

# Report of the Melbourne Underground Rail Loop Authority for the year ended 30th June, 1976

## Front Cover

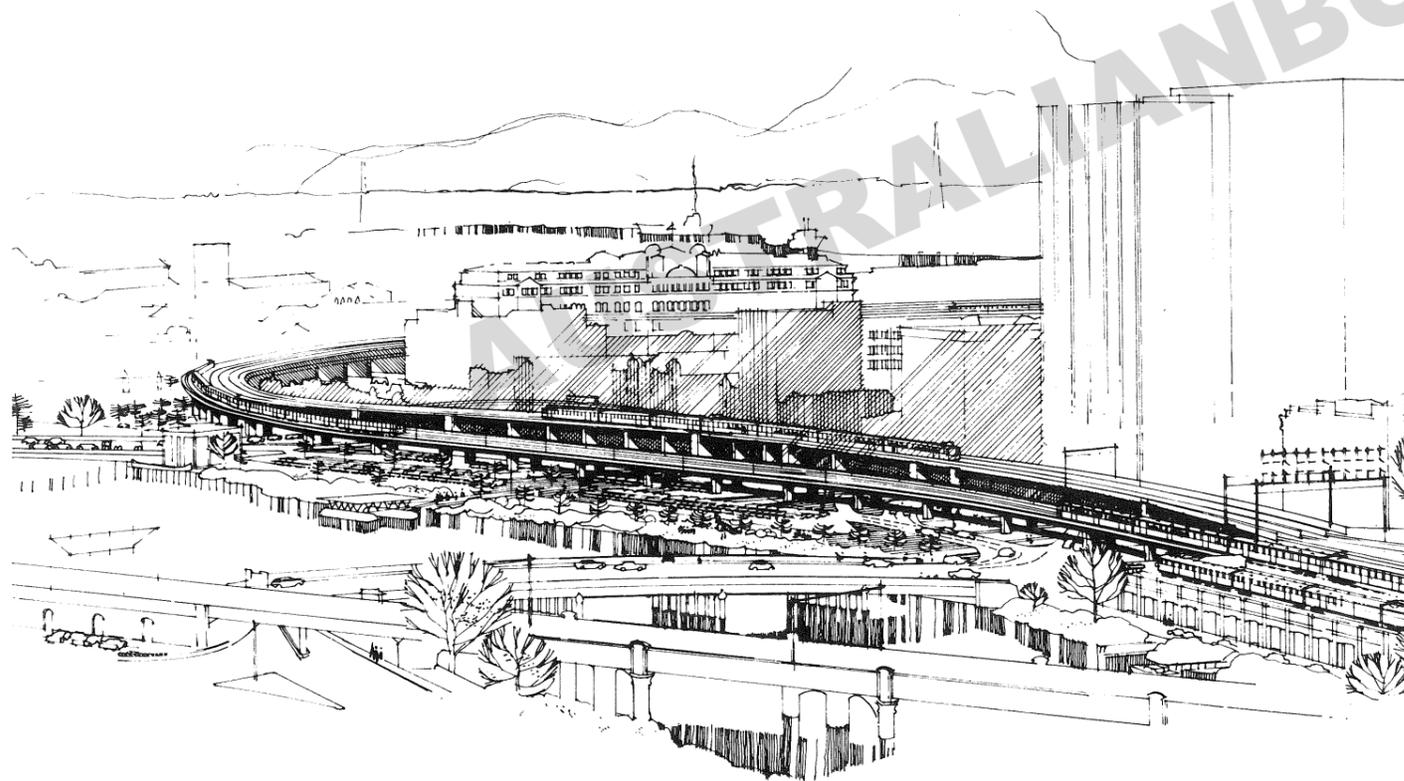
Platform tunnel for Burnley loop at Parliament Station with excavation and primary support complete. On the right is the opening to the escalator concourse. The length of the station platform will be 158 metres. The depth of the rail track below Spring Street will be 38 metres.

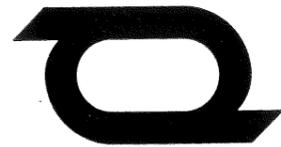
## Back Cover

Top cross-cut at Flagstaff Station showing ground support. This is construction of a temporary nature to enable permanent station excavation to be carried out.

## Below

Architect's impression of new overpass structures to support two extra elevated tracks between Spencer Street and Flinders Street Stations, releasing four existing tracks for use mainly by loop and other suburban train traffic.





**Melbourne Underground  
Rail Loop Authority**

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Melbourne  
Victoria  
Australia 3000

Postal Address  
G.P.O. Box 2280U Melbourne  
Victoria Australia 3001

The Honorable J. A. Rafferty, M.P.,  
Minister of Transport,  
570 Bourke Street,  
Melbourne 3000.

25th October, 1976

Dear Minister,

Pursuant to the provisions of the Melbourne Underground Rail Loop Act, 1970, we the Members of the Authority submit the following report on its operations for the year ended 30th June, 1976 together with statements of its financial transactions for that year and of its financial position as at 30th June, 1976 which, to the best of our knowledge and belief, are certified correct.

Yours sincerely,

*R. B. Roscoe*  
*T. P. Scott*  
*K. A. Allen*  
*I. F. Beaurepaire*  
*G. F. W. Brown*  
*W. H. B. Daddo*  
*W. C. S. Ellis*  
*A. G. Gibbs*  
*K. H. Vial*

Chairman

Deputy Chairman

Member

Member

Member

Member

Member

Member

Member

**Members**

- R. B. ROSCOE, Chairman
- T. P. SCOTT, Deputy Chairman
- K. A. ALLEN
- I. F. BEAUREPAIRE, C.M.G.
- G. F. W. BROWN, C.M.G.
- W. H. B. DADDO
- W. C. S. ELLIS, O.B.E.
- A. G. GIBBS, A.O.
- K. H. VIAL, C.B.E.

**General Manager and Director of Engineering**

F. G. Watson, B.A., M.I.E.Aust., F.A.I.M., M.I.E.T., M-S.A.E.-A.

**Secretary and Assistant General Manager — Administration**

W. L. R. Daniels, F.C.I.S., F.A.S.A.

**CONSULTANTS — Engineering**

**John Connell-Mott, Hay & Anderson, Hatch, Jacobs (Principal Consultants)**

Railway Construction Board  
Victorian Railways Board

**Sub-Consultants to the Principal Consultants**

McIntyre, McIntyre and Partners Pty Ltd  
Perrott, Lyon, Timlock, Kesa and Associates Pty Ltd  
Riley, Barden and Kirkhope  
Rider Hunt and Partners  
Alan S. Porritt and Associates  
Wolferstan Trower and Partners  
Golder Associates Pty Ltd

**Consultants — Property**

George J. Connor & Associates Pty Ltd

**Office and Registry**

53 Queen Street, Melbourne 3000

# Report of the Melbourne Underground Rail Loop Authority for the year ended 30th June, 1976

## Preamble

The Authority is responsible in accordance with the Melbourne Underground Rail Loop Act 1970, as amended, for supervising and co-ordinating the planning, financing and construction of the underground rail Loop.

## Description of Main Works

### Stations

In all three underground stations—Parliament, Museum and Flagstaff—there are two levels of platforms corresponding to the two levels of the tunnels.

#### ● Parliament

Parliament Station is situated below Spring Street centred approximately on Bourke Street.

At this station there will be booking halls under the street at each end, with escalators leading to and from the platforms.

Parliament is the deepest station the upper and lower platforms being 26 metres and 36 metres below the surface respectively. At these depths, in this area, the underlying rock is of such strength that the two levels of platforms can be constructed in independent tunnels formed by enlargement of the track tunnels and separated by the rock. Conventional mining methods are being used in its construction.

#### ● Museum

Museum Station is situated under LaTrobe Street between Swanston and Elizabeth Streets. Here the top of the structure is only 1.5 metres below the road surface, which determines construction in open cut. The understreet structure for this station, in addition to the two levels of platforms, includes a concourse and above this, at the Swanston Street end, a mezzanine floor for machinery, signalling and communications equipment. Booking halls will be below ground level at each end and in the centre, with access from street level by stairways, ramps and escalators, and with openings to a concourse and platform escalators.

Construction of Museum Station in open cut has involved acquisition of land on the south side of LaTrobe Street between Swanston and Elizabeth Streets, demolition of buildings thereon, and diversion of roadway, tramway and other services to provide a clear area for excavation of a trench 168 metres long, 22.5 metres wide to an average depth of 25 metres.

The sides of the excavation are supported by steel piles, struts, timber and shotcrete. The struts are pre-loaded to prevent any movement of the ground. Struts are removed as the concrete station structure is erected.

Backfilling and restoration of roadway will follow completion of the underground structure.

#### ● Flagstaff

Flagstaff Station is situated under LaTrobe Street adjacent to and west of William Street. The lower platform is 30 metres below the surface, a depth which precludes open cut construction, and the rock in this region cannot be relied upon for adequate support between the two levels of platforms and tunnels. Here the two platform levels will be included in a double box concrete structure constructed underground by the application of a mining technique which is novel to civil construction. Only one booking hall will be provided, located below ground level.

For construction purposes two spiral access tunnels (adits) have been driven from the surface, one to the upper level of the double box structure and one to the lower level. From each level, four drifts are being excavated parallel to LaTrobe Street. By means of a raise boring machine, circular holes 1 metre in diameter are excavated at close intervals from the lower to the upper level drifts. Reinforcement is placed in these bored holes which are then filled with concrete. The four rows of columns so formed, together with the concreting of the drifts, provide support for the construction of the walls and arched roof and subsequent excavation for the double box structure of Flagstaff Station.

## Tunnels

The three underground stations are linked by four underground tracks in four separate tunnels, identified as the Burnley loop tunnel, the Caulfield-Sandringham loop tunnel, the Clifton Hill loop tunnel and the North Melbourne loop tunnel, serving respectively the Burnley group of lines, the Caulfield-Sandringham group of lines, the Clifton Hill group of lines and the North Melbourne group of lines.

The Clifton Hill loop will be closed by a connection between Parliament and Flinders Street Stations so that it may also serve as a City Circle.

In general, tunnels under the streets are circular and tunnels under existing railway tracks are rectangular (box section) in shape.

The tunnels under the streets are arranged in pairs on two levels.

The circular tunnels are constructed by

- (a) mining methods, using mechanical excavation and blasting where necessary
  - (i) heading—the top half is excavated and supported by shotcrete and half circle steel sets
  - (ii) a continuous reinforced concrete beam is cast at the base of the half circle sets
  - (iii) benching—the bottom half is excavated and shotcreted and the bottom halves of the steel sets are placed
  - (iv) the tunnels are then concrete lined.
- (b) tunnel boring machine
  - (i) the tunnel is excavated full face and supported by shotcrete and complete circular sets placed in position as the machine moves forward
  - (ii) the tunnels are concrete lined.

The box section tunnels under rail tracks are constructed of reinforced concrete in an open trench excavated in the clear, where tracks can be temporarily slewed or removed, or using temporary bridging to support the tracks which cannot be moved. The circular tunnels and the box section tunnels are joined by a transition section at the railway boundaries. "U" shaped ramps are provided at the end of the box tunnels for access to the underground portion of the Loop.

## Overpass

The four existing elevated tracks between Spencer Street and Flinders Street Stations will eventually be used for loop operations. An additional pair of elevated tracks will be provided for through traffic. These tracks will be supported on a new overpass structure constructed in reinforced concrete.

## Construction 1975/76

The main works undertaken during the year were tunnelling and station construction in the underground portion of the Loop, investigations and preliminary works for design and construction of the overpass for two additional elevated tracks between Spencer Street and Flinders Street Stations, and trackwork, signalling, overhead traction wiring and structural work associated with the connections of the underground portion of the Loop to the existing surface tracks.

### UNDERGROUND PORTION

#### Eastern section—Flinders Street—Wellington Parade to Swanston Street via Spring & LaTrobe Streets

##### by Codelfa-Holland Pty Ltd—tunnel and Parliament Station construction

###### (a) Tunnel construction included

- continuation of the North Melbourne loop tunnel in a south westerly direction from Spring Street towards Flinders Street Station and further concrete lining of this tunnel
- continuation of the Burnley loop tunnel northwards and into the curve leading westerly from Spring Street to LaTrobe Street
- excavation of a shaft at Commonwealth Centre to provide works access initially and to serve as a ventilation shaft in the finished works, and excavation of cross-passages from this shaft to the loop tunnels
- excavation of ventilation cross-passages from the loop tunnels to the shaft in Treasury Gardens.

###### (b) Parliament Station construction

- completion of excavation of the platform tunnels for the North Melbourne and Burnley loops (lower level) and concrete lining of the Burnley loop platform tunnel
- completion of concrete lining of the lift shaft at the north end, and most of each draught relief shaft at the ends of the station and the lower level relay room at the south end of the station
- further excavation of the inclined escalator tunnels down to the upper platform levels at each end of the station
- completion of excavation of the lower level relay room at the north end of the station, the platform concourses at the bottom of the upper escalator tunnels and the four cross passages at the lower platform level.

#### Central section—Swanston Street to William Street via LaTrobe Street

###### (a) Tunnel construction

##### by John Holland (Constructions) Pty Ltd

- Preliminary works commenced for the construction of the Burnley loop and Caulfield-Sandringham loop tunnels from Museum Station to Flagstaff Station and for the North Melbourne and Clifton Hill loops from Museum Station to the west side of Elizabeth Street. As part of the work, the Melbourne and Metropolitan Board of Works has commenced preliminary work as sub-contractors for the two upper tunnels (the Caulfield-Sandringham and the Clifton Hill-City Circle) through an old river bed area under Elizabeth Street.

###### (b) Museum Station construction

##### by Leighton Contractors Pty Ltd

- continuation of excavation of open trench and construction of station structure.

###### (c) Underpinning

##### by Pearson Bridge-Bachy

- underpinning of the ANZ Bank building and the Argus building, both on the western side of the Elizabeth Street-LaTrobe Street intersection
- construction of a diaphragm wall to protect Bourkes-A.C.T.U. store building foundations, close to Museum Station.

#### Western section—William Street to Adderley Street

##### by Codelfa Construction Pty Ltd, Sogene (Australia) Pty Ltd, and Cogefar Construction Pty Ltd, Joint Venture operating under the name of "C.M.T.—Construction of Metropolitan Tunnels"—tunnel construction including Flagstaff Station

###### (a) Tunnel construction

- further part excavation of all four tunnels under LaTrobe Street from Adderley Street towards Flagstaff Station
- preliminary work in Flagstaff Gardens for sinking the draught relief shaft at the western end of Flagstaff Station
- completion of sinking the North Melbourne loop ventilation shaft in the Spencer Street railway carriage yards, adjacent to Adderley Street, and preparatory work for concrete lining of the shaft.

###### (b) Flagstaff Station construction

- continuation of excavation and concreting of drifts and columns forming the station structure.

### APPROACHES FROM SURFACE TRACKS TO UNDERSTREET TUNNELS

#### by Victorian Railways Board

Work carried out by the Victorian Railways Board to link the underground portion of the Loop with the surface tracks includes the construction of ramps and box section tunnels under railway tracks.

During the year under review the works program included

###### (a) between Flinders Street and Richmond Stations

- completion of the Caulfield-Sandringham loop box tunnel and ramp structures
- re-arrangement of trackwork and signalling
- completion of structural work on the emergency exit from the Caulfield-Sandringham loop box tunnel
- completion and commissioning of the new "E" Signal Box.

###### (b) Flinders Street east yard

- alterations to trackwork to permit the construction of the City Circle and North Melbourne loop ramps and tunnels
- bridging and shoring to support the Clifton Hill lines during the construction of the City Circle box section tunnel
- diversion by the Melbourne and Metropolitan Board of Works of a sewer main to allow construction of the North Melbourne loop ramp.

###### (c) between Princes Bridge and Jolimont Stations

- slewing of Clifton Hill lines to final alignment.

###### (d) between Princes Bridge and Parliament Stations

- construction of the City Circle box tunnel. This will pass under the abutment of the Wellington Parade South bridge.



A fully excavated lower tunnel under LaTrobe Street, between Adderley Street and Flagstaff Station, complete with first stage concrete lining in the crown to enable an upper tunnel to be excavated above it.

- (e) between North Melbourne Station and Dudley Street bridge
- completion of restoration of the broad gauge track on the Victorian Railways ramp and flyover
  - completion of retaining walls east and west of suburban tracks
  - construction of the east box tunnel and splay tunnel at junction of the east and west ramps and box tunnel section of the North Melbourne loop
  - slewing of tracks to permit construction of the west side ramp and box tunnel to the splay tunnel for the North Melbourne loop.
- (f) between Spencer Street Station and Adderley Street
- extensions to the box tunnels for the Burnley and Clifton Hill loops
  - reconstruction of the face of No. 8 platform, Spencer Street Station, as part of the re-arrangement to accommodate the loop lines in this area.
- (g) in Spencer Street Station area
- remodelling platform 9/10 for through island operation and provision of access ramps to it from passenger and parcels subways and complementary additions and alterations to tracks, overhead power lines and verandahs
  - preliminary work on a new signal box and tie station to replace the existing overpass junction box.
- (h) in Melbourne Goods Yard
- re-location of gantry crane facilities to provide space for overpass construction.

#### OVERPASS STRUCTURE FOR ELEVATED TRACKS NECESSITATED BY LOOP OPERATION

##### by John Holland (Constructions) Pty Ltd

- site establishment and mobilization of materials and equipment for the overpass structure for the two additional tracks between Spencer Street and Flinders Street Stations.

##### by various government instrumentalities and other contractors

- diversion and alteration of roads and services and demolition of buildings to make way for construction of the overpass.

## Construction Status at 30th June, 1976

### Clifton Hill loop and City Circle

- the ramp for the Clifton Hill loop which is adjacent to Wellington Parade—completed.
- box section tunnel for Clifton Hill loop under Wellington Parade—completed
- circular tunnel for Clifton Hill loop from the north side of Wellington Parade to the Clifton Hill-City Circle junction—tunnel heading excavated
- Clifton Hill loop and City Circle—from Clifton Hill-City Circle junction to the draught relief shaft at the south end of Parliament Station—tunnel heading excavated
- City Circle—tunnel heading from Clifton Hill-City Circle junction to Wellington Parade South—fully excavated
- box tunnel in Flinders Street east yard for City Circle partly constructed. Bridging and shoring for excavation under existing Clifton Hill lines—completed
- box tunnel under the Spencer Street Railway yards—52% completed
- circular tunnel from the railway boundary at Adderley Street to Flagstaff Station—30% fully excavated

### Burnley loop

- the ramp near the corner of Jolimont Road and Brunton Avenue and the box tunnel under the Flinders Street Railway Yards—complete (except for a gap which has been left for access to the circular tunnel being constructed northwards under Spring Street from Wellington Parade South)
- circular tunnel from Wellington Parade South to Parliament Station—fully excavated and arch 28% concreted
- circular tunnel north of Parliament Station—tunnel fully excavated northward from Parliament Station under Spring Street and part way under the Commonwealth Centre; top heading excavated back from the ventilation shaft at the Commonwealth Centre towards the full section tunnel being excavated northwards; tunnel top heading excavation from the ventilation shaft towards Museum Station commenced
- circular tunnel from Adderley Street to Flagstaff Station—50% fully excavated and a further 14% of top heading excavated
- box tunnel under the Spencer Street Railway Yards—52% completed.

### Caulfield-Sandringham loop

- the ramp near the Melbourne Cricket Ground and the box tunnel under the tracks between Flinders Street and Richmond Stations and under the Flinders Street Railway Yards—complete (except for the gap which has been left for access to the circular tunnel being constructed northwards under Spring Street from Wellington Parade South)
- circular tunnel from railway boundary Wellington Parade South to Parliament Station—51% fully excavated and a further 18% of top heading excavated, 35% fully concreted
- circular tunnel from Adderley Street to Flagstaff Station—13% fully excavated and a further 31% of heading excavated
- box tunnel under the Spencer Street Railway Yards—44% completed.

### North Melbourne loop

- circular tunnel—fully excavated from the railway boundary on the south side of Wellington Parade South to Parliament Station and invert concreted
- circular tunnel from Adderley Street to Flagstaff Station—72% fully excavated
- the ramp for the eastern branch connection with existing tracks which surfaces at North Melbourne Station, the box tunnel and the splay tunnel for the western branch—completed
- retaining walls east and west of suburban tracks—completed
- North Melbourne loop ventilation shaft at Adderley Street—excavated and reinforcement placed for concrete lining.

### Parliament Station

- North Melbourne loop platform tunnel—fully excavated and concreted
- Burnley loop platform tunnel—fully excavated and 39% arch concreted
- relay room at north end of the station—excavated
- relay room at south end of the station—concreted
- platforms and cross passages—excavated and part concreted
- escalator declines, platform concourses and machine rooms
  - north end—upper escalator decline, intermediate concourse and machine room completed and top heading of lower concourse excavated
  - south end—upper escalator decline, intermediate concourse and machine room fully excavated and lower concourse top heading excavation commenced.

### Museum Station

- excavation—75% completed
- concrete structure—26% of reinforcement and 23% of concrete placed in the base slab; columns, walls and suspended slabs at east end of the station constructed.

### Flagstaff Station

- all wall drifts excavated except for the Burnley loop for which 80% was excavated
- 57% of the concrete columns connecting the drifts constructed
- North Melbourne loop and Clifton Hill loop-City Circle—south east and north east wall drifts concreted. Approximately 30% of the south west drifts concreted
- west draught relief shaft—excavated.

### Overpass Structure for elevated tracks

- investigations for substructure foundations and the diversion of services completed
- contract for overpass structure let; site establishment and mobilization of piling equipment commenced.

### Ancillary Works

- emergency exit from Caulfield-Sandringham box tunnel located at the corner of Brunton Avenue and Jolimont Road—concrete structural work completed
- new E signal box—constructed, equipped and commissioned
- ventilation shaft at Commonwealth Centre—excavated
- reconstruction of face of No. 8 platform Spencer Street Station—completed.
- new parcels subway access to platform 9/10 at Spencer Street Station—completed
- trackwork and signalling alterations associated with the construction of the Loop—effected as required by work progress.



### Centre Pages

Burnley loop tunnel between Jolimont area and Parliament Station site. The tunnel was excavated by full-face, rotary boring.

### Left

Lower platform construction of Museum Station. In the background formwork is in place for further slab and wall pours.

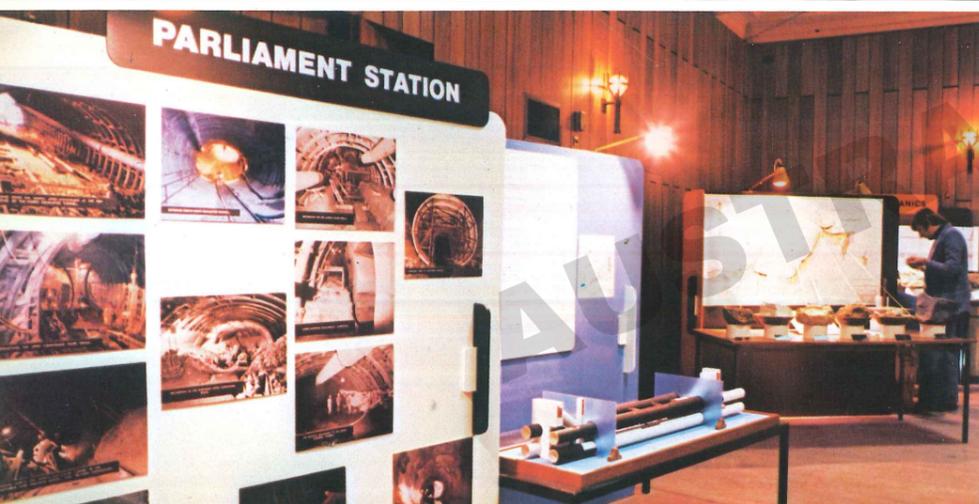
### Below

Museum Station is being built in open cut in LaTrobe Street, between Elizabeth and Swanston Streets.





The Authority's Project Exhibition was opened in the Lower Melbourne Town Hall during the last week in June and continued until the first week in July. The Premier of Victoria, the Hon. R. J. Hamer, E.D., M.P., left, officially opened the display. With him is the Chairman of the Authority, Mr. R. B. Roscoe.



The Project Exhibition attracted considerable public interest. Stands depicting different aspects of activity were a feature of the display.



## Construction Program 1976/77

### UNDERGROUND PORTION

#### Eastern section

- Tunnelling
  - continue construction for all four tunnels between Parliament Station and Wellington Parade South
  - continue construction of Burnley loop tunnel between Parliament and Museum Stations
  - proceed with construction of the North Melbourne loop tunnel between Parliament and Museum Stations.
- Parliament Station
  - complete concrete lining of lower level platform tunnel for the Burnley loop
  - proceed with excavation for upper level platforms and escalator declines between the upper and lower platforms.

#### Central section

- Tunnelling
  - proceed with the construction of the Burnley and Caulfield-Sandringham loop tunnels from Museum Station to Flagstaff Station
  - construct the North Melbourne and Clifton Hill-City Circle loops tunnels under Elizabeth Street.
- Museum Station
  - continue construction of Museum Station. Proceed with the manufacture of escalators and lifts.
- underpinning of buildings
  - complete the underpinning of three buildings at the intersection of LaTrobe and Elizabeth Streets.

#### Western section

- Tunnelling
  - continue construction of the four tunnels under LaTrobe Street from Adderley Street to Flagstaff Station.
- Flagstaff Station
  - continue excavation and underground construction of Flagstaff Station.

### APPROACHES FROM SURFACE TRACKS TO UNDERSTREET TUNNELS

- commence construction of the west ramp and box section tunnel leading from North Melbourne Station into the North Melbourne loop
- extend the Clifton Hill, Burnley and Caulfield-Sandringham box section tunnels in the Spencer Street railway yards
- construct the ramps in Spencer Street railway yards for the Burnley, Clifton Hill and Caulfield-Sandringham loops
- continue alterations to parcels handling facilities at the Spencer Street outward parcels depot
- rearrange trackwork in the overpass junction area to provide for loop operation

- complete the construction of, and install equipment required for, loop operation in the new No. 2 Signal Box at the north end of No. 13/14 platform, Spencer Street Station
- commence work on "Metrol", the new Metropolitan Train Control centre, Batman Avenue, in conjunction with the Victorian Railways Board
- complete work at "A Box" relay room and provide overhead structures associated with the rearrangement for loop working of trackwork in the "A Box" junction area between the west end of Flinders Street Station and the commencement of the overpass.

#### OVERPASS STRUCTURE FOR ELEVATED TRACKS

- proceed with construction of overpass structure to provide for two additional tracks between Spencer Street and Flinders Street Stations.

### Planning

Works schedules are continuously under review and are modified to suit changes in both the industrial and financial situations. The latest program allows for the opening of the Burnley Loop and Museum Station in December 1979 and completion of all works by 1982.

Overall project cost and annual cash flow forecasts are also frequently reviewed, taking into account changes indicated by Australian Bureau of Statistics labour and materials cost indices.

The design of entrances, booking halls and finishes for Parliament and Museum Stations is under close study. The Museum Station design is being reviewed with respect to a northern entrance for which properties have been acquired.

Investigation of both foundations and ground-water behaviour, as well as design, is proceeding for completion of the North Melbourne loop tunnel from Adderley Street to Dudley Street.

To determine the effectiveness of alternative methods of suppressing ground-borne noise and vibration, and to test them under operating conditions, lengths of two new systems of track support are to be laid in the Jolimont cutting, Clifton Hill line. One is the "R.S. STEDEF" concrete sleeper system and the other double concrete sleepers evolved from a design adopted by the Toronto Transit Commission, Toronto, Canada.

Studies are continuing into methods of reducing stray traction-current leakage from the electric train system, with a view to avoiding consequent electrolytic corrosion in nearby buried metallic structures such as pipes and services.

Planning for the provision of emergency light and power and other services in tunnels and stations is well advanced.

Surveying continues of the structural conditions of buildings adjacent to the Loop.

A continuous monitoring program is being maintained to ensure that specified limits for vibration and movement resulting from construction activities are not exceeded.

Planning is proceeding for the provision of a computer-based train describer system by which train movements can be monitored and controlled and despatch information displayed at stations for passengers. This will be integrated with a new central train control facility, "Metrol", currently being designed by the Victorian Railways Board, in association with the Authority.

### Industrial Relations

The Authority's contractors experienced their worst year of industrial disruption on Loop work and about 21% of the total work time available was lost because of union action.

The demarcation dispute in force at the end of the previous year developed into major proportions with bans being imposed on the supply of concrete to all building sites in the Central Business District. The dispute was settled in mid August but an overtime ban by crane drivers which affected construction at Museum Station continued until the end of the following March.

Logs of claims submitted to contractors at the end of 1975 were resisted by the contractors. The claims went to Arbitration and the Authority intervened in the public interest in the numerous hearings before the Conciliation and Arbitration Commission.

Extensive strike actions and bans caused loss of work from mid March to mid May when production was resumed on all sites.

Since the end of the financial year work has proceeded without significant interruption from industrial disputes.

### Safety

During the year the Authority together with its Consultants and Contractors further developed a Safety program.

The aims of the Safety program are—

- to co-ordinate the safety efforts of all involved in the construction.
- to promote safe working practices and safety consciousness.

The co-ordination of the program is the responsibility of a "Joint Safety Council". The Council members, drawn from top management of the Authority's Contractors, its Principal Consultants, the Victorian Railways Board, and the Railway Construction Board, are under the chairmanship of a representative of the Authority.

The implementation of the policies determined by the Joint Safety Council and the promotion of safe working practices and safety consciousness are the responsibilities of a "Safe Working Committee" whose members are the senior project managers on loop works for the Authority's Contractors, supervising engineers of the Authority's Consultants and senior executives of the Authority.

A "Safety Booklet" has been produced which outlines basic principles for safe working and is issued by each contractor to his workmen. A "Supervisors' Safety Handbook" is in course of publication.

In recognition of the adjudged best safety performance and to stimulate safety consciousness on the job, trophies are provided by the Joint Safety Council. They are awarded quarterly to the worksite and to the key supervisor with the best safety record, and weekly to workmen winning competitions relating to safety matters.

### Land Acquisition and Other Matters Affecting Property

It was not necessary to serve any further Notices to Treat during the year.

Possession was obtained before 30th June 1976 of all properties to the north of Museum Station for which Notices to Treat were served in 1975 and all buildings thereon have been demolished.

In preparation for work on the new overpass, the building on the south west corner of Spencer and Flinders Streets was demolished.

Settlement of compensation claims proceeded during the year as agreement was reached in negotiations with owners and occupiers. No cases were referred to a Land Valuation Board or taken to the Supreme Court during the year and only nine claims remain to be finalised in respect of all property acquired since commencement of loop construction.

Arrangements were made with the Argus & Australasian Limited to lease the car park adjoining the Argus building in LaTrobe Street for use as a work site for construction of the tunnels between Museum and Flagstaff Stations.

#### LaTrobe Street Designated Area

In September 1975 Cabinet appointed a Steering Committee, which included representation by the Authority, to study the block bounded by LaTrobe, Swanston, Lonsdale and Elizabeth Streets. This area, adjacent to Museum Station, had been gazetted an "Investigation Area" under the Development Areas Act in January 1974 following publication of the Feasibility Study Report on the block commissioned by the Authority and Melbourne City Council in 1973. On 2nd July 1975 the area was declared a "Designated Area" under the Act following the Report prepared by the Town and Country Planning Board.

The Steering Committee prepared an outline plan and recommendation for the development of the area and on the 18th March 1976 the then Minister for Planning, the Hon. A. J. Hunt M.L.C., announced that the Steering Committee's report had been submitted to Cabinet.

The Report recommended a development and management program to consolidate and mobilise the site area necessary to enable a viable and desirable form of initial development to take place to fit in with the opening of the underground system. This calls for integrated commercial development over the north-western quadrant of the area and an adjacent wide corridor of land linking Museum Station to Lonsdale Street.

The proposed development plan is designed to strengthen the Central Business District as the principal social and commercial centre of the metropolitan area by effectively and attractively linking Museum Station, the key station of the Melbourne Underground Rail Loop, with the city's retail and commercial centre.

## Finance

### Loans

For 1975/76 the Authority was authorised to borrow \$35,020,000 of which \$20,000 was to redeem a maturing loan. The remaining \$35,000,000 represented 13.6% of Victoria's loan allocation for new works for that year.

Loans for the Authority's total allocation for the year were raised by private placements against the security of the Authority's Inscribed Stock, which is guaranteed by the Government of Victoria.

More difficulty was experienced in filling the loan allocation than in previous years due mainly to the shift of funds in the latter part of the year away from the Savings Banks, the Authority's largest loan subscribers, mainly into Australian Government Savings Bonds which attracted \$1,110 million between February and June; and also to the 19% (approximately) reduction in the percentage of Government Securities to total depositors' funds required to be held by Savings Banks. This latter measure, introduced the previous year, became fully effective in 1975/76.

The Inscribed Stock issued during the year, the total Inscribed Stock issued to the 30th June 1976 and the amounts of Inscribed Stock outstanding as at that date at the various interest rates applicable thereto are shown in the following table:

Rate % P.A.	Issued During 1975/76 \$	To 30/6/76 \$	Outstanding at 30/6/76 \$
10.5	30,725,000	30,725,000	30,725,000
10.35		612,000	612,000
10.3	2,095,000	15,975,000	15,922,500
9.9		600,000	596,500
9.85		5,508,000	5,506,750
9.8	2,200,000	2,200,000	2,200,000
9.5		50,000	50,000
8.9		1,020,000	1,020,000
8.7		4,990,000	4,990,000
7.4		11,305,000	11,131,267
7.3		1,688,100	1,666,850
7.15		25,000	25,000
7.1		3,170,000	3,110,000
7.0		41,900	41,900
6.9		570,000	570,000
6.7		10,000	10,000
6.6		50,000	50,000
6.4		7,250,000	7,110,156
6.3		1,000,000	992,500
6.2		3,150,000	3,120,000
6.0		1,000,000	985,000
5.7		100,000	100,000
	<u>\$35,020,000</u>	<u>\$91,040,000</u>	<u>\$90,535,423</u>

Other liabilities of the Authority at the 30th June 1976 included an advance from the State Government's Works and Services Account of \$1,987,944 which bears interest at 8.9% p.a.

### Temporary Financial Accommodation

During the year the Authority's working overdraft and standby arrangements with trading banks, which had been arranged to meet any shortfall in its loan raisings, were renewed. It was not necessary to have recourse to any of the standby arrangements.

Under the recent amendments to the Melbourne Underground Rail Loop Act, the Authority is now authorised to obtain temporary accommodation by such other means as the Treasurer approves.

## Expenditure

The Authority's expenditure for the year on loop works, other fixed assets and administrative expenses amounted to \$34,780,454. Total expenditure to date for the same items is \$89,047,267.

Interest payable, less interest receivable, amounted to \$5,564,219 for the year and totals \$10,323,158 to the 30th June 1976.

The Authority did not expend the full amount programmed for 1975/76 principally due to:

- the disruption of contract works due to industrial stoppages.
- the inability to let all contracts when programmed because of the uncertainty of finance likely to be available in the subsequent years.
- delays in reaching agreement on the compensation payable for properties acquired.

### Treasurer's Determination

As required by the Act and in accordance with a determination made by the Treasurer of Victoria, the Authority duly received the following contributions to loan redemption payments and interest on loans (in the Act referred to as "Loan Redemption Payments")

From City of Melbourne	\$1,260,775
Melbourne & Metropolitan Board of Works	1,260,775
Victorian Railways Board	1,394,801
Consolidated Fund	1,126,749

Interest earned by the Authority is deducted from interest payable by it in the calculation of the "Loan Redemption Payments".

No amount was required to be paid in the year to the Authority for the purpose of defraying administrative expenses.

### Investment of Unused Funds

Under recent amendments to the Authority's Act, the Authority is now specifically authorised to invest any moneys held by it that do not form part of any sinking fund provided by the Authority for the purposes of redeeming loans, and are not for the time being required for the purposes of its Act, in such manner as the Treasurer from time to time approves. A wide range of investments has been authorised.

The Authority has continued to invest funds which are not immediately required mainly with subscribers to the Authority's loan issues or their affiliated "official market" companies.

The amount of interest receivable by the Authority for the year amounted to \$1,442,800.

### Proposed Borrowings

For 1976/77 the Authority has been authorised to borrow \$37 million for new works by way of issues of its Inscribed Stock or Debentures. This sum represents approximately 12.1% of Victoria's total allocation for semi-government issues in the year for new works.

Most of the amount which the Authority may borrow in 1976/77 is required to meet commitments under contracts which have already been let.

### Proposed Expenditure

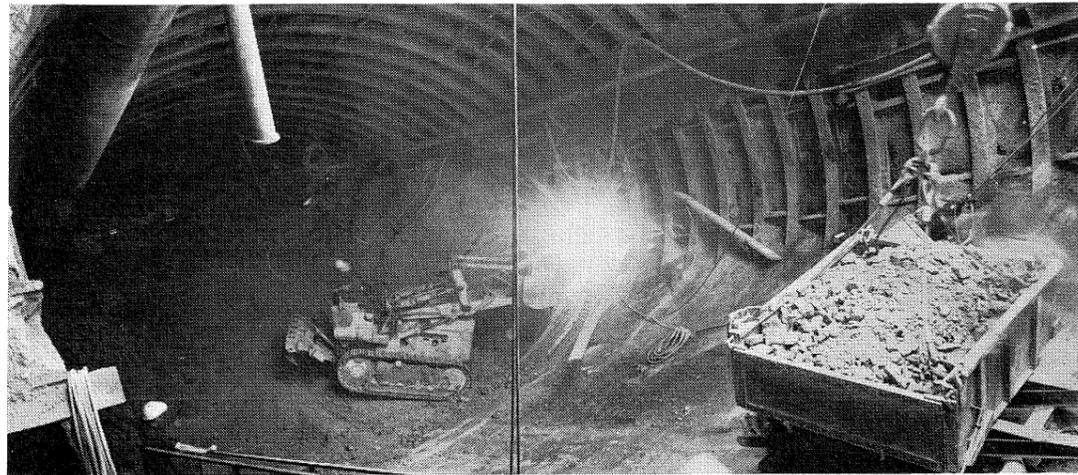
The total expenditure proposed by the Authority in 1976/77 is \$53.1 million including interest and redemption payments of \$9.1 million.

### Revised Construction Cost

The estimated cost of the works, based on costs of materials and labour at June 1976 prices is \$226 million, exclusive of the cost of land acquisition, signalling and communications, booking halls not previously provided for, consultancy, administration and interest on moneys borrowed. This compares with \$192.6 million stated in the 1974/75 report based on June 1975 prices and the Authority's first estimate of \$117.23 million for the same items based on prices current in the last quarter in 1971.

The increased estimate is due principally to increases in the costs of materials and labour.

The excluded items, other than interest on moneys borrowed, are expected to cost in the order of \$75 million making a total estimate of \$301 million for the cost of the Loop at June 1976 prices.



Spring Street is supported by a "cage" of steel ribs and concrete beams while mechanical loaders, skips, trolleys and cranes are used to bring excavated spoil to the surface from the inclined tunnels being constructed for future escalators.

### Information Services

Since inception the Authority has maintained a comprehensive recording and reporting service which has been sufficiently technical to meet the special interests of students in engineering and related disciplines as well as the public generally.

Displays were presented during the year to enable members of the public to gain more appreciation of the nature and scope of loop work which it is not possible for them to inspect personally. Two major exhibitions on a comprehensive scale were arranged, one in the Caulfield-Sandringham box section tunnel at Jolimont during March and the other in the Lower Melbourne Town Hall over the period from 24th June to 3rd July. The latter project, officially opened by the Premier the Honorable R. J. Hamer, E.D., M.P., attracted considerable interest from the business community.

Site inspections were conducted for professional and technical groups and for representatives of financial institutions investing in the Authority's Inscribed Stock.

Speakers were provided for addresses and lectures on the Loop to community groups, professional associations and educational bodies. Papers were presented at two seminars organised by professional bodies.

Copies of the film "Loop", which are made available through the State Film Centre, the Victorian Education Department and a commercial distributor, were in continuous use.

Several new publications were produced on various aspects of Loop activity, supplementing previous literature distributed as educational material for the community in general, and student youth in particular.

### Acknowledgements

Advice and assistance given by the Hon. E. R. Meagher, C.B.E., E.D., M.P., and his successor in the portfolio of Minister of Transport, the Hon. J. A. Rafferty, M.P., were of special value to the Authority. Mr. Meagher retired at the end of the 46th Parliament. His association with the Loop project pre-dated the Melbourne Underground Rail Loop Act of 1970 by more than a decade. It was pleasing that his final Parliamentary portfolio should have involved him so directly with the Loop program.

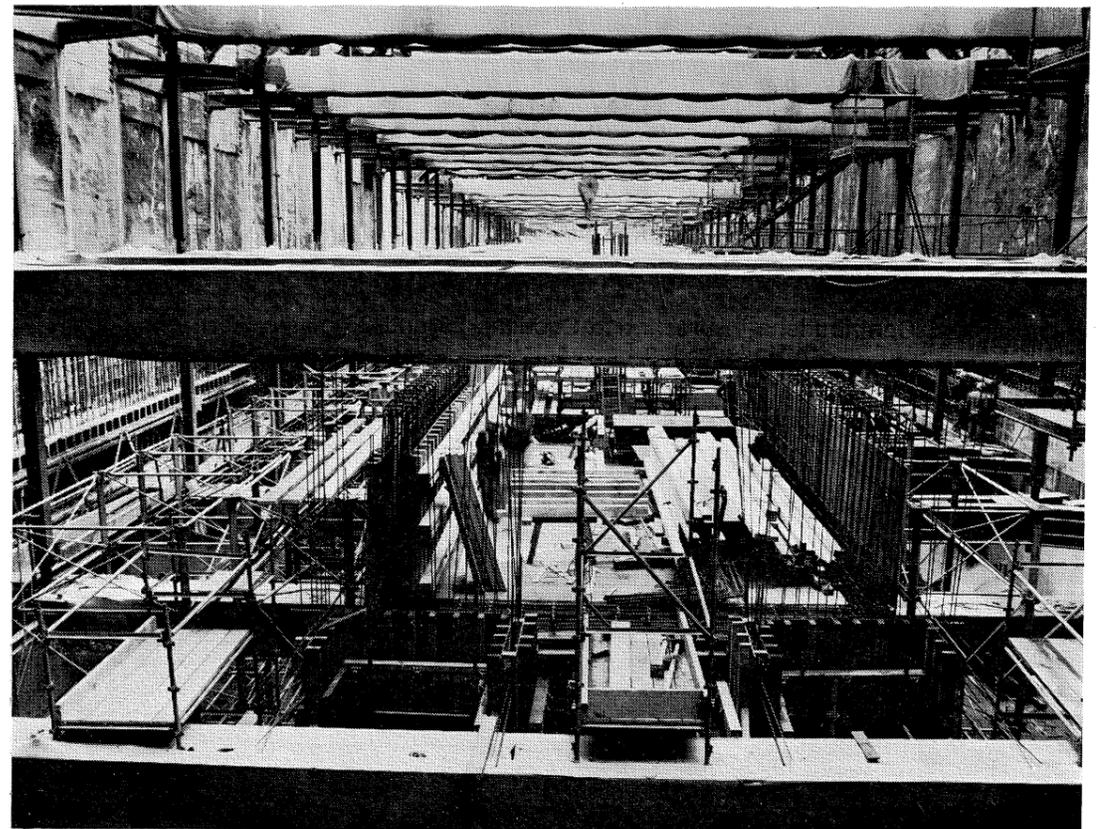
The Authority places on record its appreciation of the co-operation afforded by the Director of Transport and the staff of the Ministry, the State Treasury, the Railway Construction Board, the Victorian Railways Board, government departments, statutory bodies, and the Melbourne City Council.

Thanks are extended to the investors who subscribed to the Authority's 1975/76 financial requirements and to those who have indicated their intentions to subscribe in 1976/77.

John Connell-Mott, Hay & Anderson, Hatch, Jacobs, the Authority's principal consultants, together with consultants in specific areas, sub-consultants and research bodies have continued their major contribution to the overall program.

The Authority was valuably aided by the guidance of its legal and other professional advisers, and the dedicated work of its officers.

For the construction of Museum Station, 3000 tonnes of temporary steel piles and horizontal struts support the sides of a 100 000 cubic metres hole as the permanent, reinforced concrete structure is built to support trains, platforms, escalators, pedestrian concourses, station facilities and the roadway and tramway when re-instated.



## Statement of Financial Position

As at 30th June 1975		As at 30th June 1976
\$	\$	\$
<b>Fixed Assets—See Note 1</b>		
42,473,585	Loop Development Account—See Note 2	74,104,206
87,816	Plant	99,937
90,230	Office Furniture Fittings & Equipment	94,204
3,286	Motor Vehicle	6,609
10,111,454	Land Acquisitions & Expenses—See Note 3	12,693,480
52,766,371		86,998,436
167,886	<b>Investment—Sinking Fund</b>	318,256
<b>Current Assets</b>		
—	Cash at Bank and on Hand	66,548
7,500,000	Investments—Short Term	6,971,000
266,443	Accrued Interest Receivable	384,052
147,928	Prepayments	416,709
1,704	Debtors	—
7,916,075		7,838,309
<b>Intangibles—Capitalised Costs</b>		
1,500,442	Administrative Expenses—See Note 4	2,048,831
4,758,939	Interest (Net)—See Note 5	10,323,158
158,660	Contributions to Sinking Fund	293,660
6,418,041		12,665,649
67,268,373		107,820,650
<b>Less Current Liabilities</b>		
74,216	Bank Overdraft	—
12,680	Less Cash at Bank and on Hand	—
61,536		—
—	Inscribed Stock Applications	490,000
1,102,550	Sundry Creditors	307,487
1,093,098	Accrued Interest Payable	2,055,984
7,665	Contractors Deposits	6,967
2,264,849		2,860,438
<b>Reserves</b>		
167,886	Sinking Fund Reserve	318,256
2,432,735		3,178,694
\$64,835,638		\$104,641,956
<b>SOURCE OF FUNDS</b>		
<b>Contributions—Pursuant to Sections 25 and 26 of the Act</b>		
To Loan Redemption Payments		
1,920,539	Victorian Railways Board	3,315,340
1,220,349	City of Melbourne	2,481,124
1,220,349	Melbourne & Metropolitan Board of Works	2,481,124
520,156	Consolidated Fund	1,646,905
4,881,393		9,924,493
To Administrative Expenses		
56,975	Victorian Railways Board	56,975
For Capital Works		
2,137,121	Victorian Railways Board	2,137,121
7,075,489		12,118,589
<b>Loans</b>		
55,765,915	Secured by Inscribed Stock	90,535,423
1,994,234	Works and Services Account	1,987,944
57,760,149		92,523,367
\$64,835,638		\$104,641,956

## Notes on Statement of Financial Position

Year Ended 30/6/75		Year Ended 30/6/76
\$	\$	\$
<b>Note 1</b>		
<b>Fixed Assets</b>		
Fixed Assets are shown at cost		
No provision is made for Depreciation		
<b>Note 2</b>		
Loop Development Account includes advances to contractors on account of future works of \$2,900,000		
No provision has been made for the value of work which may have been done by contractors but which had not been certified by the Authority's Consultants (as "Engineer" under the contracts) as at 30th June, 1976.		
<b>Note 3</b>		
The Authority has taken possession of certain land for which it has not reached agreement as to the amount of compensation payable		
The value of that land and provision for such compensation are not included in the Statement of Financial Position		
<b>Note 4</b>		
<b>Administrative Expenses</b>		
301,930	Salaries and Allowances	336,481
187,416	Other Administrative Expenses	211,908
\$489,346		\$548,389
<b>Note 5</b>		
<b>Interest (Net)</b>		
4,010,697	Paid and Payable	7,007,019
1,141,286	Less Received and Receivable	1,442,800
\$2,869,411		\$5,564,219



W. L. R. Daniels  
Secretary.

### Audit Certificate

The books and accounts of the Melbourne Underground Rail Loop Authority for the year ended 30th June, 1976, have been audited.

The foregoing statement of balances, read in conjunction with the explanatory notes, is in my opinion, properly drawn up so as to exhibit a true and fair view of the financial position of the Authority as at 30th June, 1976.



B. Hamilton  
Auditor General.  
25th October, 1976

## Melbourne Underground Rail Loop Authority

### Senior Officers

#### General Manager and Director of Engineering

F. G. Watson, BA, MIEAust, FAIM, MIET, M-SAE-A

#### Senior Executive Engineer

R. A. Wegener, ED, BE, MIEAust, AMAIMM

#### Executive Engineer, Electric Power Signals and Communications

M. F. R. Thomson, Dip EE, Dip MechE, MIEAust

#### Assistant Contracts Manager, Architectural Contracts

J. Skopakow, Dip Arch

#### Assistant Secretary and Registrar

J. C. Davey, AASA, ACIS

#### Senior Administrative Officer

C. Davidson Johnstone

#### Secretary and Assistant General Manager — Administration

W. L. R. Daniels, FCIS, FASA

#### Chief Manager, Works and Contracts

M. C. Healy, BME, FIEAust, AMAIMM

#### Executive Engineer, Railway Activities

G. G. Bennett, BCE, MIEAust, MICE

#### Executive Engineer, Structures and Buildings

E. G. Terry, BE, MIEAust

#### Manager, Accounting and Contracts Administration

M. Armstrong, AASA, ACIS, AAIM

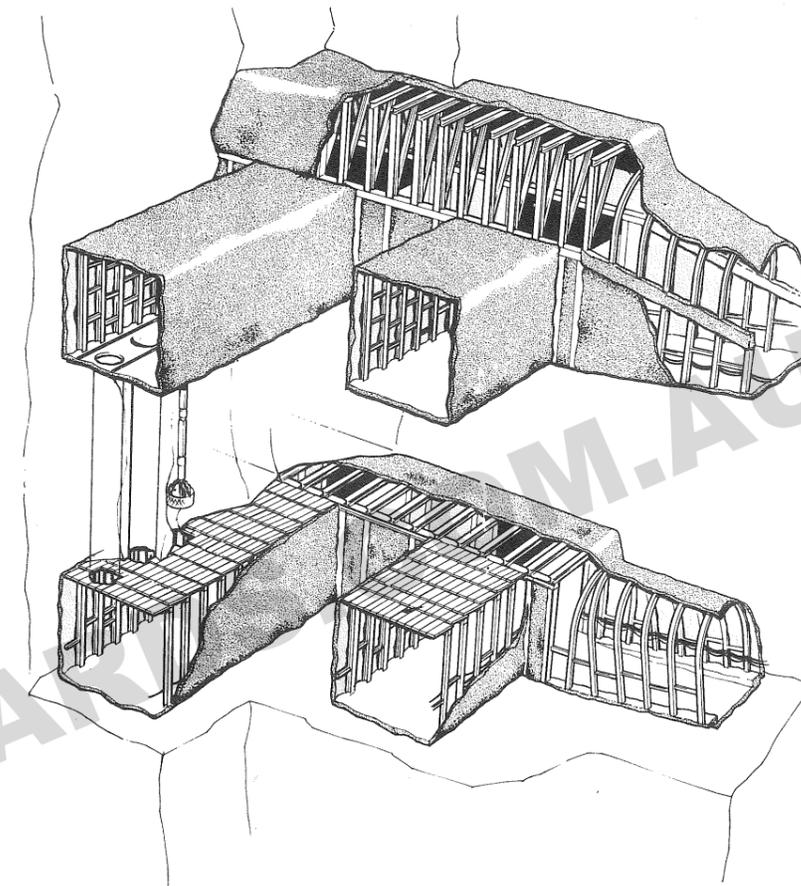
#### Information Services Officer

T. J. Dwyer, BA, AFAIA(Dip)

In order to excavate the upper tunnels through soft ground in an old river bed under Elizabeth Street, the Melbourne and Metropolitan Board of Works has mined an adit tunnel in preparation for an air lock to apply any air pressure required for reducing the flow of water into tunnels during construction.



## Melbourne Underground Rail Loop Authority



### Flagstaff Station

From central sloping access adits at the upper and lower levels a pair of platform tunnels is being constructed under each side of LaTrobe Street. A drift is excavated along each corner of each pair. From the upper drifts, holes are drilled to the lower drifts. Larger tools are attached to the drill rods and the holes are raise-bored to one metre diameter. Each hole is used to form reinforced concrete piers. Concrete beams are poured in each lower drift to support the piers and further concrete beams are poured in each upper drift on top of the piers. These form the permanent support for the station roof arches and the ground and traffic above while the main excavation and concreting proceeds below. (The final escalator and under-street concourse compartments are not shown in these diagrams.)

