

CHRISTCHURCH - LYTTELTON ROAD TUNNEL



OFFICIAL OPENING

by

HIS EXCELLENCY BRIGADIER SIR BERNARD FERGUSSON

G.C.M.G., G.C.V.O., D.S.O., O.B.E.

Governor General of New Zealand

on

THURSDAY, 27th FEBRUARY, 1964

*“Gateway to the Plains”
Aerial Photography by V. C. Browne*





MR. R. A. WITBROCK, Chairman
Chairman of Finance Committee
Appointed by
The Governor General

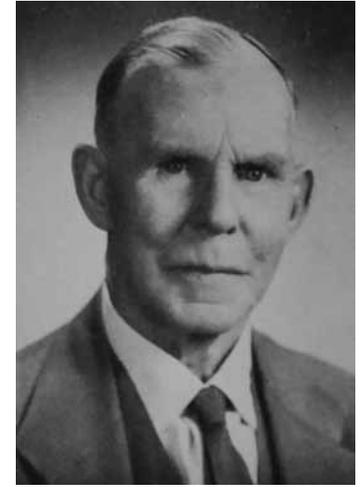


MR. V. G. SPILLER
*Deputy Chairman
and Chairman of Staff Committee*
Appointed by the Boroughs

MEMBERS
OF
THE
AUTHORITY



MR. L. G. AMOS, J.P.
*Chairman of Traffic
and Public Relations Committee*
Appointed by
The Christchurch City Council



MR. W. P. GLUE, O.B.E.
Chairman of Works Committee
Appointed by
The Christchurch City Council



MR. J. J. B. CONNOR
Appointed by
The Governor General



MR. J. B. COLLETT, J.P.
Appointed by
The Lyttelton Borough Council



MR. F. W. FREEMAN, O.B.E.
Appointed by the Counties



MR. L. H. WILSON
General Manager



MR. F. G. K. GILCHRIST
Secretary-Treasurer

OPENING CEREMONY

Programme of Events – 2.30p.m.

The arrival of His Excellency the Governor General will be announced by a fanfare of trumpets.

The National Anthem and breaking out of His Excellency's Standard.

Presentation of Bouquet to Her Excellency by Miss Jennifer Witbrock.

Address by Mr. R. A. Witbrock, Chairman of the Christchurch-Lyttelton Road Tunnel Authority.

Address by the Right Honorable K. J. Holyoake, C.H., Prime Minister of New Zealand.

Dedication of the Tunnel by the Right Reverend A. K. Warren, M.C., M.A., Bishop of Christchurch.

Address by His Excellency the Governor General.

Presentation to His Excellency the Governor General by Mr. V. G. Spiller, Deputy Chairman of the Christchurch-Lyttelton Road Tunnel Authority.

Cutting of the Ribbon by His Excellency the Governor General.

Departure of the Official Party for drive through the tunnel to the Upham Memorial Gardens, Lyttelton for afternoon tea.

Departure of invited guests for official drive through the tunnel to the Upham Memorial Gardens, Lyttelton for afternoon tea.

Departure of His Excellency the Governor General from the Upham Memorial Gardens.

Departure of invited guests for drive back to Christchurch through the tunnel.

First toll to be taken by Mrs. R. A. Witbrock

Christchurch-Lyttelton Road Tunnel officially open for traffic.

Music at the Heathcote Portal by Woolston Brass Band, includes march "*Gateway to the Plains*" composed for the occasion by T. J. Kirk-Burnnand, Esq.

Music at Upham Memorial Gardens by Lyttelton Marine Band. This includes the march "*Lyttelton*" composed for the occasion by T. J. Kirk-Burnnand, Esq.

FULFILMENT OF PLANNERS' HOPES

The opening of the Christchurch-Lyttelton Road Tunnel by His Excellency Brigadier Sir Bernard Fergusson, represents the completion of a project which for many years has been the objective of a group of enthusiasts and the desire of thousands of Christchurch, Lyttelton and Canterbury people.

But fulfilment of the desires has had to surmount many difficulties – an active group pulling against a tunnel and wanting a port in Christchurch City, a World War which put a stop to all but the essential public works and delay in sanctioning finance for the project.

With all these difficulties overcome, the Road Tunnel Authority, provided for by legislation in 1956, has had the assistance of the contractors and the Ministry of Works, as engineering consultants, in pushing through a direct road link between port and plains.

Drawing on the toll-collecting experience of the Auckland Harbour Bridge Authority and traffic regulations and safety precautions in tunnels in many parts of the world, the Authority presents a tunnel which is among the world's most modern.

The first Chairman of the Authority was Mr. W. S. MacGibbon, who had been an enthusiast for many years and one of the driving forces in the Tunnel Road Promotion Committee. Mr. R. A. Witbrock, the present chairman, another Promotion Committee executive member, was appointed the other Government nominee and was Deputy Chairman until the death of Mr. MacGibbon, in 1962.

Other original members still on the Authority are Messrs. V. G. Spiller, the Deputy Chairman, L. G. Amos, F. W. Freeman and W. P. Glue. Mr. J. B. Collet replaced Mr. W. Morris in 1961, and Mr. J. J. B. Connor joined the Authority in 1962, to fill the vacancy caused by Mr. MacGibbon's death.

When Christchurch and Lyttelton were settled from 1850, access between the city and the port was either by way of the Bridle Path over the Port Hills or by water via Sumner and the Heathcote-Avon Estuary. Canterbury in those days could best be described as a “trackless waste” but the early pioneers saw the immensities of the development of Canterbury and went to work with great courage and faith in the future. In 1851, the year after the arrival of the first colonist, a Select Committee of three was set up to inquire into the best means of access to the sea. There were several proposals put forward.

1. A bridle path-this was considered to laborious because of the steepness of the hills.
2. A sea route over the Sumner bar by open boat-this was considered too dangerous.
3. A road tunnel-one reason advanced against this was that horses would catch cold coming from the hot plains into a cold tunnel.
4. A road via Evans Pass.

The Evans Pass Road was chosen at a cost of about £30,000 and was opened in 1857.

Then came the increasing use of the steam engine invented by Stephenson so a report was obtained from a nephew of his, one G. R. Stephenson. This led to the construction of the single-line rail tunnel which began in 1860 and was opened for traffic in 1867. The striking of hard rock caused



General view of Heathcote Valley with work in progress.



abandonment at one stage. The cost of that project was £200,000 and this had been paid for by the people of Canterbury by the time the Canterbury Provincial Government went out of existence when the General Assembly came into being. When the rail tunnel was opened there were only 10,000 people in the whole of Canterbury. This indicates the wonder of the achievement. One hundred years later that same method of communication between Lyttelton and Christchurch is the main connection.

As traffic increased and with the advent of motor transport the need for extra facilities became more pressing. Two alternatives-a further tunnel or canal-became the subject of considerable argument. In 1919 an Australian firm offered to construct a road tunnel in 3 years for £700,000 but the scheme lapsed. From then there were bursts of public enthusiasm in favour of the road tunnel scheme followed by long periods of inactivity. The Port and City League was formed 1922 with its principle objective the formation of a road tunnel. There was also a Port Christchurch League which advocated a Port Christchurch at the estuary. Sir Joseph Ward, Prime Minister and Minister of Railways in 1929, arranged a Government grant of £1,000 to the Port and City League, provided, a similar sum was raised by the League. This was regarded by the League as a significant gesture of official backing. In 1930 a “Direct Access to the Sea Commission” was held and the Commission reported that they could not recommend the adoption of the proposals for either a road tunnel or a Port Christchurch. This decision was mainly because of economic and cost considerations. Suggestions for improving the rail facilities were given and it was even suggested that the Lyttelton Harbour Board might consider taking over the running of the railway to give unified control of operation the greater advantage of both shipping and merchant interests.

Opening of Heathcote Portal area prior to Drilling-11th July, 1961.

In 1937, a Conference representative of 28 public bodies was convened by the Prime Minister, Mr. M. J. Savage. A strong recommendation for the construction of a road tunnel was made but this came to nothing when the Second World War stopped all but essential works and services. Just 20 years ago, in 1943, another Conference representing 19 public bodies constituted itself into the "Tunnel Road Promotion Committee." A definite step took place the following year when the Minister of Works, Mr. R. Semple, met deputations from both the Tunnel Road Committee and the Canal League. He considered that the canal scheme, then estimated to cost £5,000,000, had no hope of success, whereas he was very favourably impressed with the road tunnel scheme, then estimated to cost £700,000. With this official support the road tunnel scheme started to make real progress although still very slowly.

A Gazette notice was issued in June, 1949, authorising the construction of a motorway as a tunnel road. This was followed in 1952 by a survey defining the limits of the land required. In October, 1956, the Christchurch-Lyttelton Road Tunnel Bill was passed. This provided for a seven man Authority to construct and control a tunnel road with authority to fix and collect tolls for the use of the Tunnel to meet the cost of construction and operation. The Government guaranteed the repayment of loans raised by the Authority.

Arrangements were made for the Ministry of Works to be the Chief Consultants to the Authority and no time was lost in preparing plans and calling for tenders.

Drilling Jumbo starting work at Heathcote Portal—3rd August, 1961.



Various proposals were considered and much thought given to items such as size and ventilation. A drilling programme was carried out in the proposed portal areas to locate bedrock. An early plan provided for a width of 37 feet with cycle track each 5ft. 6ins. on either side and a roadway of 24 feet. The provision of cycle tracks was estimated to involve an extra cost of £500,000 so it was finally decided not to include them. The Tunnel has therefore been constructed with a 24 feet roadway and 2 feet kerbs on either side giving a total width of 28 feet at ground level. The kerbs are not intended as walkways but they will be useful for maintenance personnel and will also help in keeping motor vehicles just that little extra distance away from the tiled walls, thus preventing possible damage to the tiles through vehicles scraping along the walls.

Then there occurred difficulty with the Local Authorities Loans Board in obtaining sanction to the raising of a loan. After deputations to the Prime Minister (Mr. Nash) and the Minister of Finance (Mr. Nordmeyer) approval was given in March, 1960 for the Authority to raise a loan of £3,250,000. So far £2,652,330 has been raised, most of it in large sums at 4½% and 5%.

Tenders were received in January, 1961, and these ranged from £1,949,000 to £3,774,000.

The contract was let on 28th January, 1961, to the lowest tenderer, Messrs. Fletcher-Kaiser, combining the Fletcher Construction Co. Of N.Z. and Kaiser Engineers and Constructors Inc, of U.S.A. The National Roads Board is meeting the cost of the motorway from Ferry Road to the

Driving Pilot Tunnel from Lyttelton Portal—6th April, 1962.

Heathcote Underpass near the Heathcote portal, a distance of some 2½ miles. This will involve an expenditure of something like £530,000 including provision for bridges over the Heathcote River and the Lyttelton railway line and an interchange and underpass system at the bottom of Horotane Valley. This motorway will ultimately be passed by the National Roads Board to the Authority for control and maintenance.

Thus, just over 4 years after the passing of the Road Tunnel Act, the contractors moved on to the site and began construction. Although the contract price is in the vicinity of £2 million and the final cost will of course be greater because provision has had to be made for such items as any extras on the contract, loan interest during construction, purchase of property, consultants' fees to the Ministry of Works and an administration building with toll plaza. The total cost excluding the motorway will be in the vicinity of £2,700,000. The Authority has power under the terms of its loan authority to meet interest out of loans up to the middle of 1966 and when this is added the total loans will be close to £3 million.

The motorway commences at Ferry Road near Dyers Road where there is a bridge over the Heathcote River, There is a traffic roundabout here astride Ferry Road and the Christchurch City Council plans to connect with a new road in a direct line to Linwood Avenue



Lyttelton Portal after final break through—21st August, 1962.



(the old Canal Reserve) to relieve Ferry Road of traffic. The line of the motorway runs direct to the bottom of Horotane Valley and then along the hillside above Heathcote in an easy grade to the Heathcote portal and the toll plaza. As the motorway is approximately 2½ miles long and the Tunnel is approximately 1¼ miles long, the extent of the Authority's control will stretch for about 4 miles, There is a saving of 5 miles in the trip by road to Lyttelton when compared with the Evans Pass route and of course the steep and difficult hill climb will be avoided. The Lyttelton portal is slightly closer to Cathedral Square than Sumner. The motorway has a formation width of 45 feet with a sealed carriageway of 24 feet which can then be widened to cater for increased traffic in the future.

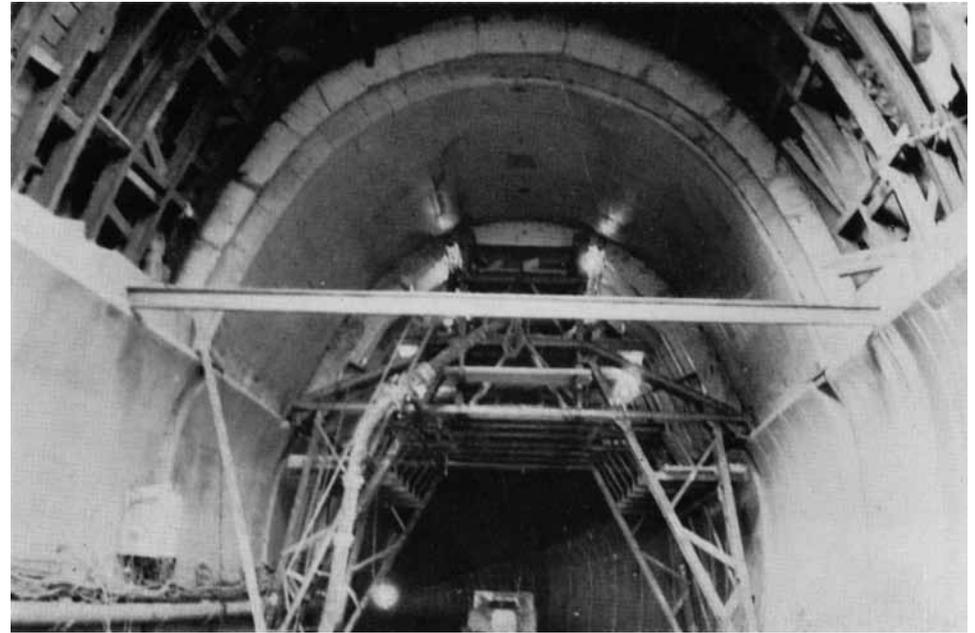
The boring of the Tunnel involved the removal of 200,00 yards of material and this was accomplished in one year almost to the day. The spoil was used in the formation of the motorway. A total of 50,000 cubic yards of concrete has been used in the tunnel walls arch lining and roadway through the Tunnel. The finished floor of the Tunnel is concrete. The length of the Tunnel is 6,377 feet or approximately 1.2 miles or just a little longer than the Rakaia Bridge. The trafficable width is identical with the Rakaia Bridge—2—12ft lanes—but with a 2 feet kerb on either side. The size is about 4 times that of the rail tunnel and approximately half is taken up with the ventilation system in ducts above the ceiling which will be 14 feet 7 inches above the roadway with slight variations depending on the slope in the roadway for

Interior of Tunnel with Footings and Walls concreted but Arch and Roadway still to be concreted.

drainage purposes. The slope is to the centre with the drainage sumps connected to the drain pipes running the entire length of the Tunnel from Heathcote to Lyttelton. There is a gradient of 1 in 38 sloping to Lyttelton which means that the Lyttelton portal is about 162 feet lower than the Heathcote portal. At each end of the Tunnel there is a curved section some 300 feet long to cut down the effect of entering into bright daylight and to provide a silhouette so that drivers can judge distance more easily.

The walls and ceilings are tiled off white on the walls and yellow on the ceiling. This is a large item in the contract, somewhere about £287,000. Great care has been taken in the selection of proper adhesives. Many tests have been conducted. If all the tiles being used were placed end to end they would stretch about 115 miles or from Christchurch to Timaru. Each tile is 6 inches square and there will be approximately 1½ million of them covering 7 acres. Tiles were chosen because of cleanliness, light reflection and low maintenance costs. With continuous traffic, painting a concrete or plastered surface would create many difficulties and would still have to be cleaned in the same way as tiles. The ventilation system is in the ceiling. This has been formed by using precast, prestressed concrete slabs. The diaphragm slabs dividing the inlet and outlet ducts were put up first, suspended from the centre of the arch by stainless steel hangers. Each hanger was tested in situ to twice the weight they are required to carry. The slabs weigh about 2½ tons each and when tiled close on 3 tons. The ceiling slabs were tiled on the ground in the Tunnel and then reversed and lifted into position, resting on

Arch being formed with concrete pump-14 August, 1962



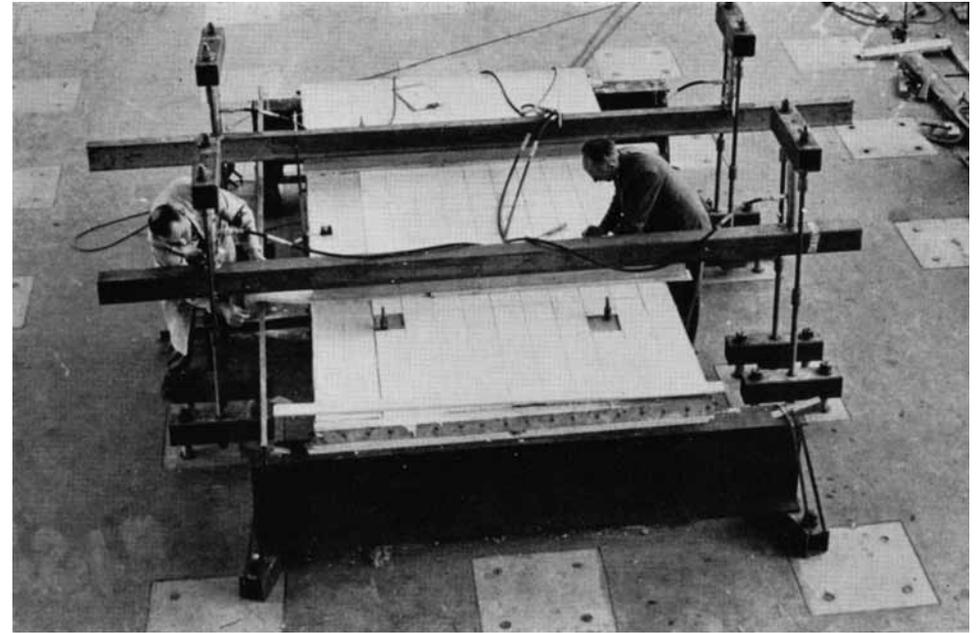
a corbel each side and bolted to the diaphragm slab in the centre. This meant the construction of a special lifting apparatus. These ventilation ducts are divided halfway along the Tunnel by steel bulkhead doors so that in the event of a breakdown of fans at one end the fans at the other end will be able to cope with the ventilation. The bulkhead doors will be remotely controlled from the Tunnel Supervisor's desk in the Control Room at the administration building. The fan houses at each end contain exhaust and intake fans each capable of moving 320,000 cubic feet of air each minute running at full speed but it is expected half maximum output will be required only in emergencies. The fans can be run at quarter, half or full capacity as required and they will be controlled from the administration building by the Tunnel Supervisor. Each electric motor driving the fans will be 110h.p. Carbon monoxide analysers installed in the Tunnel and visibility indicators also, both recording in the Control Room, will provide a constant check on air conditions. Carbon monoxide content of the air will not be allowed to rise above 2 parts in 10,000. Electric power will be supplied to the fanhouses at each end from independent sources to avoid power failures. There are stand-by plants which will cut in to supply power in less than half a minute to keep essential lighting going. The fresh air supply will be fed through wall ducts to adjustable grills just above road level on either side of the Tunnel at 25ft. intervals while stale air will enter the exhaust duct by way of slots between each ceiling slab on the exhaust duct side.

Pouring concrete Roadway in Tunnel-18th January, 1963.

The lighting specification provided for a varying intensity of lighting so that it reduces gradually from the portals towards the centre. Intensity of lighting at portals will be related to the outside light conditions by automatic control. Fluorescent lighting of the strip type is used throughout. Mounting is on walls just below ceiling height.

Great care has been taken in the planning of emergency operations. There are alcoves on both sides, spaced at 200 feet intervals staggered at 100 feet. Any stoppage therefore will never be more than 50 feet away from an alcove. All alcoves contain a telephone and two CO₂ fire extinguishers and those on the east side contain hydrants connected to an 8 inch watermain fed from a 50,000 gallon reservoir on the hillside above the Heathcote portal. The lifting of a telephone will give automatic connection with the control room without necessity for dialling. The lifting of an extinguisher will also record in the control room and will very quickly bring the Authority's own fire tender to the known point of stoppage. Furthermore this will be backed by an automatic call to the Fire Brigade and their control room will be able to discern whether to dispatch an engine from Woolston or Lyttelton. In the event of any fire having been dealt with by the Authority's staff and equipment the Fire Brigade engine can be turned back at the toll plaza. The use of telephones or fire extinguishers will also set a pattern for the traffic lights which will be placed on the walls every 400 feet through the Tunnel. Once the lights alter they can only be reset from the Control Room and of course this will not happen until the cause of the stoppage has been reported back to the Control Room by radio telephone from the emergency vehicle sent to investigate the stoppage.

Testing Tiles for Ceiling Slabs-1st May, 1962.



The Authority will have two small patrol vehicles fully equipped to deal with most emergencies but in addition there will be large breakdown vehicle as well as the small fire engine already mentioned. Everything possible has been planned to avoid traffic delays and to provide safety precautions and equipment for the protection of the travelling public. The Authority has set a speed limit of 30 m.p.h in the Tunnel and overtaking or passing will be prohibited. Stopping in the Tunnel except for emergencies will also be forbidden. All vehicles will be required to preserve a spacing of 75 feet. There are overheight indicators at each end of the Tunnel and these will be set at 14 feet. Any stoppage in the Tunnel will create a traffic hazard and the immediate concern will be to remove the obstruction as soon as possible.

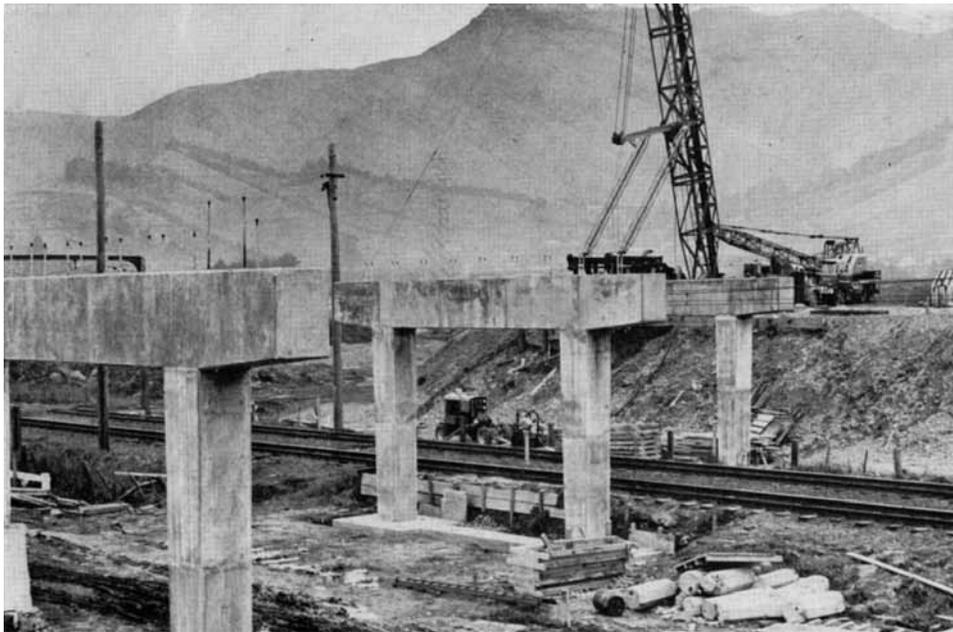
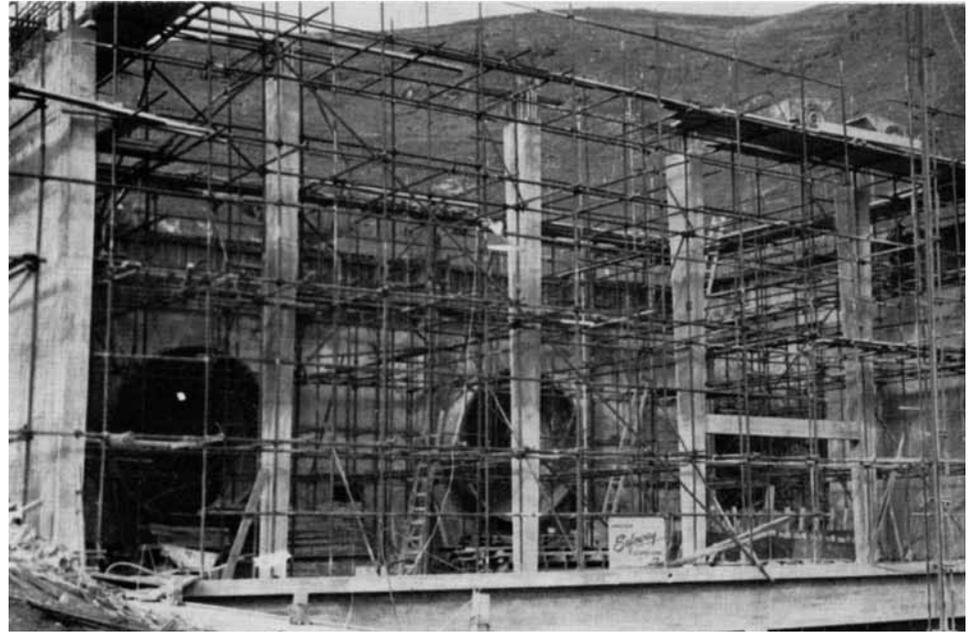
Facts and Figures about causes of breakdowns have been assembled from many toll facilities. In one particular year main stoppages on the Auckland Harbour Bridge were-out of petrol 726, punctures 506, mechanical breakdowns 1,474, no funds to pay tolls 1,409. The administration building is at Heathcote. It is however more than an administration building because it will be the nerve centre of the whole tunnel operation. It also incorporates the toll plaza with 4 toll booths and 5 toll lanes and facilities for the traffic and emergency operations staff. Provision has also been made for landscaping in the area. This is a point of entry to Canterbury in the same way as the Christchurch Airport and the Authority is anxious to have it worth and attractive. As the Tunnel will be open 24 hours each day and 365 days a year, the estimated requirements for staff are greater than might be expected. It will require 6 Supervisors and 21 Tunnel Control Officers to work three shifts a day.

Erecting Diaphragm and Ceiling Slabs-1963.

These men who will be warranted Traffic Officers, will be concerned with toll collection, traffic control and manning emergency services. Provision has to be made for 2 days of each week, sickness and annual leave. The administration building also has garaging for the emergency vehicles and other vehicles and facilities to service them. The electronic equipment for toll registration, carbon monoxide analysis, fan control, traffic light control, fire extinguisher control, visibility indicators, water control, bulkhead door control and tunnel telephone control are used in the Control Room situated in the administration building overlooking the toll plaza. This building also contains workshops for electrical, vehicle and general maintenance. It is hoped to have a machine specially designed to clean the walls and ceiling of the Tunnel. This presents quite a few problems.

The toll schedule, which has been approved by the Minister of Finance, as required by the Act, has already been announced. Broadly speaking, the tolls will be 2/6 for motor cars, 1/- for motor cycles, 6/- for buses, 3/- to 10/- for trucks according to number of axles and laden weight which will be ascertained from the Heavy Traffic License. All vehicles will pay these tolls when passing through the toll lanes at the Heathcote Portal, either in cash or by pre-purchased ticket. In addition there will be a goods toll of 4/6 per ton calculated on weight or measurement whichever is the greater. This is the measurement used for wharfage dues and cartage. This goods toll will apply only to goods to or from shipping whether direct or through wharf sheds. Thus domestic traffic such as local trade delivery trucks will pay the vehicle toll only. Collection of this goods toll will be by monthly declaration from previously licensed operators so as to avoid expensive delays through calculating loads when passing through the toll lanes. In deciding on the toll schedule, the Authority had to take many factors into account. The economic justification for constructing the Tunnel was to obtain greater speed in

Fan-House under construction at Heathcote-14 August, 1962.



carting goods to and from shipping and of course this is tied in with the planning of the Lyttelton Harbour Board for motor vehicle access to the wharves including the new eastern extensions. This involves the construction of wharves, wharf sheds, and adequate roading at Lyttelton. These are not the problems of the Authority but they are being tackled by the appropriate bodies.

As time goes on and traffic increases reductions in tolls will no doubt be possible. Definite patterns of traffic and usage have still to be established. The big advantage will be the time saved in getting goods to and from Lyttelton. Compared with overseas standards the volume of traffic is not likely to be great but there is no doubt that it will grow. The estimate is for 2,000-2,500 vehicles a day. The Tunnel has been constructed to cater for that number per hour. There is for instance an average of approximately 20,000 vehicles a day on the Auckland Harbour Bridge but the Bridge has four lanes, two each way, and peak periods of traffic occur in the morning and evening. The original economic survey was based on twenty year term with 60% of inwards goods and 30% of outwards goods. The advantages of using the Tunnel are likely to become more apparent as time goes on and all the factors tie in with one another. It is certain that the more the Tunnel is used the lower it will be possible to make the tolls. It is calculated that in the first few years revenue will be sufficient to meet operating costs and a portion of interest charges and that after that there will be surpluses for loan redemption. The Authority has not any rating powers but the loans are Government guaranteed.

Now that the Tunnel is open the Authority is confident that the people of Canterbury have something which will be of immense value to our Province. From today, as the port and hinterland continue to develop, the Road Tunnel will play an increasing part in our prosperity.

Railway Overbridge on Motorway under construction-1963.



A brief summary of some facts and figures

Rail Tunnel Commenced	..	..	..	..	..	1860
Rail Tunnel Opened	..	..	..	..	..	1867
Road Tunnel Commenced	..	..	..	..	..	1961
Road Tunnel Opened	..	..	..	..	..	1964

Road Tunnel saves 5 miles in distance between Lyttelton and Christchurch and avoids hill climb.
Direct access to wharves when Harbour Works completed enabling transport direct from ships side to warehouse or factory or vice versa.

Tunnel will be open continuously for 24 hours of every day.

Capacity of Tunnel will be 2,400 vehicles both ways each day.

Traffic flow expected to average 2,000-2,500 vehicles each day.

Estimated Cost of Tunnel and Equipment including interest and administration during construction	£2,700,000
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Estimated Cost of Access Motorways (Provided by National Roads Board)	£530,000
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Material excavated from Tunnel	Approx. 200,000 cubic yards.
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Concrete used in construction	Approx. 50,000 cubic yards.
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Length of Tunnel	6,377 feet (approx. 1.2 miles)
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Width of Tunnel	28 feet.
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Width of Roadway	Two 12 feet lanes.
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Width of Kerb each side	2 feet.
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Ceiling Height	14 feet 7 inches.
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Gradient in Tunnel	1 in 38 sloping to Lyttelton.
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Length of Motorway from Ferry Road to Heathcote Portal	2 ½ miles.
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Christchurch to Lyttelton via Evans Pass	12 miles.
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Christchurch to Lyttelton via Tunnel	7 miles.
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5 miles saving and hill climb avoided

Speed Limit in Tunnel for all vehicles	30 m.p.h.
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Passing in Tunnel will be prohibited.

Travelling distance between vehicles will be	75 feet.
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Lighting of Tunnel interior is by fluorescent tubing intensified at portals to simulate outside daylight conditions. Each end is slightly curved to prevent dazzle when coming into sunlight.

EMERGENCY EQUIPMENT

To deal with stoppage in the Tunnel and to avoid traffic delays emergency services will be provided. Safety precautions and equipment in the tunnel are for the protection of the travelling public.

Emergency alcoves are spaced at 200 feet intervals throughout the Tunnel, staggered at 100 feet on both sides.

All Alcoves contain:	Telephones to Tunnel Control Room. 2 Fire Extinguishers.
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Alcoves on East side also contain:	Hydrants connected to 8in. water main fed from 50,000 gallon reservoir on hillside at Heathcote.
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Lifting of a telephone or fire extinguisher will bring emergency vehicle to known place of stoppage in minutes and will automatically set pattern for traffic lights in Tunnel. Lifting of a fire extinguisher will also register at Fire Brigade.

A large breakdown vehicle and a small fire tender will be available for immediate use.

Two small patrol vehicles will be used for traffic control and minor emergency services.

VENTILATION SYSTEM

Exhaust and Intake Ventilation Ducts between ceiling an arch of Tunnel.

Exhaust and Intake Ducts divided along entire length of tunnel by concrete diaphragm slabs.

Bulkhead Doors halfway in Tunnel.

Exhaust and Intake fans at Heathcote deal with north half of Tunnel.

Exhaust and Intake fans at Lyttelton deal with south half of Tunnel.

Fresh air pushed into Tunnel at 25 feet intervals through grills at ground level from intake ducts.

Foul air drawn through spaces in ceiling to exhaust ducts.

Electric power from both Heathcote and Lyttelton to avoid power failures. Each set of fans capable of continuing ventilation by operation of bulkhead doors in centre. Each fan driven by 110 h.p. electric motor. Two no-break generator standby sets at Heathcote fan house.

Capacity of each fan is 320,000 cubic feet of air per minute. They can be run at full, half, or quarter speed.

Automatic Carbon Monoxide fumes detectors to provide information for varying fan speeds.

Automatic Visibility Indicators to record air density.

ADMINISTRATION BUILDING

The Administration Building at Heathcote will include:

The toll plaza with 4 toll booths and 5 toll lanes.

Tunnel Control Section with Superintendent, Supervisor, and Tunnel Control Officers for 24 hours each day.

Electronic Equipment for-

Toll Registration

Visibility Indicators

Carbon Monoxide Analysis

Fan Control

Traffic Light Control

Fire Extinguisher Control

Tunnel Telephone Control

Reservoir Control

Garage for Emergency Vehicles to cater for breakdowns and fire and to service them.

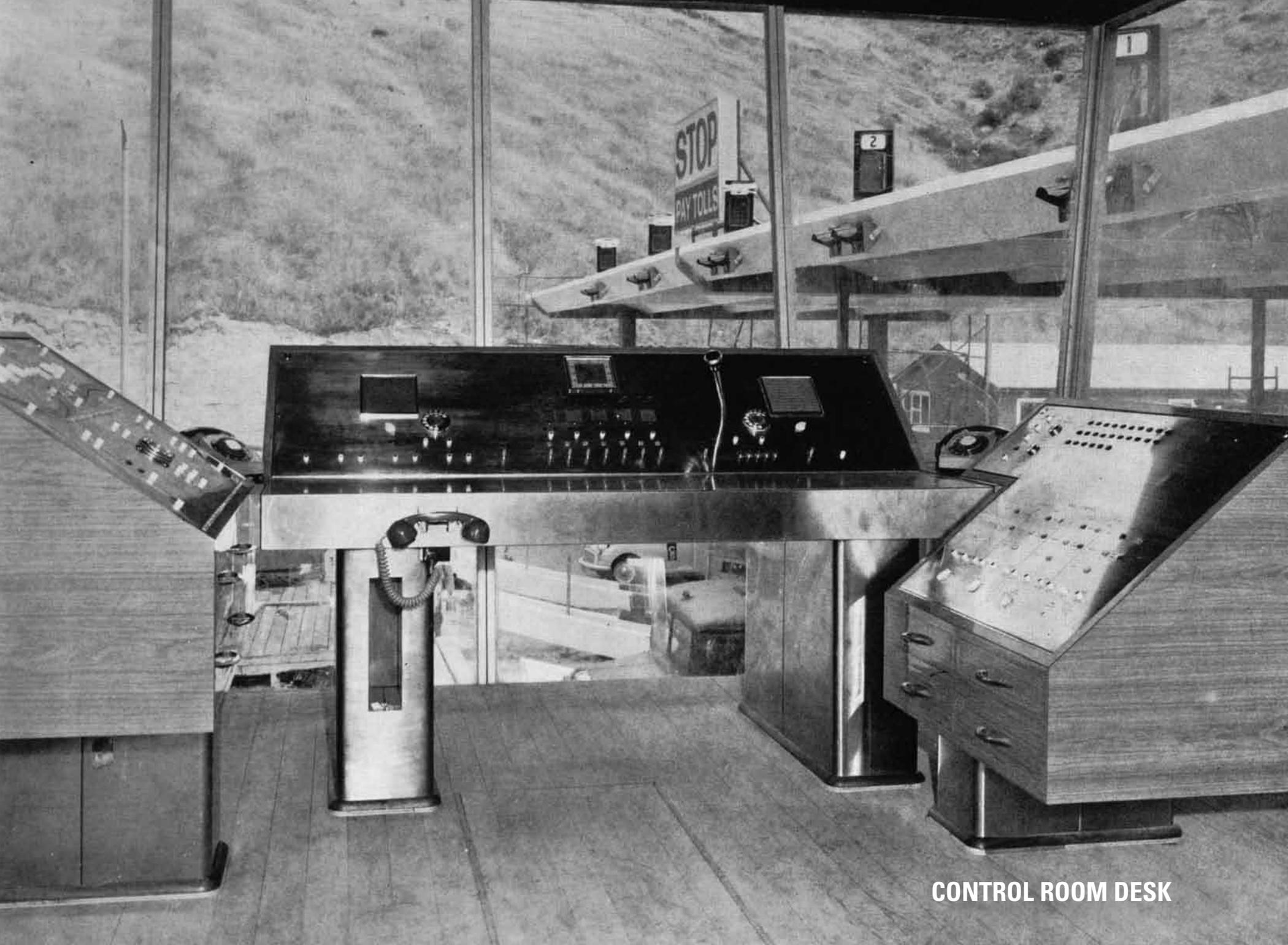
Workshop for electrical and general maintenance including tunnel cleaning.

General Office.

Board Room.

Staff Cafeteria facilities.

Limited parking facilities for visitors and staff.



CONTROL ROOM DESK



TUNNEL CONTROL EQUIPMENT

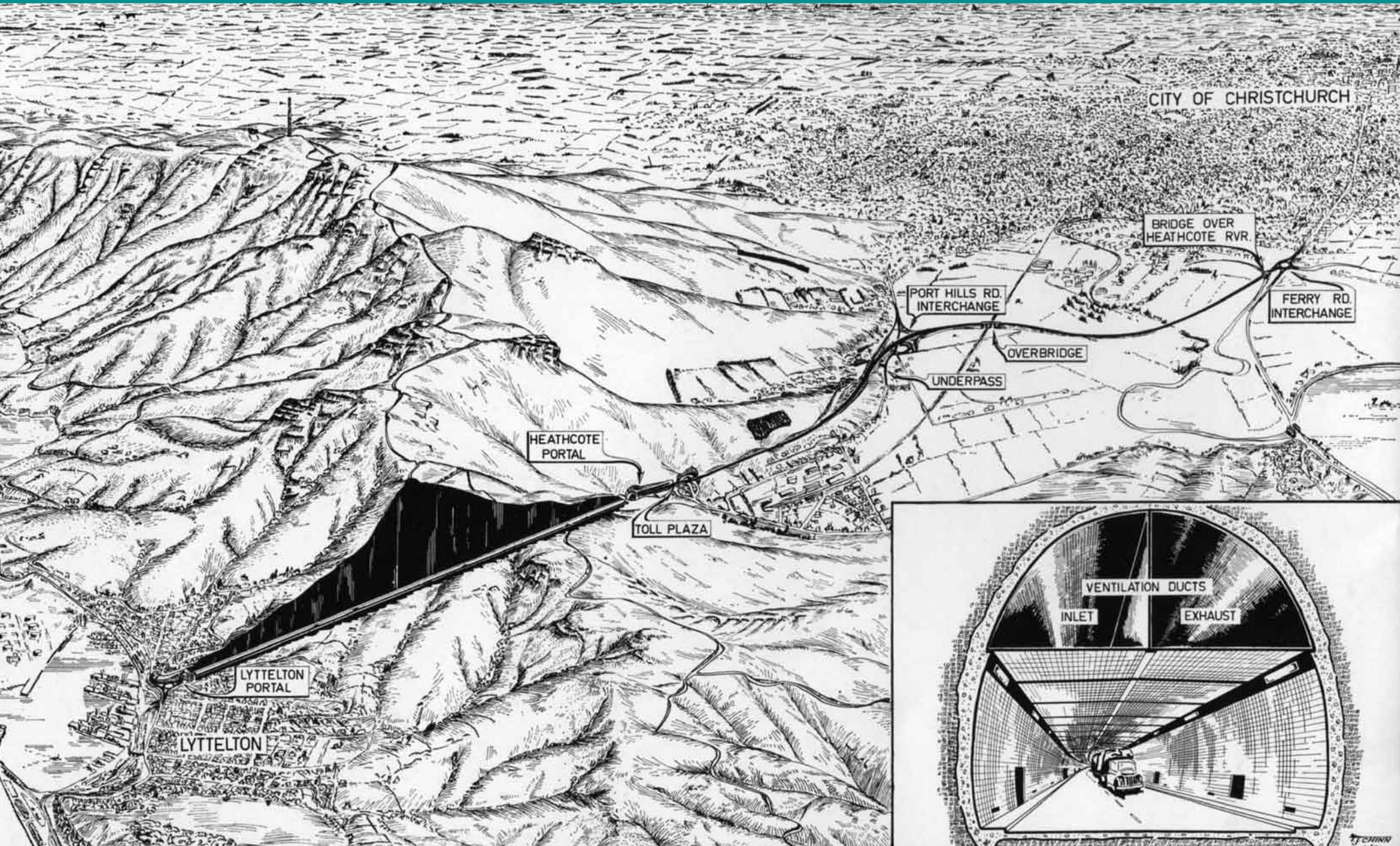
TRAFFIC LIGHTS

SPEAKER

TELEPHONE

EXTINGUISHERS

HYDRANT



CITY OF CHRISTCHURCH

BRIDGE OVER HEATHCOTE RVR.

FERRY RD. INTERCHANGE

PORT HILLS RD. INTERCHANGE

OVERBRIDGE

UNDERPASS

HEATHCOTE PORTAL

TOLL PLAZA

LYTTELTON PORTAL

LYTTELTON

VENTILATION DUCTS

INLET

EXHAUST

J. CHINN