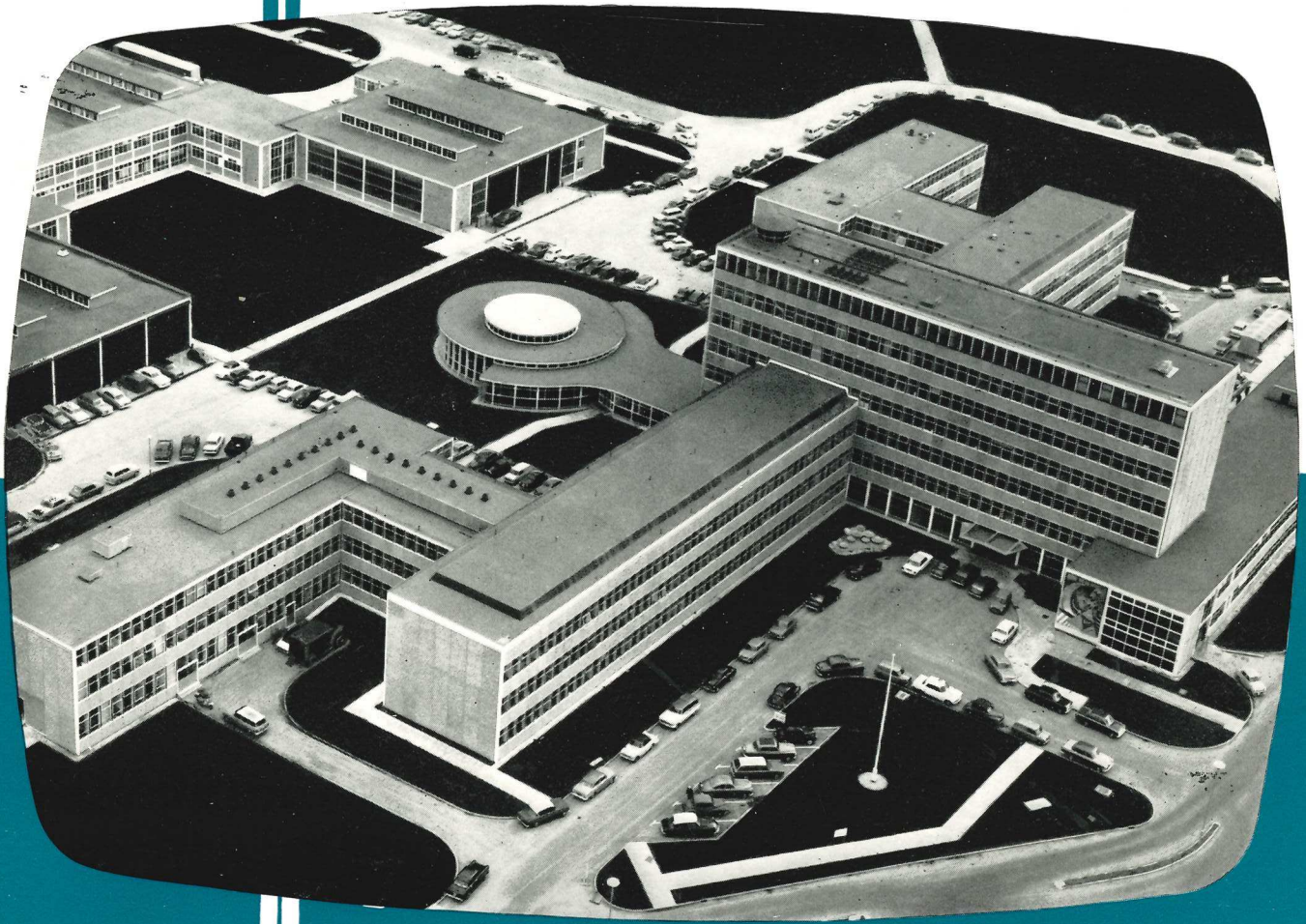




**ROAD
RESEARCH
LABORATORY**



The Road Research Laboratory is a vital part of the Ministry of Transport. It provides the scientific backing which we must have in order to produce sensible, workable transport policies. I rely on the RRL's scientists to advise me on road surfaces, the effect of speed limits and a hundred and one other things which are essential to comfort, safety and efficiency in a highly mobile community.

In a country where nearly half the families have the use of a motor car we are all experts on road problems – at least we think we are. I know that I am not an expert. But the scientists who staff the Road Research Laboratory are. I depend on their brains and so, indirectly, do most people in Britain.

I am very glad that they are now to be housed in their new buildings at Crowthorne instead of being scattered about several different locations. I am sure that this will make life pleasanter and more convenient for the staff of the Laboratory. It will also make them even more efficient – if that is possible.

Barbara Castle

27th June, 1967



The responsibilities of the Road Research Laboratory have been growing steadily since 1933, when it was established as an additional part of the Building Research Station of the Department of Scientific and Industrial Research. Under the energetic leadership of Sir William Glanville, my predecessor, it changed from a laboratory primarily concerned with road construction to one concerned with the many problems that affect the planning, construction and use of roads and bridges, the design of vehicles for safety, and the behaviour of road users.

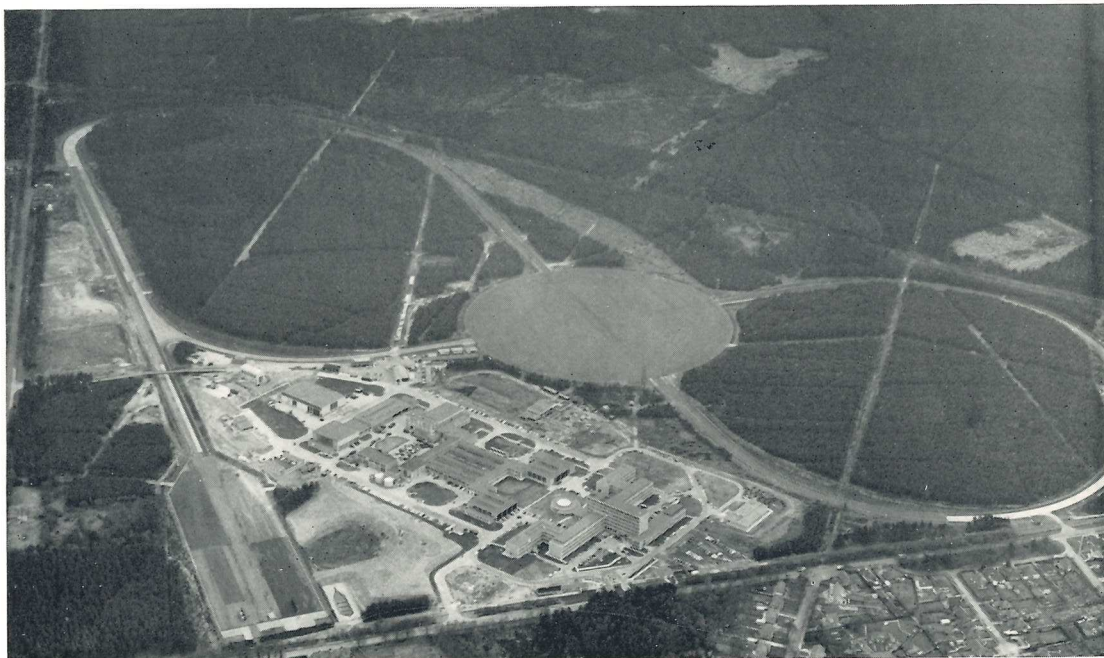
For many years, the staff of the Laboratory was dispersed over several sites but now, after many delays, they have been moved into permanent buildings at Crowthorne. I am sure the staff will work more efficiently in the new offices and laboratories, and I have great pleasure in welcoming you and inviting you to inspect our new home and to see something of our work.

27th June, 1967

ROAD RESEARCH LABORATORY

BUILDINGS AND FACILITIES

1. The Road Research Laboratory and Research Track from the west.



In 1930 the Ministry of Transport set up a small experimental station on a 20-acre site at Harmondsworth beside the newly built Colnbrook By-pass. In 1933 this establishment was transferred to the Department of Scientific and Industrial Research and became the Road Research Laboratory. Five years later the staff had increased to 100, the annual budget was £30 000. In these years the work was almost all concerned with road engineering in the fields of soil mechanics, and bituminous and concrete technology.

After the end of the 1939-45 War, when the Laboratory returned to peace-time research after its war-time activities, the research was expanded to include road traffic and safety. This expansion brought in its train a need for improved laboratory facilities and more office accommodation. In 1947 a new Traffic and Safety Division was set up at Langley, four miles from Harmondsworth. By 1950 the Harmondsworth site itself was getting cramped and the noise from the increase in air traffic at London Airport was interfering with the work. It

was clear that a more suitable and larger site was needed which would accommodate all the staff and research facilities and provide better working conditions. Even as early as 1947 it had been decided that an extensive research track for realistic traffic and road safety experiments and studies was needed as well as space for full-scale experimental construction work.

After considering many sites in the Home Counties, in 1955 a 250-acre triangular site on Forestry Commission ground near Crowthorne, Berkshire, was selected. This was heavily planted but had the advantage that it is of little agricultural value.

In 1958 work began on the construction of the $3\frac{1}{2}$ -mile figure-of-eight research track with its 300-yard diameter central area, and in 1960 this track became operational.

The construction of the permanent offices and laboratories began in 1963. By then, provision had to be made for over 800 staff of all grades; by 1967 the annual budget had risen to over £2 million. Part of this expansion was accounted for by the setting



2. The main frontage of Glanville Hall with the Mills mural on the right of the entrance.

3. The main entrance hall.



up of a Tropical Section in 1955, a Bridges Section in 1961, and a Road User Section in 1964.

In 1965 the Department of Scientific and Industrial Research was disbanded and the Laboratory became part of the Ministry of Transport.

The initial building programme has been completed. An additional building to accommodate a new computer, which was not included in the first instance, is in the course of construction and a new building for work on bridge investigations is in the design stage. The total capital cost of the initial contract involved some £4 million including £½ million for the construction of the research track.

THE BUILDINGS

The Laboratory buildings are on the west side of the site. There is a large main building in which the majority of the scientific staff, the administration

and the library are housed together with the majority of the smaller bench-type laboratories; the rest of the buildings are in three main blocks to the east.

The layout of the buildings has been designed so that extensions could be made to the present buildings to cope with a further expansion of the Laboratory's work without marring the design features, and there is ample space for this.

Glanville Hall, a 7-storey block in the centre of the main building, provides the frontage and incorporates the entrance hall. Near this is a cast aluminium relief designed and executed by the sculptor Mr. John W. D. Mills, A.R.C.A. This high structure is the administration block, with the Director's office and offices of other senior members of staff on the 5th floor. The 6th floor of Glanville Hall accommodates the design offices. On the roof above there is an observation room with polarized glass windows primarily intended for visual and radio control of the research track. It also gives fine

4. The Library.





5. The Design Office.

views of the whole 250-acre site and the surrounding country.

Glanville Hall is flanked by long 3-storey wings, and leads to a short 2-storey photographic wing and the Library. The 3-storey wings house physics and chemistry laboratories and associated staff offices. Space has been left for the extension of these.

Behind this main block lie other separate large blocks containing some offices for scientific staff but mainly housing pilot-scale laboratories, stores, workshops, garages and the boiler installation. The canteen is also in a separate building near the end of the southern 3-storey wing.

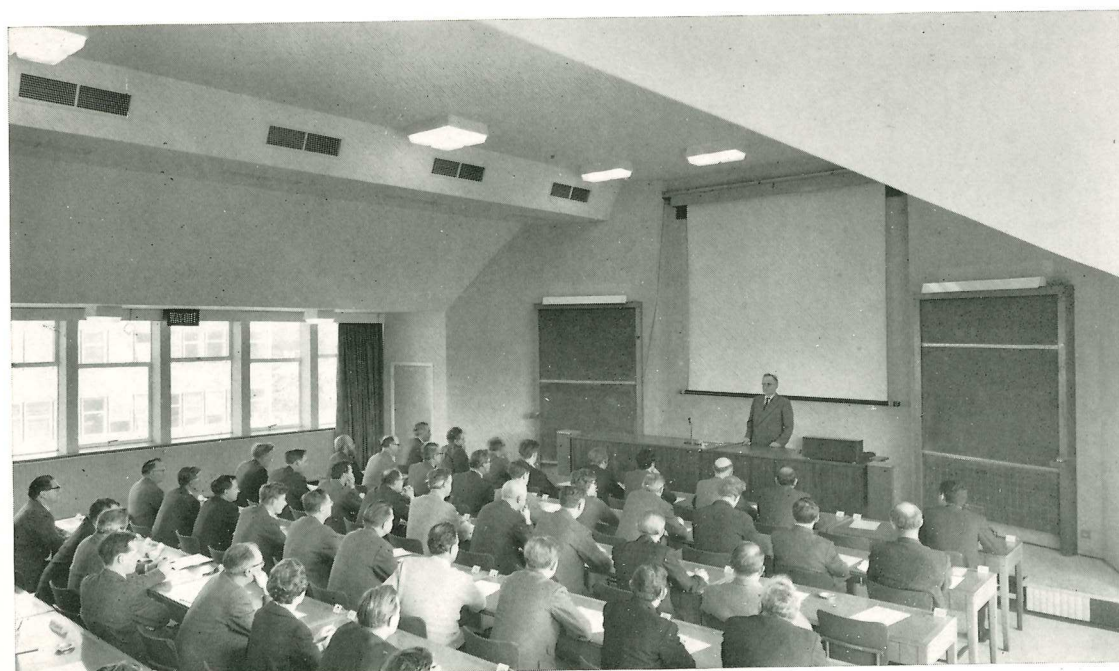
Altogether the buildings have a total floor area of some 335 000 square feet, i.e. nearly eight acres. In addition to the facilities already mentioned there is a lecture hall and special laboratories for courses, and the highly specialized Structures Laboratory. Offices and small laboratories are based on building modules. The photo-studio is two storeys high to

permit such subjects as crashed cars to be photographed from any direction. In the photographic unit as a whole, normal facilities are provided for monochrome and colour processing. The accommodation for such processing in general has temperature control and dust-free air. In addition, one section has humidity control.

As special care is needed to obviate air pollution from the 49 fume cupboards in the small laboratories of the 3-storey wings, the flues are carried to the 7th floor of the high block and discharge into the air at the safest possible position.

The Library is a single storey circular building attached to the back of the main block. It has been designed to allow expansion of the facilities by constructing new offices around the periphery and absorbing existing offices into the large central reference section of the Library.

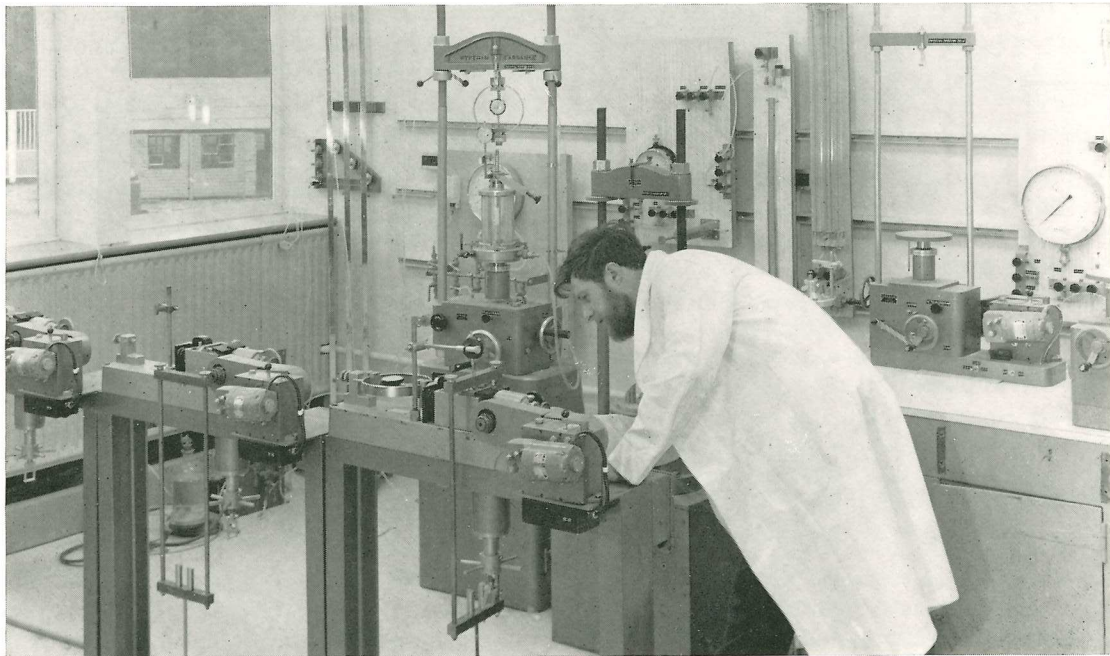
The large block immediately behind Glanville Hall and its wings, known as the Central Building, has on its two sides large pilot-scale laboratories which



6. The Lecture Hall.

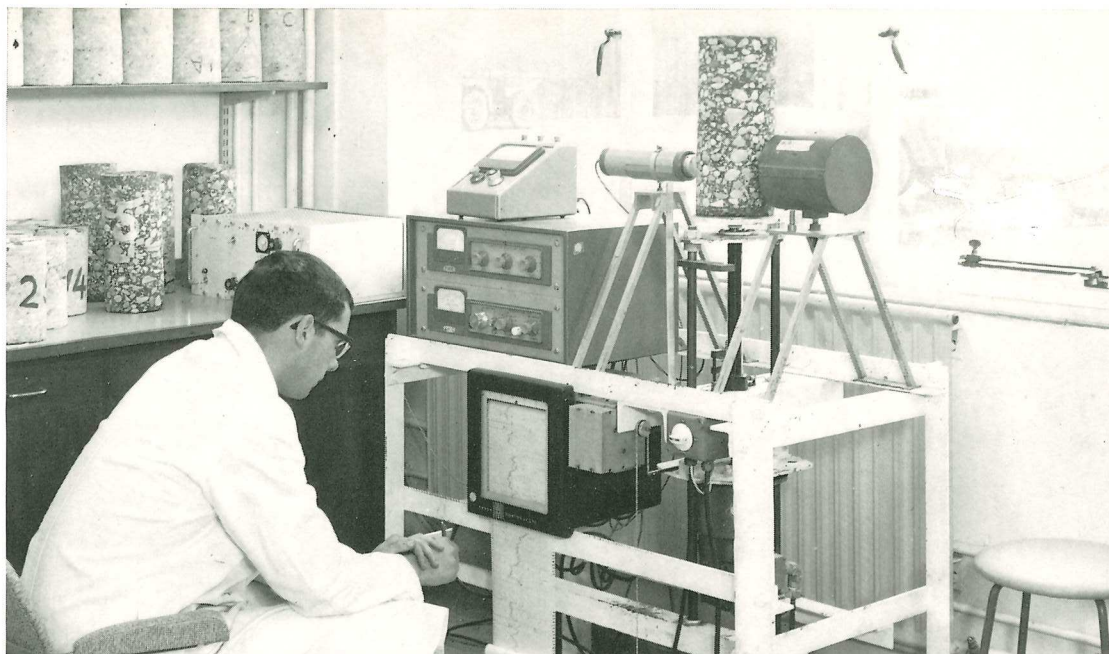
7. The Vehicle Pilot
Scale Laboratory.





12. Laboratory for the measurement of the shear strength and compressibility properties of soil. A shear box test in progress.

13. Testing concrete by radiation method.



THE TWO HUNDRED LABORATORIES

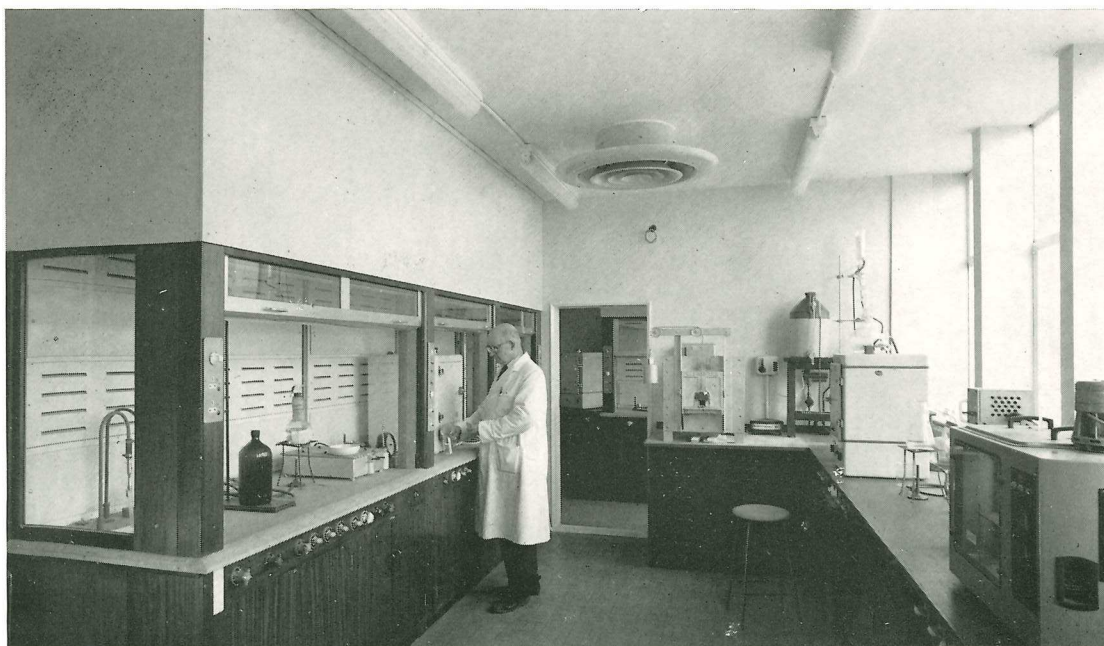
The Road Research Laboratory buildings include over 200 individual laboratories which vary in size and sophistication. They are of four main types.

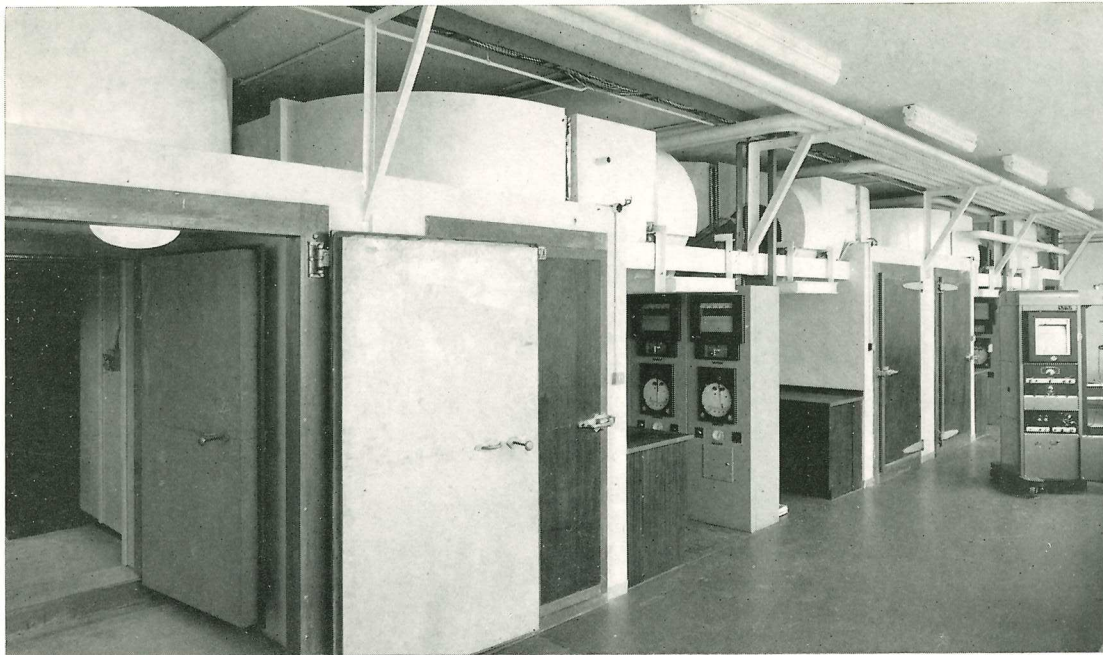
- (a) *Standard laboratories* provided with general laboratory services but having no special environmental control, though normal heating is provided.
- (b) *Laboratories with fume cupboards.* In addition to normal laboratory services, air conditioning by plenum control is provided in summer and winter; radiators provide extra heating in winter, windows are sealed and special provisions have been made to control the demand for replace-

ment air when the fume cupboards are being used. This control system is a mechanical-pneumatic one which maintains a low frontal air velocity of 50 ft/minute at the fume cupboards. Some 70 of these cupboards are provided, each with its own extractor fan and ducting.

- (c) *Laboratories with climatic control.* Thirty-seven laboratories are provided with temperature control, eleven of which also have controlled humidity. The overall temperature range is from -25°C to $+70^{\circ}\text{C}$ and varies from laboratories conditioned to operate at a constant temperature of relatively wide tolerance to others capable of operating at a pre-selected temperature to within close limits ($\pm 0.1^{\circ}\text{C}$). These last have total air recirculation with air inlet through perforated ceilings and outlet at skirting level through double-skinned walls, while saturable reactor control circuits are provided for electric heaters and there are package refrigeration units and brine cooling.

14. A general chemical laboratory.





15. The Constant Temperature Laboratories.

The largest plant is for the Structures Laboratory. It has a handling capacity of 50 000 cu. ft of air per minute and a maximum demand on the chilled water service of 90 tons of refrigeration. This service enables very large specimens, such as 100-ft reinforced concrete beams, to be maintained in conditions of substantially constant temperature and humidity for the duration of a long-term test, if necessary for several months.

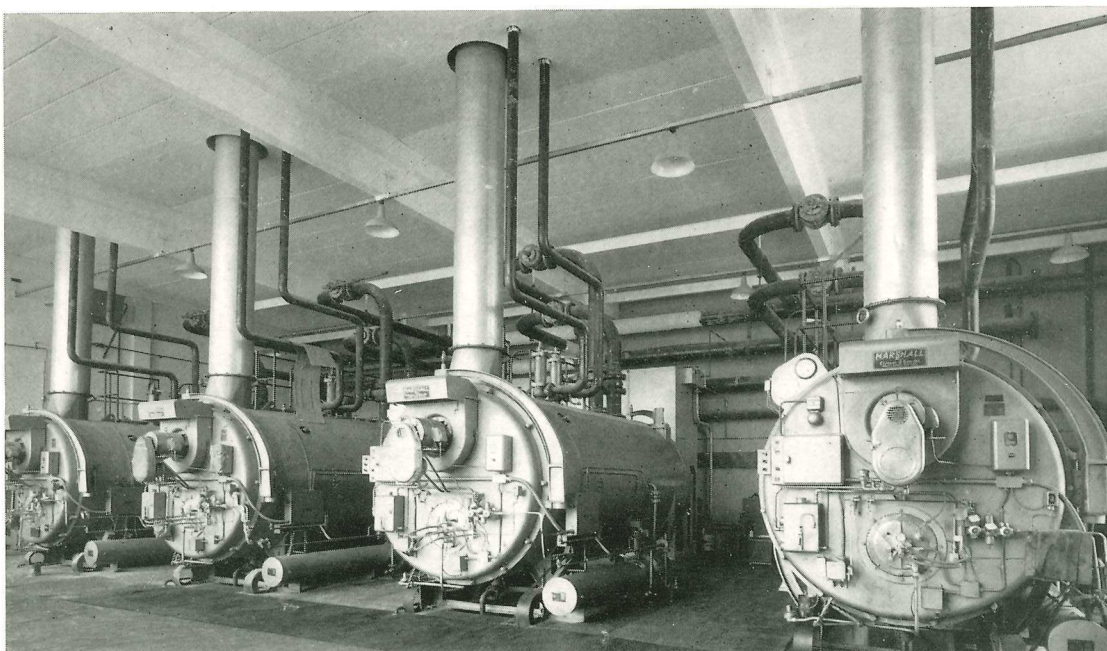
(d) *Pilot-scale laboratories* are designed for work with vehicles and plant. In two of these, special arrangements have been made for a high concentration of construction plant and other vehicles by the provision of equipment to control smoke density and exhaust gases.

The services supplied where needed include hot and cold water, filtered water, demineralized water, pressurized water, town gas, oxygen, nitrogen, compressed air at various pressures, and vacuum at 10 mm absolute.

GENERAL SERVICES

The engineering services, costing £1.2 million, range from the normal services for offices and workshop areas to the sophisticated air conditioning already referred to as being provided in specialized laboratories. The functional layout of the buildings influenced the policy of centralizing the services and spur or ring feeding the complex. The site contains a central boiler house, central chilled water station, central compressed air station, central water storage and a main electrical sub-station. Minor services, such as those supplying oxygen, nitrogen, vacuum and so on, are provided as required but not from central plant.

The specialized nature of the research work posed many problems associated with a multiplicity of fume cupboards and benches. These were resolved



16. The four central boilers each with 10 million Btu/h capacity.

17. Glanville Hall by
night.



at an early stage by the use of full-size mock-ups of three of the chemical laboratories.

A major engineering requirement was the air conditioning of the various laboratories and a feature of this service is the central chilled water station which contains two 110-ton absorption units. A third is being installed and provision has been made for a fourth. Duplicate centrifugal pumps discharge the chilled water at 5°C into site mains which run in covered ducts to the buildings requiring this service.

The compressed air station distributes its service at 100 lb/in² to the building through site mains.

The laboratory sinks are connected to a separate trade waste system which joins the main soil drainage outfall near the boundary of the site. Here, a monitoring chamber is provided so that tests can be made at regular intervals to ensure that contamination never exceeds a safe level.

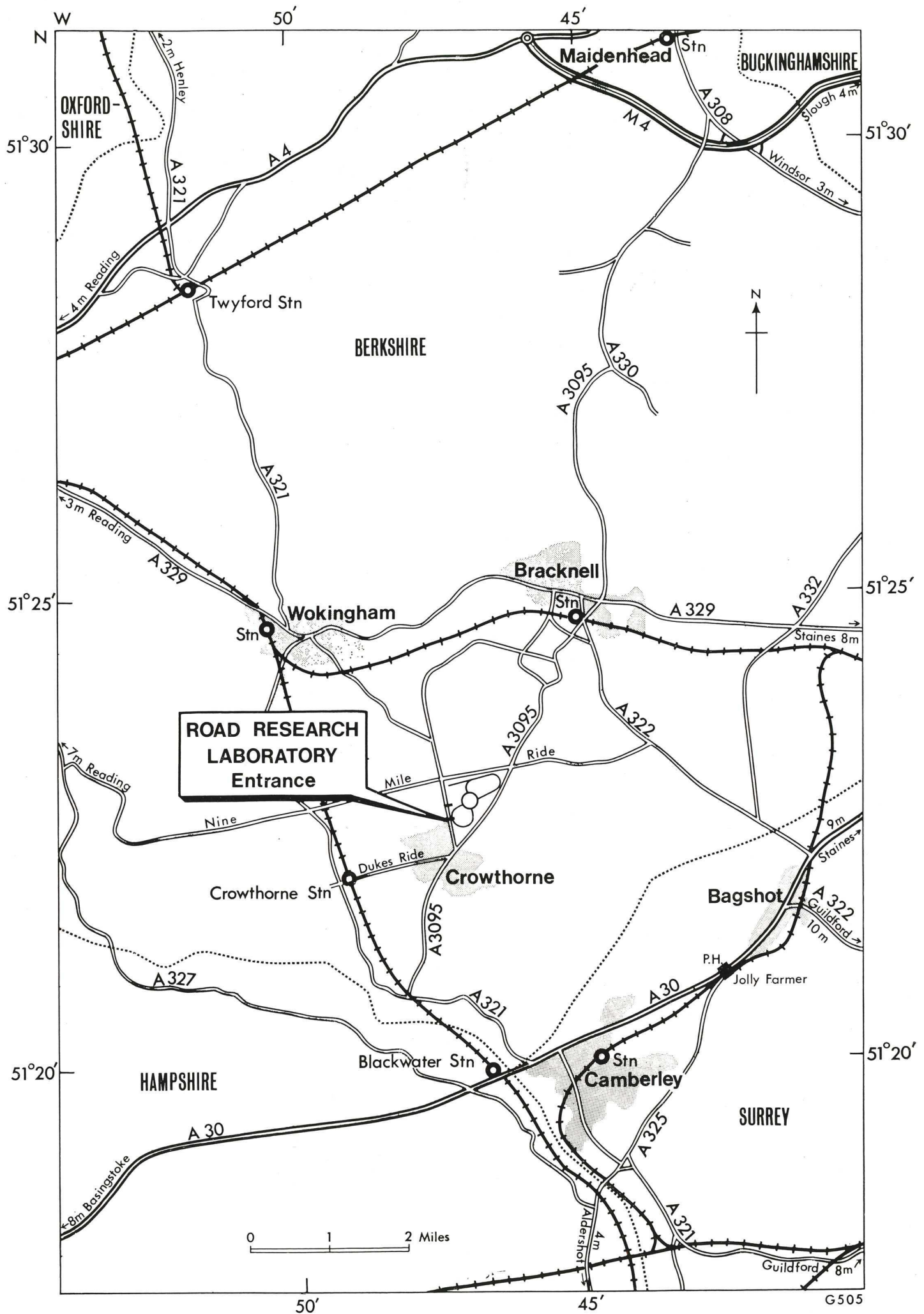
The surface-water drainage systems from the buildings and roads also take potentially heavy

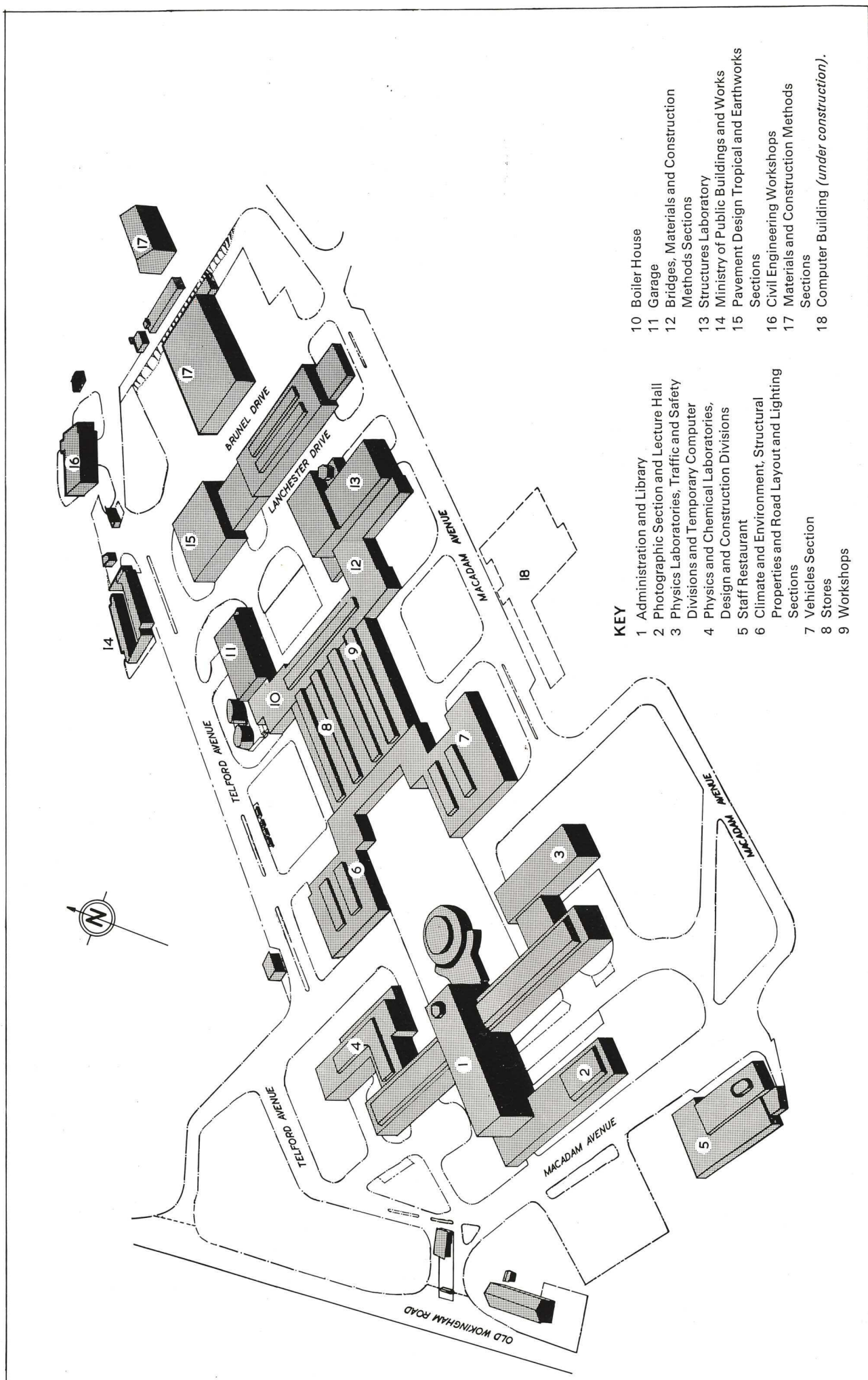
run-off of surface water from the large central area of the track and from water courses which cross the building site. All this surface water is directed into a lagoon alongside the terminal area of the track, where rainfall can be held temporarily so that the run-off into the ditches and culverts outside the site is not excessive.

The engineering services as a whole are designed for expansion in the future as required and work is already proceeding on their extension to meet the needs of the Computer and Bridges buildings.

The buildings were designed in the Directorate General of Works of the Ministry of Public Building and Works. The senior architect and project manager was Mr. J. Moss, A.R.I.B.A.

The site and building layout was planned by Laboratory personnel under the direction of Mr. J. A. Chappell, M.I.Struct.E., Head of the Laboratory's Civil Engineering Section, in conjunction with staff of the Ministry of Public Building and Works.





Front cover photograph: Aerial view of the Road Research Laboratory buildings from the west.