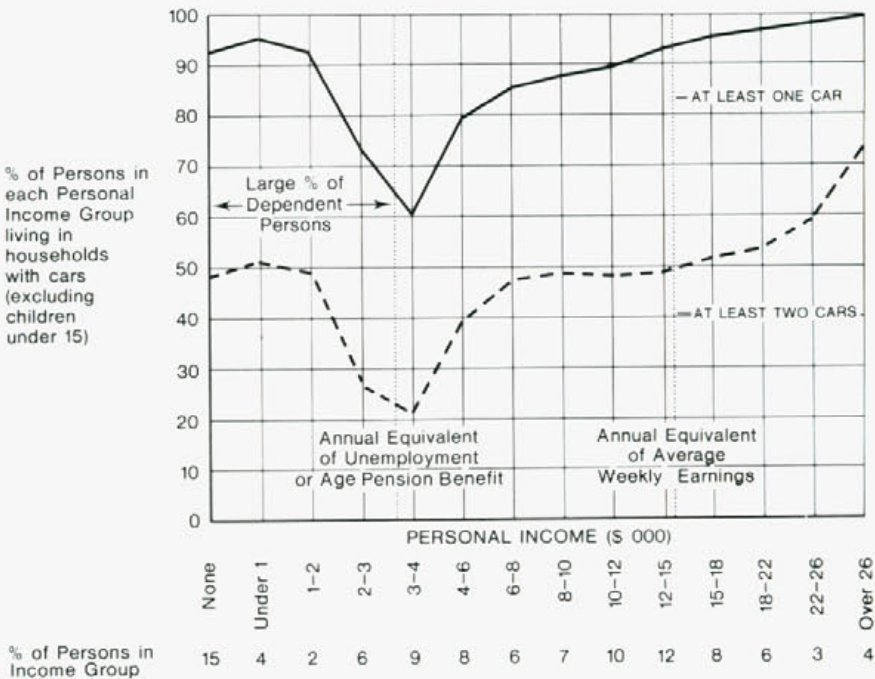


The availability of cars to persons with different personal incomes is illustrated here.

Persons with very low incomes, mainly dependent persons, have similar levels of access to cars as persons with high personal incomes.

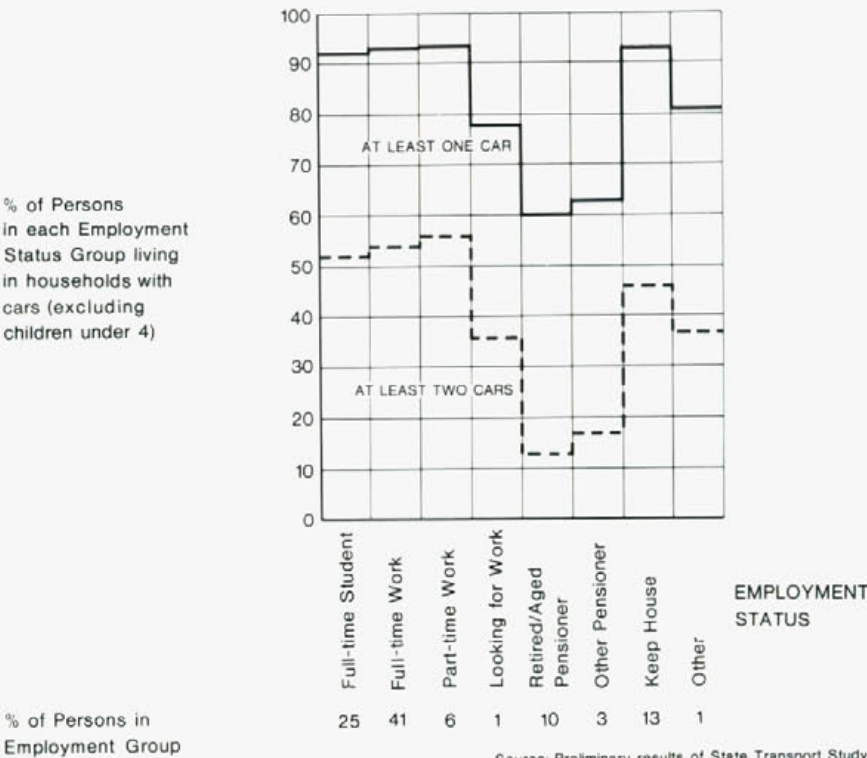
Otherwise, access to cars increases with personal income.

Figure 3 - CAR AVAILABILITY BY PERSONAL INCOME: SYDNEY 1981



Source: Preliminary results of State Transport Study Group 1981 Sydney Travel Survey.

Figure 4 - CAR AVAILABILITY BY EMPLOYMENT STATUS: SYDNEY 1981



Source: Preliminary results of State Transport Study Group 1981 Sydney Travel Study

Car availability varies by personal employment status as illustrated here.

93% of employed persons, students and persons who keep house, live in households which have one or more cars available.

78% of unemployed people live in households which have one or more cars available.

These figures contrast with 61% of retired persons and pensioners who live in households which have one or more cars available.



Figure 5 – PERSONAL CAR AVAILABILITY: SYDNEY, 1981

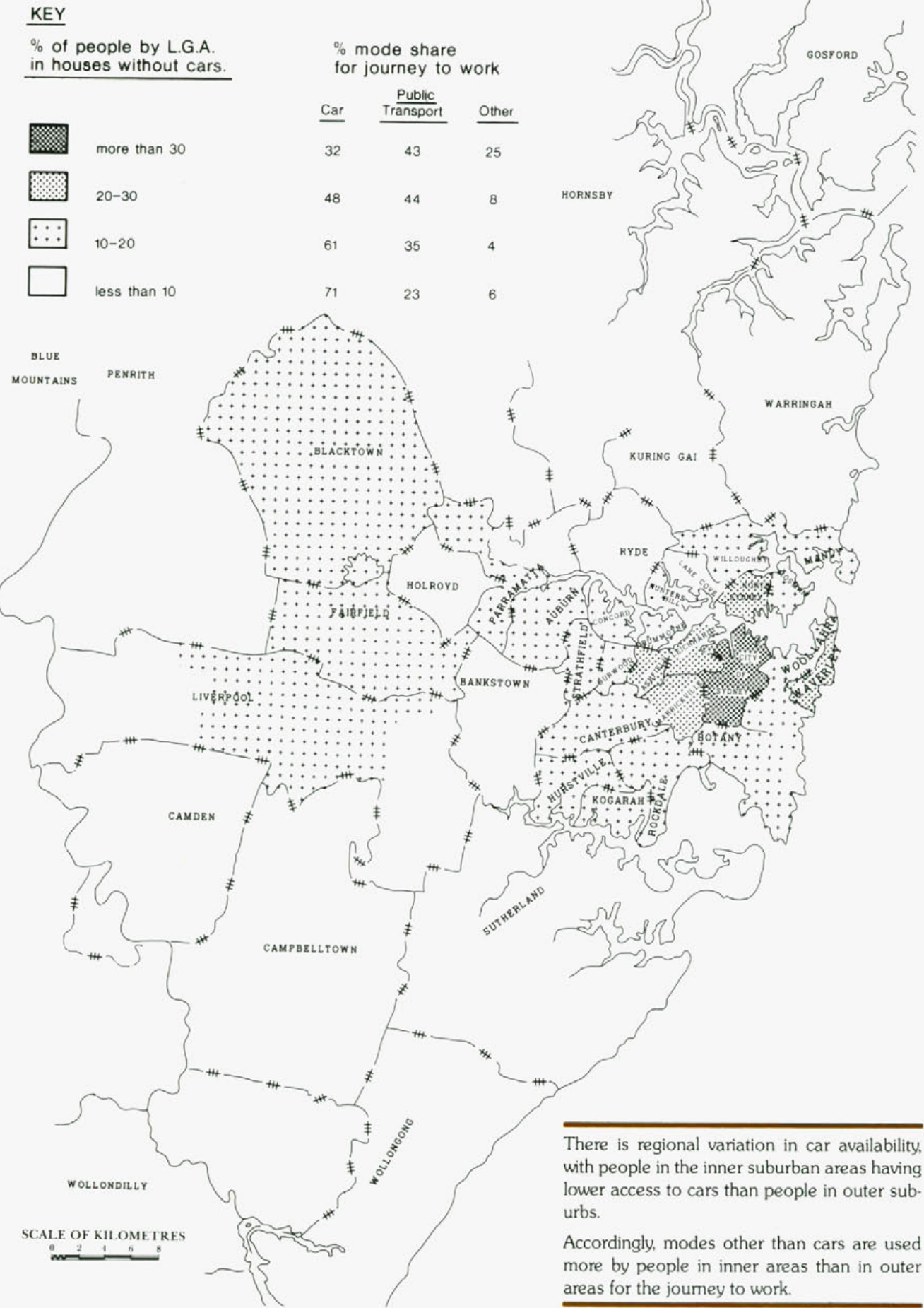




Figure 6 – AVERAGE TRIP DISTANCE BY PURPOSE AND REGION  
AIRLINE KILOMETRES, SYDNEY, WEEKDAYS, 1971

Source: SATS

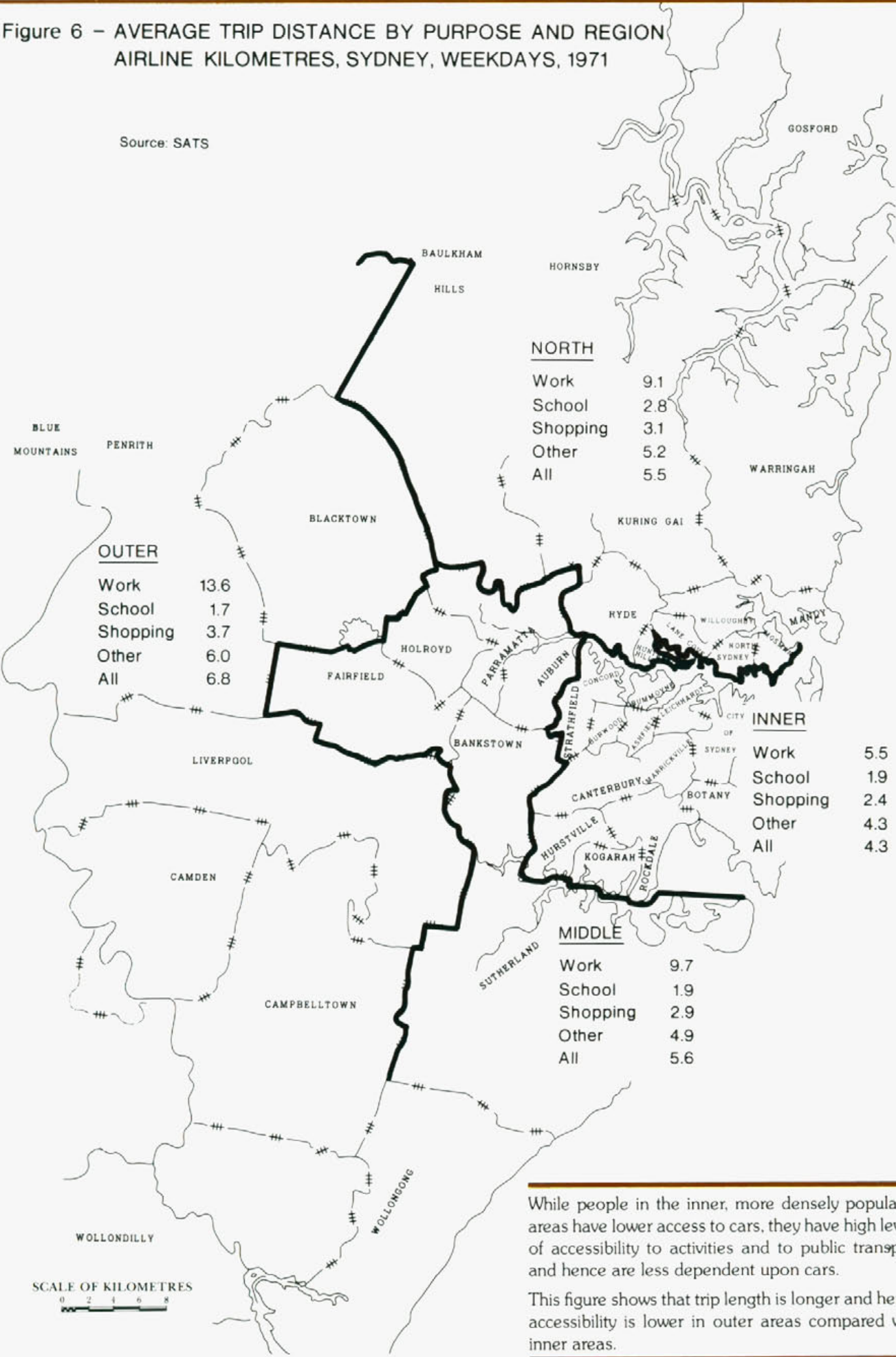
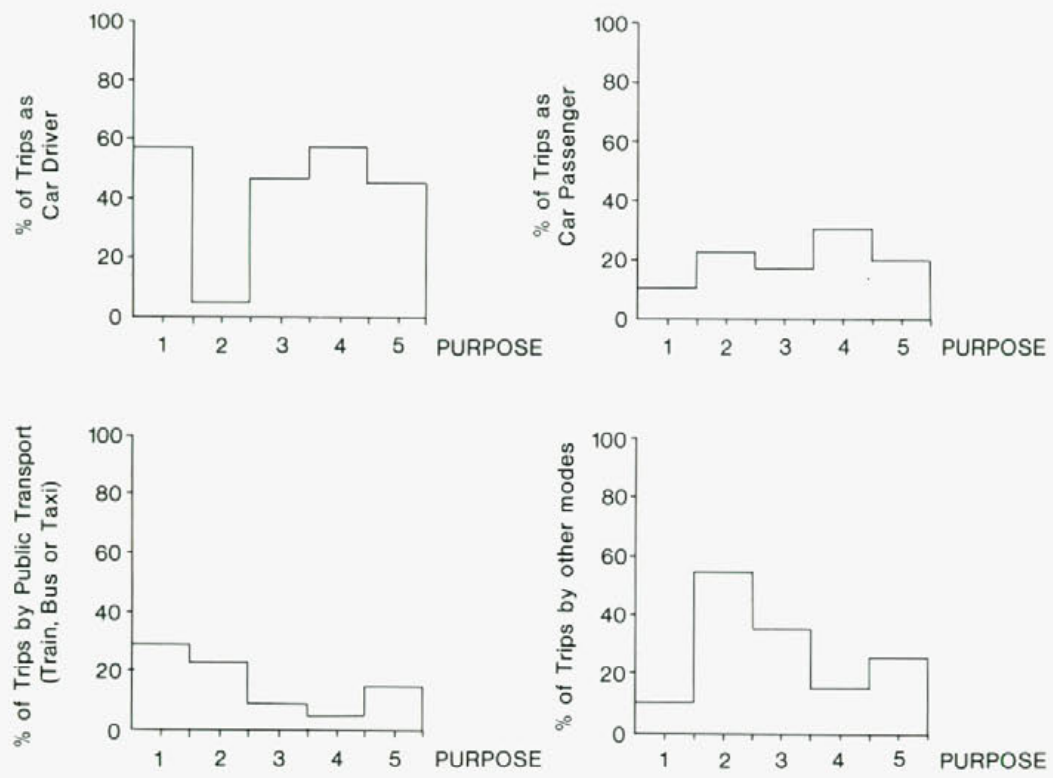
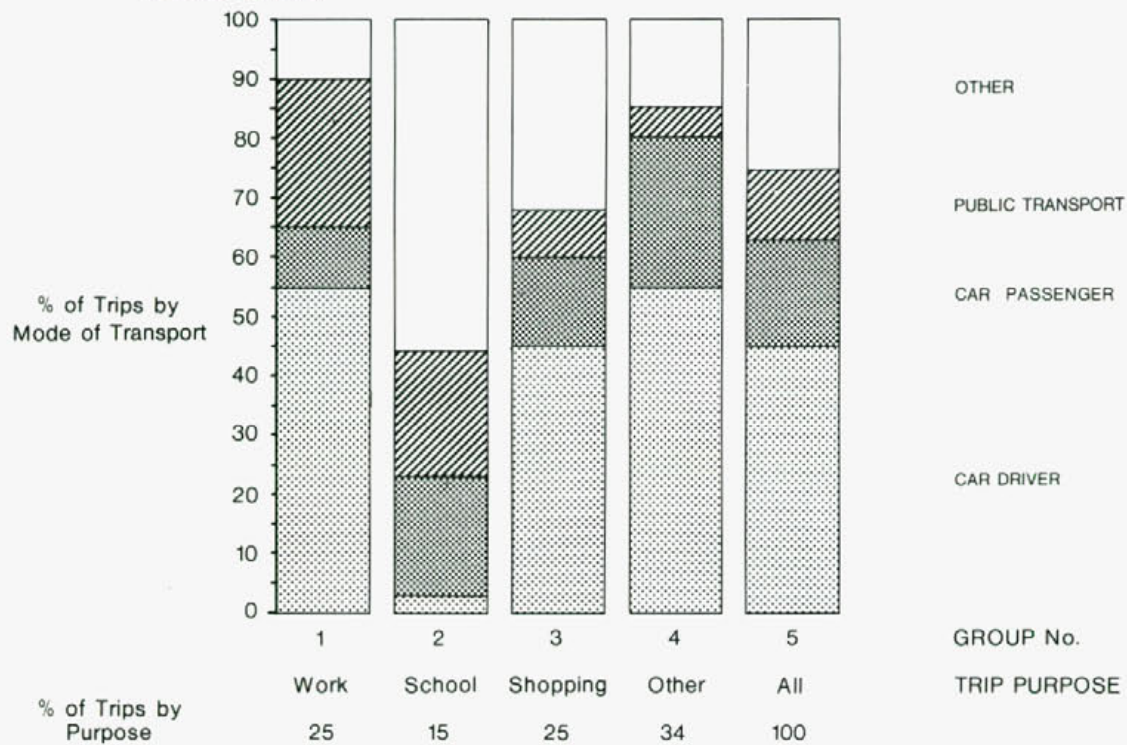




Figure 7 – PURPOSES OF TRIPS MADE BY CAR (AND OTHER MODES OF TRANSPORT):  
SYDNEY, 1981



Source: Preliminary results of State Transport Study Group 1981 Sydney Travel Survey

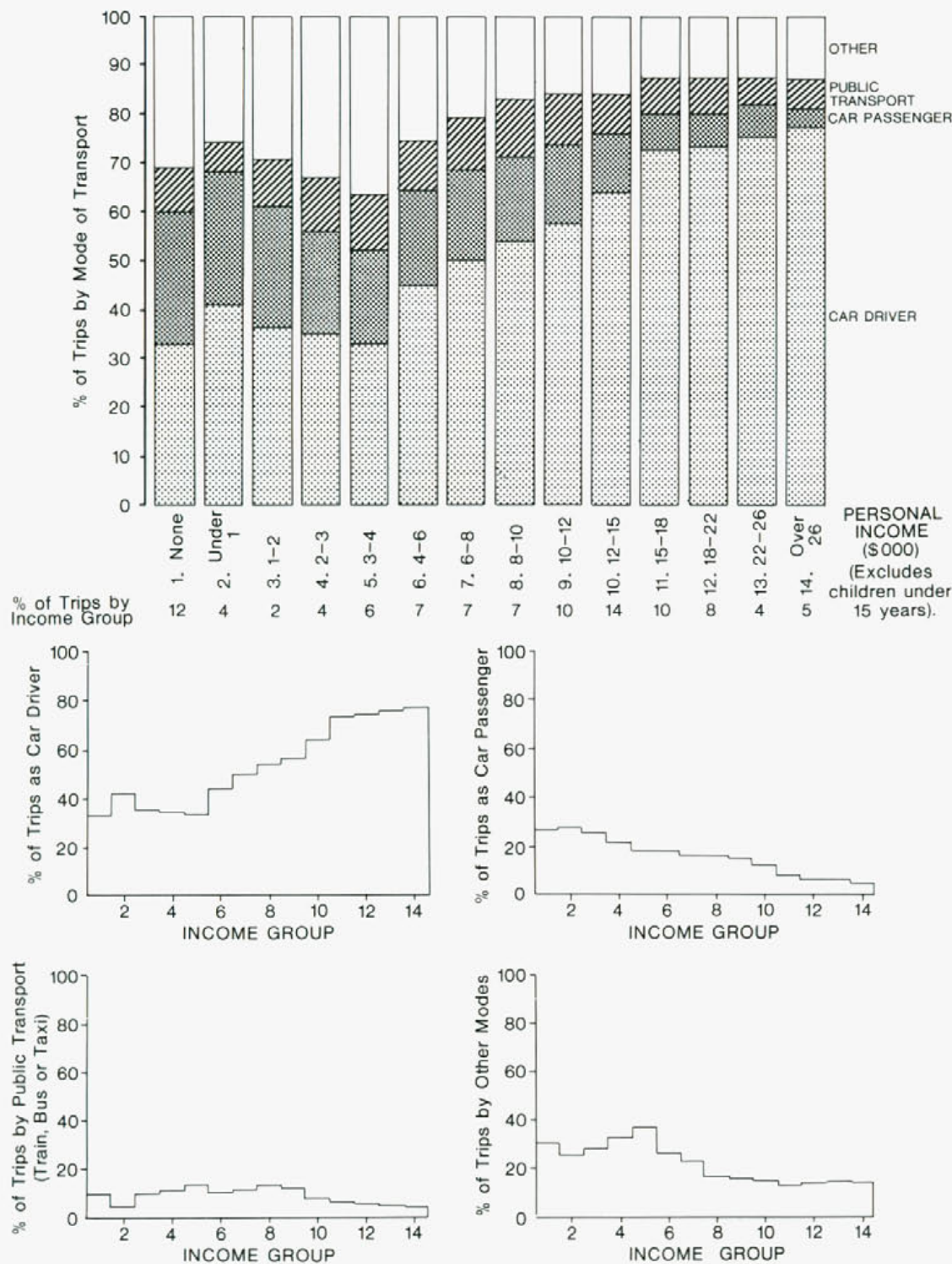
The car is used for 63% of trips made for all purposes.

It is used for 65% of work trips, 60% of shopping trips, 23% of school trips and 81% of trips for other purposes.

In contrast, public transport is used for only 12% of trips for all purposes, carrying 24% of work trips, 21% of school trips and 50% of trips for other purposes.



Figure 8 – INCOMES OF CAR (AND OTHER TRANSPORT SYSTEM) USERS: SYDNEY 1981



Source: Preliminary results of State Transport Study Group  
1981 Sydney Travel Survey.

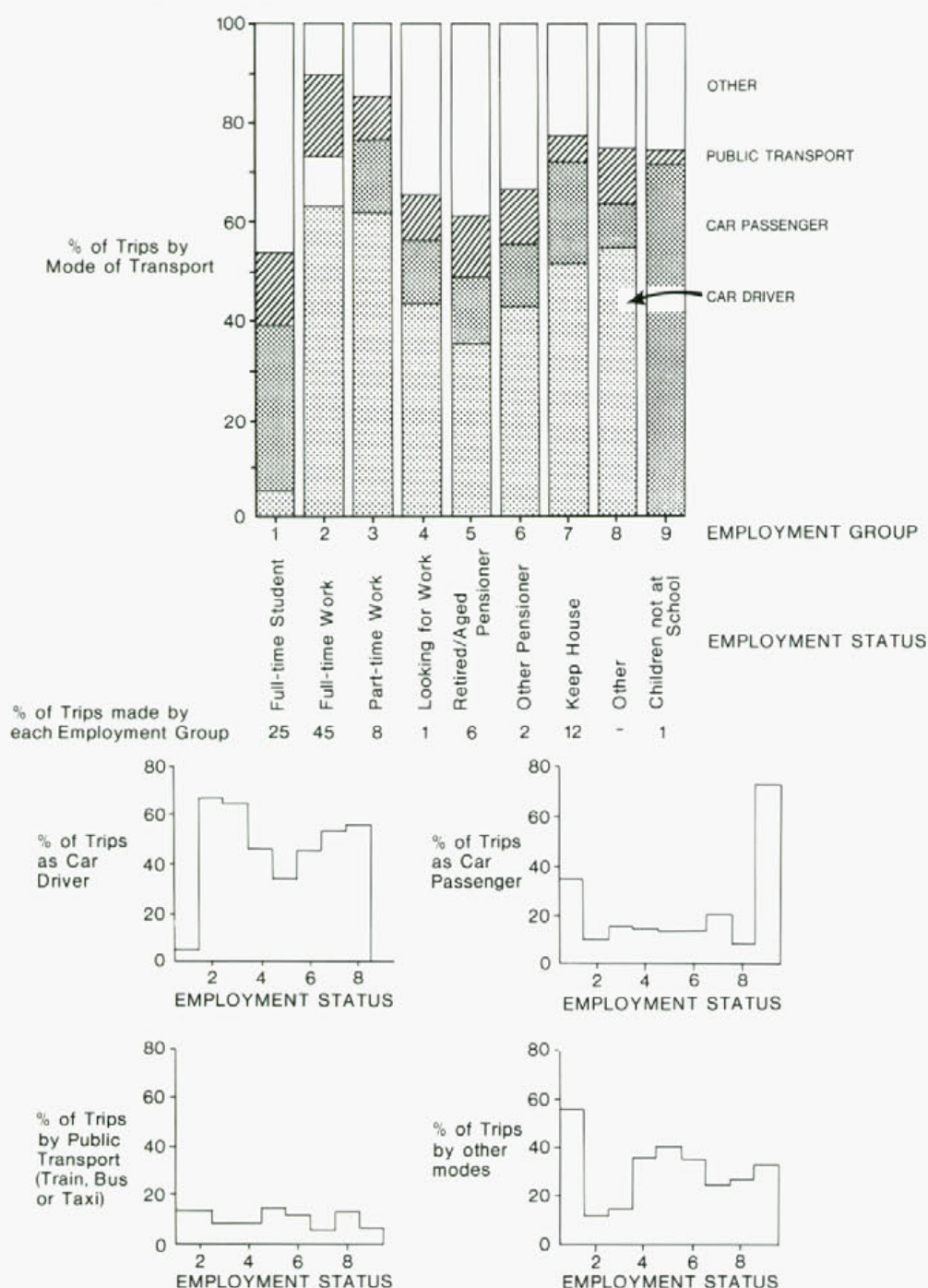
The use of cars changes with income level.

As personal income increases car driver trips are substituted for car passenger, cycling and walk trips, with 33% of trips made as car driver at an income level of \$4,000 and 76% at income levels over \$26,000.

Public transport use declines from 11% of all trips at personal incomes over \$12,000 to 5% of all trips at income levels over \$26,000.



Figure 9 – EMPLOYMENT STATUS OF CAR (AND OTHER TRANSPORT SYSTEM) USERS :  
SYDNEY 1981



Source: Preliminary results of State Transport Study Group 1981 Sydney Travel Survey

The use of cars and other transport modes by personal employment status is illustrated here.

All groups make at least 40% of their trips by car, with employed persons and people keeping house making 74% of their trips by car. (These groups account for 65% of all trips.)

The groups making least use of cars are students, unemployed persons, pensioners and retired persons, who collectively make 42% of their trips by car, compared with 74% for all other groups.

Students, full-time workers, unemployed persons and pensioners account for 89% of public transport use and on average make 14% of their trips by this mode. (Other groups on average make 6% of their trips by public transport.)



Figure 10 – HOUSEHOLD EXPENDITURE ON TRANSPORT: ALL CAPITAL CITIES: 1975-76

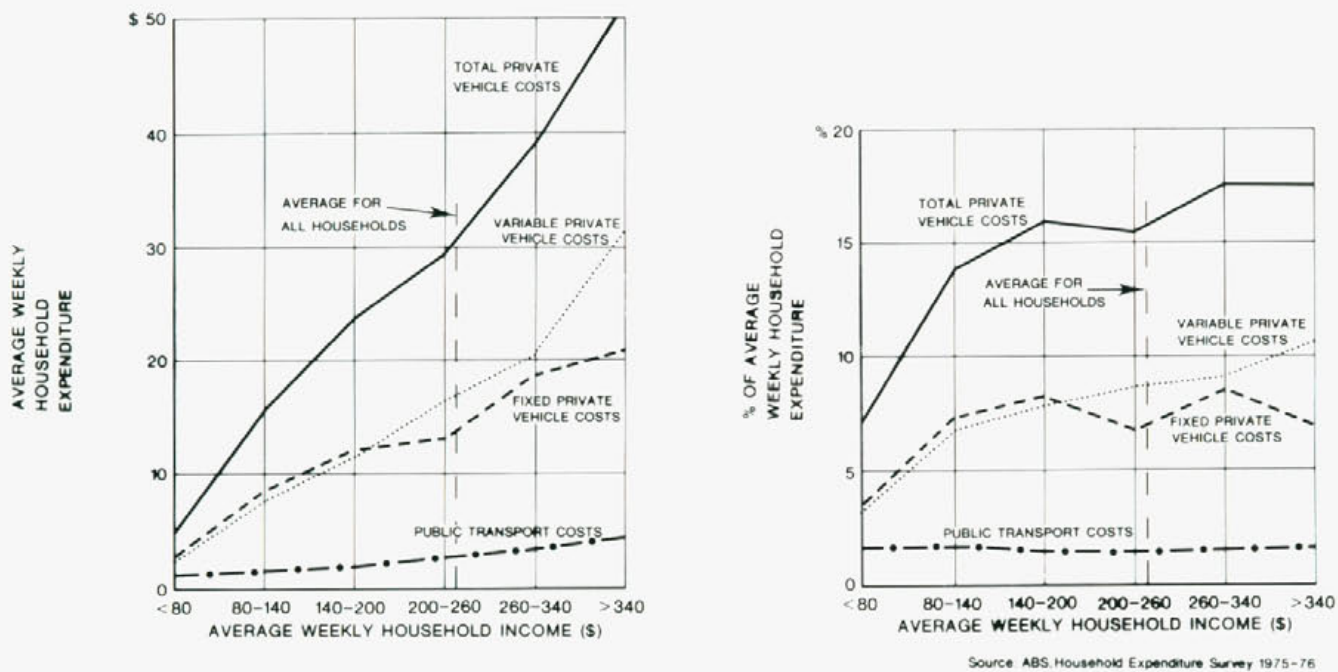


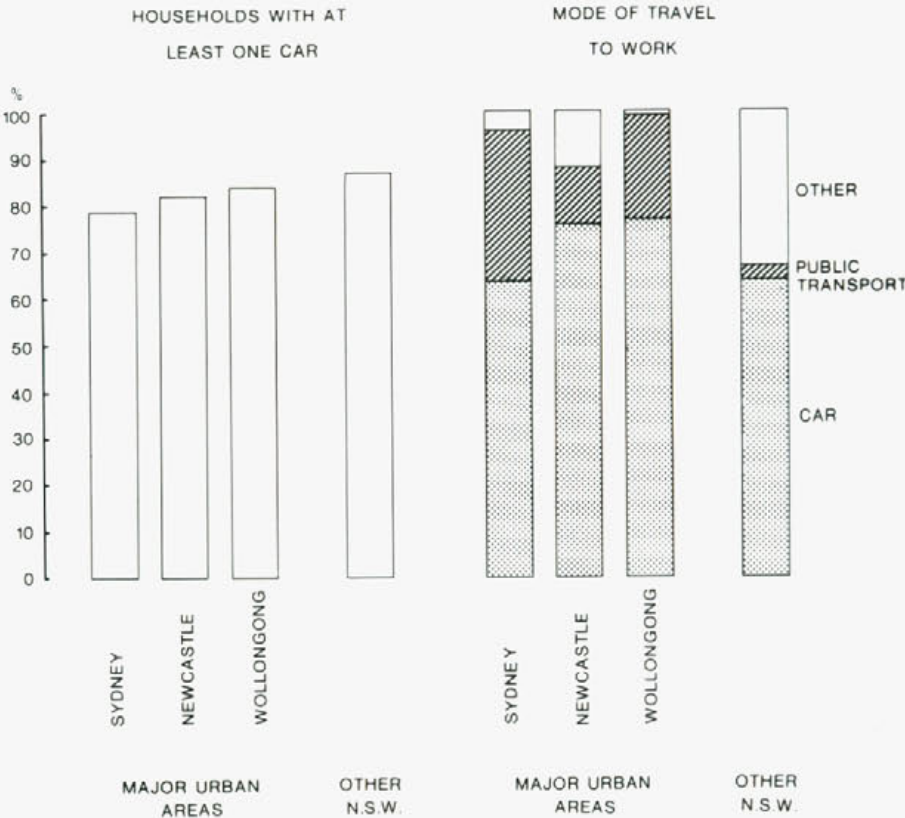
Figure 11 – HOUSEHOLD CAR AVAILABILITY AND MODE OF TRAVEL TO WORK : N.S.W., 1976

Differences in car availability and use by various community groups are reflected in household expenditure on transport by income as shown here.

Household expenditure on both private and public transport increases with income (with the former increasing much more rapidly than the latter).

The fixed costs of private transport are relatively more important than variable costs at low income levels, but increasing use of private transport as income increases reverses this relationship.

While private transport expenditure relative to total household expenditure increases with income, expenditure on public transport as a proportion of total household expenditure remains fairly stable.



Source: 1976 Census



# WHEN A RIVER MEETS A HIGHWAY...

Through songs, books and films, Australia has been witnessed as a land of contrasts. We can experience snow and bushfires in the same season. And heart-break can come through either drought or flood.

Such was the early explorers' encounter with the country surrounding the Castlereagh River. On 25 July 1818, Surveyor-General John Oxley had written in his journal, "At nine o'clock we set forward with anxious hopes of reaching Castlereagh River in the course of the day; we struggled for nine miles through a line of country that baffles all description; we were literally up to the middle in water the whole way..."

Captain Charles Sturt reached the Castlereagh River on 10 March 1829. Although the river channel was found to be 130 metres wide, there was no water whatever. In describing his experience, Sturt wrote, "so long had the drought

*continued that the vegetable kingdom was almost annihilated and minor vegetation had disappeared . . . The emus with outstretched necks, gasping for breath, searched the channels of the rivers for water, in vain; and the native dog, so thin that it could hardly walk, seemed to implore some merciful hand to despatch it".*

The village of Armatree in the heart of Castlereagh country derives its name from a 6500 ha property selected by John Jude, an ex-convict. Despite working diligently, he was never able to rejoin his wife and family in England.

The southern boundary of his property formed a common line dividing it from a selection known as *Curban*, which was occupied by Robert Bennett, one of the district's earliest settlers.

Armatree did not share in the early pioneer growth typical of the Castlereagh district, especially when compared with the rapid progress made by *Curban* and *Gulargambone*. In fact the village of

Armatree was not established until 1911, after the extension of the railway from Dubbo to Coonamble. Another influx of settlers occurred after World War I, when the State Government resumed a large area of land for soldier settlement which was allocated by ballot.

Today, the district surrounding Armatree is considered as prime rural land. And John Jude, one of the district's early pioneers, is remembered by a small creek bearing his name.

## **A bridge to clear the floodwaters at Armatree**

A new bridge which carries the Castlereagh Highway over the Castlereagh River at Armatree has replaced a low level single lane 14 span timber beam bridge 126 m long. The original structure, built in 1912, was constructed in seven months at a cost of £1,998.176.

Four major floods have occurred since that time, the highest being in 1955, when

***Flood-prone . . . and flood-free: a new crossing of the Castlereagh River.***





the water level rose to 5.3 m above the bridge deck.

In 1965, following the sealing of the Castlereagh Highway through Gilgandra Shire, the responsibility for the maintenance of the highway was taken over by the Department. Up to that time the Gilgandra Shire had carried out all maintenance on the bridge.

### The new bridge

The new 195 m long bridge comprises thirteen 15 m spans of prestressed concrete planks and a cast-in-place reinforced concrete deck. It is 10.2 m wide and provides a carriageway width of 9.2 m, with wall-type piers and abutments supported on a total of 134 driven reinforced concrete piles. Its deck is 5.5 m higher than the deck of the old bridge, 200 mm higher than the 1955 flood level, and is therefore unlikely to be affected by floodwaters.

Tenders closed on 18 March 1981, and on 13 April 1981 a contract was let to Bridge and Civil Pty. Ltd. of Tamworth at a tender price of \$933,703. With cost adjustments, etc., the final cost of the bridge is \$1.07 million.

Construction of the bridge was completed in October 1982.

Some local labour was employed and local sub-contractors were engaged for the supply of material and components. Construction was supervised by the Department.

The 208 prestressed concrete planks were manufactured and delivered by Dyson-Holland Precast Pty. Ltd. of Narromine. Approach works for the bridge were constructed by the Department's own work force from Dubbo Works Office at a cost of approximately \$380,000.

### ... and in the same area

At Coonamble, 60 km north of Armatree, a 98.3 metre long bridge over the Castlereagh River is nearing completion and is expected to be available to traffic by April 1983.

Planning is underway for a new 165 m long bridge over the Castlereagh River at Gilgandra. Construction of a 126 m long bridge over the Castlereagh River at Boyben (near Mendooran) on Trunk Road 77 is to begin shortly. A new 27 m long bridge is to be built over Sallabalah Creek, also on Trunk Road 77.

More detail of these works will appear in future issues of *Main Roads*. ●

## NEW ROUTE SERVES COMBOYNE PLATEAU

On 5 November 1982, the Commissioner for Main Roads, Mr. Bruce Loder, officially opened a newly sealed section of Main Road 112, the Wauchope to Comboyne Road.

Comboyne itself is the centre of a rich and productive agricultural and pastoral area. The plateau it lies upon has long been famous for its picturesque landscape, making it a popular tourist attraction for visitors to the Port Macquarie district.

Before 1961 when work commenced on the Comboyne Road (Main Road 211) the Comboyne community could elect to travel a choice of three predominantly gravel roads to commercial centres. Although the road to Kendall (Main Road 538) may have been preferred from some points of view, the town could not offer amenities comparable with those available at Taree or Wauchope. The road to Taree was considerably longer than the other two and the descent from the plateau was narrow and winding but thereafter an acceptable gravel road was available to Wingham from which a sealed pavement (Main Road 192) could be travelled to Taree. The Oxley Highway was already sealed between Wauchope and the junction of Main Road 211 leading to Comboyne and this became the preferred route for further construction and sealing.

Although the initial progress of construction was unspectacular, steady improvements were made during the period from

1966 to 1978. Work then commenced on the more difficult sections.

By June 1980, the route had been reconstructed and bitumen sealed for a length of 20 km from the Oxley Highway to the foot of the final ascent to the Comboyne plateau, and then from the start of the plateau into the Comboyne township, a distance of 3.4 km.

The final 1.7 km section was commenced in January, 1981. The existing gravel formation was narrow, only 4 m wide, and of poor alignment. There was no fencing on the outer edge of the formation to protect traffic from a very sheer drop into the valley and only a few locations where two cars could pass. During wet and foggy weather, road conditions on the mountain pass were particularly hazardous. When work commenced on this mountain pass, Council let a contract for \$261,926.00 to a local firm, CTK Engineering Pty. Ltd., for drilling, blasting and removal of 16 874 m<sup>3</sup> of rock. This work was difficult as a length of hand packed stone retaining walls had to be preserved in order to prevent the existing road and a part of the foundation for the new road from collapsing into the valley.

The reconstruction and bitumen sealing of Main Road 112 to Comboyne should both improve the lifestyle and reduce the isolation of the plateau community. ●

**The Commissioner for Main Roads, Mr. Bruce Loder accompanied by Comboyne School Captain, Lindy Downes, cuts the official ribbon.**







## **TURN OFF TO THE WORLD ... TURN ON TO DANGER**

Advances in electronics in recent years have given us many benefits. While not directly improving our quality of life, they have often added to our ease and convenience. But some, however, lead to potential danger.

Small radio-cassettes with headphones are a good example. At high volumes surrounding sounds can be completely blocked out. Even at moderate volumes other sounds become unclear. When worn in or near traffic they place their user in considerable danger.

Drivers, cyclists and pedestrians all depend on sound to help them interpret situations and assess danger. So those who wear headphones drown out vital warning sounds. Even at low volume, the wearer's attention can be easily distracted.

To ensure their own survival, cyclists and pedestrians who persist in wearing headphones in or near traffic should compensate with their eyes for the lack of warning sounds, just as someone would who was partially deaf. Headphones should never be worn when driving.

Those who pay attention to the dangers of using headphones near traffic will be able to enjoy the benefits of this technology without risking their lives.



# ARRESTOR BEDS: COMING TO REST SAFELY

A missed gear change can be a frustrating experience for any motorist, but for a truck driver approaching a steep descent it often leads to brake fade and loss of control of the vehicle. The provision of gravity-type safety ramps has been the traditional method of bringing such vehicles to rest safely. An alternative to the gravity-type safety ramp is the arrestor bed.

An arrestor bed is a large bed of sand or rounded river gravel, which is placed next to a road on either down or up grades. Errant vehicles with reduced or complete loss of brakes can be brought to a safe stop by means of the decelerating action of the bed material. To determine the characteristics of arrestor beds made

***Caught in the act: a laden prime mover with a two axle trailer is brought to rest safely by the decelerating action of the arrestor bed.***





from locally available materials the Department organised field trials which involved driving heavy trucks at speed into beds of sand and gravel. The field trials were undertaken on the disused Cordaux airstrip. The behaviour of the material was observed, the drivers' comments were taken and the deceleration characteristics of the bed materials were recorded.

Bed materials tested were sand and 10 mm diameter rounded uncrushed river gravel. Both were tested to maximum bed depths of 350 mm and 450 mm and each had a 50 m long entry transition.

The vehicles used for the tests were:

- single unit tipper truck (19.7 t loaded);
- prime mover and three-axle low loader (44 t loaded and 19.9 t unloaded);
- prime mover with two-axle trailer (26.9 t loaded and 10.9 t unloaded);
- prime mover with two-axle trailer (35.0 t loaded and 14.5 t unloaded).

The deceleration of the vehicles entering the arrestor beds was recorded for speeds in the range of 60 to 94 km/h.

The results of the test showed that laden and unladen trucks, single unit or articulated, could be safely brought to a stop without causing any concern to the driver. A typical example of the stopping distance required showed that a laden semi-trailer weighing 26.9 t entering a

350 mm deep gravel bed at 83 km/h was brought to rest in 114 m.

Other findings can be summarised as follows:

- (i) a bed depth of 350 mm provided adequate deceleration in the range of 3 to 3.5 m/sec<sup>2</sup>. A 450 mm deep bed provided deceleration 20% greater but resulted in minor vehicle damage and driver discomfort;
- (ii) the 50 m long entry ramp provided a safe means of entering the full depth of the arrestor bed.
- (iii) when the length of the bed is restricted due to the site, bed depth can be increased in stages from 350 mm to 450 mm, or even further, to provide higher deceleration. The last portion of the bed can be ramped up to reassure the driver.
- (iv) the sand bed performed poorly when it became saturated. This emphasised the need for adequate drainage;
- (v) deceleration for laden vehicles was 10% lower than for unladen vehicles;
- (vi) the maximum deceleration achieved with the single unit truck was approximately 20% greater than that achieved with articulated vehicles;
- (vii) the average deceleration achieved increased with entry speed, with the

maximum deceleration occurring at or above 75 km/h;

(viii) the average decelerations achieved were:

- Sand 350 mm deep 2.8 m/sec<sup>2</sup>
- 450 mm deep 3.4 m/sec<sup>2</sup>
- Gravel 350 mm deep 3.0 m/sec<sup>2</sup>
- 450 mm deep 3.7 m/sec<sup>2</sup>

(ix) These decelerations may be used in the following formula to calculate the length of an arrestor bed:

$$L = \frac{V^2}{26a - 2.55X}$$

where L = length of full depth bed excluding 50 m transition at start, m

V = entry speed, km/h

a = deceleration, m/sec<sup>2</sup>

X = grade, %, (positive for upgrade, negative for downgrade)

The Department's immediate interest in arrestor beds is for main roads descending the coastal escarpment at Wollongong. As an example, the final descent of Mt. Ousley Road drops 295 m in 4.4 km, giving an average grade of 6.7%, but with a maximum of 9.3%. In areas such as this, it is expected that arrestor beds will provide increased safety when used in conjunction with gravity type safety ramps, and a viable and safe alternative when site constraints prevent the construction of a gravity type safety ramp. ●

## Tenders Accepted by Department of Main Roads

The following tenders (in excess of \$20,000) for road and bridge works were accepted for the three months ended 31 December 1982.

Road No.	Work or Service	Name of Successful Tenderer	Amount
Freeway No. 3	Municipality of Hunters Hill. Installation of traffic control signals at intersection of Freeway No. 3 ON/OFF loading ramps and Church Street and reconstruction of traffic control signals at Gladesville Road, west of Joubert Street, Hunters Hill.	Harnett Constructions Pty. Ltd.	\$28,000.00
State Highway No. 2	Hume Highway. Shires of Haden and Yass. Seeding and vegetation of construction works between 5 and 70 km south of Yass.	Evergreen Machinery and Sales Pty. Ltd.	\$30,400.00
State Highway No. 2	Hume Highway. Shire of Yass—Crushing and stockpiling of up to 10 000 m <sup>3</sup> of naturally occurring base gravel at Bogo Pit.	Snowy Mountains Blue Metal and Sand	\$27,250.00
State Highway No. 3	Federal Highway. Shire of Mulwaree. Construction of approaches to Willow Tree Creek. Winning, stabilising and hauling natural gravel.	Stabilex	\$153,870.00
State Highway No. 3	Federal Highway. Shire of Mulwaree. Winning, mixing and hauling of lime stabilised natural gravel 39.3 to 30.6 km south of Goulburn.	Stabilex	\$108,910.00
State Highway No. 9	New England Highway. Supply, deliver and spread up to 200 t of bulk quicklime between 5 and 104 km west of Maitland.	Aztec Transport Services	\$21,600.00
State Highways Nos. 9 and 10	New England and Pacific Highways. Supply and spray up to 100 000 l. of C170 bitumen for maintenance and construction works on various sections of the highways north of Newcastle within the area controlled by Waratah Works Office.	Boral Road Surfaces	\$62,450.00
State Highway No. 10	Pacific Highway. Municipality of Lake Macquarie. Supply and delivery of up to 400 t of Type FA cement to work site near Cam's Wharf, 134 km north of Sydney.	Blue Circle Southern Cement Ltd.	\$32,720.00
State Highway No. 10	Pacific Highway. Shire of Wyong. Supply and delivery of up to 350 t of bulk quicklime for widening and reconstruction at Doyalson intersection.	Blue Circle Southern Cement Ltd.	\$31,778.00
State Highway No. 10	Pacific Highway. Shire of Wyong. Supply and lay up to 3700 t of 5 mm, 10 mm and 20 mm asphaltic concrete for widening and reconstruction at Doyalson intersection.	Boral Asphalt	\$237,550.00



Road No.	Work or Service	Name of Successful Tenderer	Amount
State Highway No. 10	Pacific Highway. Supply and spray up to 100 000 l. of C170 bitumen for maintenance and construction works south of Newcastle within the area controlled by the Waratah Works Office.	Allen Bros. Asphalt	\$51,570.00
State Highway No. 10	Pacific Highway. Shire of Great Lakes. Supply and load 10 mm asphaltic concrete.	Bitupave Ltd.	\$38,165.25
State Highways Nos. 10 and 11	Pacific and Oxley Highways. Supply and delivery of 10 mm of bituminous coldmix to various locations—Fernbank Sub-depot, Ellenborough Sub-depot, Kempsey Sub-depot and Nambucca Sub-depot.	Pioneer Asphalts Ltd.	\$33,742.50
State Highway No. 15	Barton Highway. Shire of Yass. Supply of up to 500 t of 5 mm hotmix for various works.	Allen Bros. Asphalt	\$21,375.00
State Highway No. 17	Newell Highway. Shire of Narrandera. Supply and lay asphaltic concrete on approaches to bridge over Murrumbidgee River at Narrandera.	Pioneer Asphalts Ltd.	\$52,101.40
State Highway No. 19	Monaro Highway. Shire of Cooma-Monaro. Stockpiling of 6000 m <sup>3</sup> of crushed rock.	Olding Excavations Pty. Ltd.	\$41,880.00
State Highway No. 19	Monaro Highway. Shire of Cooma-Monaro. Supply of pipes for bridge over Cooma Creek.	Humes Pty. Ltd.	\$24,110.64
Main Road No. 208	Supply and lay 300 t of 20 mm asphaltic concrete between 80 and 85 km west of Muswellbrook.	Bitupave Ltd.	\$23,865.00
Main Road No. 508	Municipality of Hurstville. Construction of duplicated bridge in the eastern approach to Salt Pan Creek on Henry Lawson Drive.	Wrightson Contracting Pty. Ltd.	\$215,180.00
Secondary Road No. 2013	Municipality of Leichhardt. Installation of traffic control signals at the intersection of Marion Street and Balmain Road, Leichhardt and reconnection of traffic control signals at the intersection of Marion Street and Norton Street, Leichhardt.	P. & W. Kirby Pty. Ltd.	\$23,000.00
Various	Remarking of lane lines with sprayable thermo-plastic material at various sites in the area controlled by the Yennora Works Office.	Western Road Marking	\$26,965.20
Various	Remarking of tranverse lines with screeded thermo-plastic material at existing traffic control signal sites in the Ryde, Parramatta, Baulkham Hills and Hornsby Council areas.	Linemarking Services	\$25,035.83
Various	Supply and lay calcined bauxite epoxy seals at various locations in the Parramatta Divisional area.	Margal Holdings Pty. Ltd.	\$163,014.50
Various	Supply, heat, haul and spray C170 bitumen in sections 1 and 2 of the area controlled by the Ballina Works Office.	Boral Road Surfaces (N.S.W.) Pty. Ltd.	\$151,230.00
Various	Supply, heat, haul and spray C170 bitumen in sections 3 and 4 of the area controlled by the Ballina Works Office.	Emoleum (Aust.) Ltd.	\$137,698.00
Various	Supply, heat, haul and spray C170 bitumen in various areas controlled by South Grafton Works Office.	Spraypave Pty. Ltd.	\$114,370.00
Various	Shires of Wellington, Parkes and Gilgandra. Foundation test boring for five proposed bridge sites.	Ground Test Pty. Ltd.	\$21,737.00
State Highway No. 9	New England Highway. Municipality of Singleton. Construction of up to 1500 m of Type SH extruded concrete table drain to construction of approaches to bridge over Bowmans Creek, 60 to 63.5 km west of Maitland.	Seovic Holdings Pty. Ltd.	\$41,100.00

## Tenders Accepted by Council

**The following tenders (in excess of \$20,000) for road and bridge works were accepted for the three months ended 31 December 1982.**

Council	Road No.	Work or Service	Name of Successful Tenderer	Amount
Auburn	Main Road No. 190	Supply and delivery of 82.96 m of 2700 x 1800 box culvert crown sections and 4.88 m of 2700 x 1800 special box culvert sections for Bede Street deviation, Lidcombe.	Rescrete Industries Pty. Ltd.	\$37,872.02
Blayney	Various	Supply and spray bitumen.	Emoleum (Aust.) Ltd.	\$23,310.23
Cowra	Various	Supply and spray bitumen.	Allen Bros. Asphalts Ltd.	\$84,286.86
Crookwell	Various	Bitumen sealing.	Canberra Asphalts Pty. Ltd.	\$24,716.00
Culcairn	Trunk Road No. 78	Bitumen surfacing between 68.0 and 69.5 km south of Wagga Wagga.	Emoleum (Aust.) Ltd.	\$73,461.07
Goulburn	Various	Bitumen sealing works.	Allen Bros. Asphalts Ltd.	\$62,984.90
Griffith	Various	Bitumen sealing works.	Allen Bros. Asphalts Ltd.	\$112,101.07
Hawkesbury	Rural Local Road	Construction of bridge over Redbank Creek on Terrace Road, North Richmond.	Maric Bros. Constructions	\$159,080.00
Hume	Various	Bitumen sealing works.	Allen Bros. Asphalts Ltd.	\$96,342.97
Lachlan	Various	Bitumen sealing and re-sealing works.	Allen Bros. Asphalts Ltd.	\$79,109.04
Lockhart	Various	Bitumen sealing works.	Emoleum (Aust.) Ltd.	\$177,856.36
Maitland	State Highway No. 9 and Main Road No. 607	Supply and lay up to 700 t of asphaltic concrete for reconstruction of intersection of New England Highway with Main Road No. 607 at eastern approach to High Street overbridge, Maitland.	Asphaltic Constructions	\$47,950.00
Mulwaree	Various	Bitumen sealing works.	Allen Bros. Asphalts Ltd.	\$47,470.48
Parry	Various	Supply and spray bitumen.	Boral Road Services	\$133,019.83
Queanbeyan	Various	Bitumen sealing works.	Allen Bros. Asphalts Ltd.	\$58,646.53
Tallaganda	Various	Bitumen sealing works.	Allen Bros. Asphalts Ltd.	\$73,068.71
Temora	Various	Supply and spray bitumen.	Canberra Asphalts Pty. Ltd.	\$162,710.08
Tumut	Various	Bitumen sealing works.	Allen Bros. Asphalts Ltd.	\$173,393.08
Urana	Various	Bitumen sealing works.	Emoleum (Aust.) Ltd.	\$78,204.69
Wagga Wagga	Trunk Road No. 78	Supply and lay asphaltic concrete.	Pioneer Asphalts Pty. Ltd.	\$77,540.00
Wagga Wagga	State Highway No. 14, Trunk Road No. 78 and various roads	Supply and spray bitumen on Sturt Highway, between 2.2 and 2.8 km east of Baylis Street; supply and spray bitumen on Trunk Road No. 78 between 9.2 and 12.7 km and supply and spray bitumen on various other roads in City of Wagga Wagga.	Boral Road Services	\$97,637.00
Wakool	Various	Bitumen sealing and re-sealing work.	Emoleum (Aust.) Ltd.	\$181,569.67
Wakool	Various	Supply of aggregate.	Lake Boga Quarries Pty. Ltd.	\$39,790.13
Wellington	Various	Bitumen sealing and re-sealing works.	Emoleum (Aust.) Ltd.	\$106,189.37
Wellington	Various	Supply and delivery of aggregate.	Toprock Industries, Dubbo.	\$28,930.25



