



An aid for Townsville planners

Townsville is Queensland's northern-most growth centre. As the city spreads, the city council, engineering consultants, and all the other experts who plan, and prepare impact statements and the like, need information about the land that surrounds the town.

Almost inevitably, these people have come knocking at the door of CSIRO's Davies Laboratory in Townsville to supply them with at least some of the information they need.

The Laboratory does have a lot of information about the region, but this was collected to allow appraisal of its use for agriculture. The soils of the region have been mapped, and their agricultural limitations are well known. However, as it is an agricultural laboratory, scientists there had not studied the sort of engineering problems that may arise if the same soils are developed for urban purposes.

Because of the increasing number of requests for this other type of information, Mr Graham Murtha and Mr Bob Reid, of the Laboratory, have re-interpreted the

soils maps with town planning problems in mind.

The engineer needs detailed information if he's going to plan works in an unknown area. At a scale of 1:100 000, the soil maps are too large-scaled to give him this. Only very accurate soil surveys of the site could do so. Nevertheless, the less-detailed information coming from Mr Murtha's and Mr Reid's re-interpretation should at least allow him to enter the area forewarned of the sort of problems he is likely to encounter.

As many citizens of Townsville will be well aware, half of the city's suburbs are located on very poor soil. Much of it waterlogs, and establishing trees, shrubs, and lawns can be difficult. The luckier people live near the Ross River on more fertile young alluvial soils, and they are spared many of these problems.

No doubt more of the relatively small areas of fertile soils remaining along the river will become available for urban development in the future, but most of Townsville's spread will have to take place on something very

much poorer. If it expands north-westwards beyond the Bohle River, it will come up against a large area of particularly difficult soil—from both the engineering and agricultural points of view.

Perhaps, with the help of Mr Murtha's and Mr Reid's report, some of the worst difficulties associated with this sort of fact can be avoided.

The two scientists have come up with the rather unfashionable suggestion that urban development at Townsville should proceed on the best available agricultural land.

This suggestion seems to fly in the face of modern thinking, but appearances can be deceiving. Little of the land around Townsville is particularly suitable for agricultural purposes, and it is used only for low-density cattle-grazing. It so happens that the problem soils from the agricultural viewpoint are also the ones that present the most engineering problems.

For example, to take the most extreme case, salt-pan areas on the Town Common and to the south of the city are too salty to allow vegetation to grow. And nobody is going to attempt to build on them without carrying out major reclamation and engineering works first. (Anyway, local conservationists would be up in arms at the very suggestion of any building being done on the Town Common.)

Other soils, like the undulating 'gilgaied' clays, are unattractive to the engineer and agriculturalist alike, but the local duplex soils, which consist of a very impermeable clay layer beneath a lighter topsoil, hide the problems they may create. As well as causing waterlogging, the underlying clay may contract and crack on drying, and expand when wet.

A high sodium content

may also make these underlying clays become liquid when they are wet. Such soils become very susceptible to gully erosion, as the subsoil erodes out from under the surface layer, which then collapses into the space beneath. Mr Murtha and Mr Reid consider that road tail-drains should be very carefully designed on such soils. They also point to a number of farm dams, as well as road and railway embankments, that have failed around Townsville because this saline subsoil was unwittingly used to build them.

Concrete may be severely attacked if the sulphate content is more than 0.5%. The underlying clays of some local duplex soils (at depths where pipes and foundations may be laid) have sulphate levels six times as high. Again, these clays will corrode galvanized steel pipes very rapidly.

Engineers can take all these problems into account if they know about them in advance. They can specify special sulphate-resistant concrete mixes, or copper or asbestos pipes rather than steel ones.

Establishing playing fields and parks has always been difficult in Townsville. The city's harsh climate with its long dry season, which lasts 7-9 months, partly accounts for this, but the soils play their part. To date, no account has been taken of the soils when locating these facilities. So, often, playing fields remain bare. Taking ameliorative measures is extremely expensive for these large areas, yet nowadays people want attractive urban open spaces.

The two CSIRO scientists therefore suggest that parks and playing fields should be given the highest priority and located on the best soils. Urban development can then proceed around them. The

scientists point out that the urban gardener on his small block can afford to use fertilizers and soil improvers, and engineers can design for the problem soils. But there's no way you can economically turn an uncompromising soil into a grassed playing field or park.

Even on the best soils there are problems. Not many of the trees, shrubs, and plants commonly planted can survive the long dry season, so suitable ones have to be selected. Street trees—often planted on poorer soils—must withstand both the long dry season and water-logging in the wet season, and have a large enough root system to prevent them being blown over by cyclones.

Mr Reid published a list of suitably adapted trees and shrubs for the Townsville region about 3 years ago.

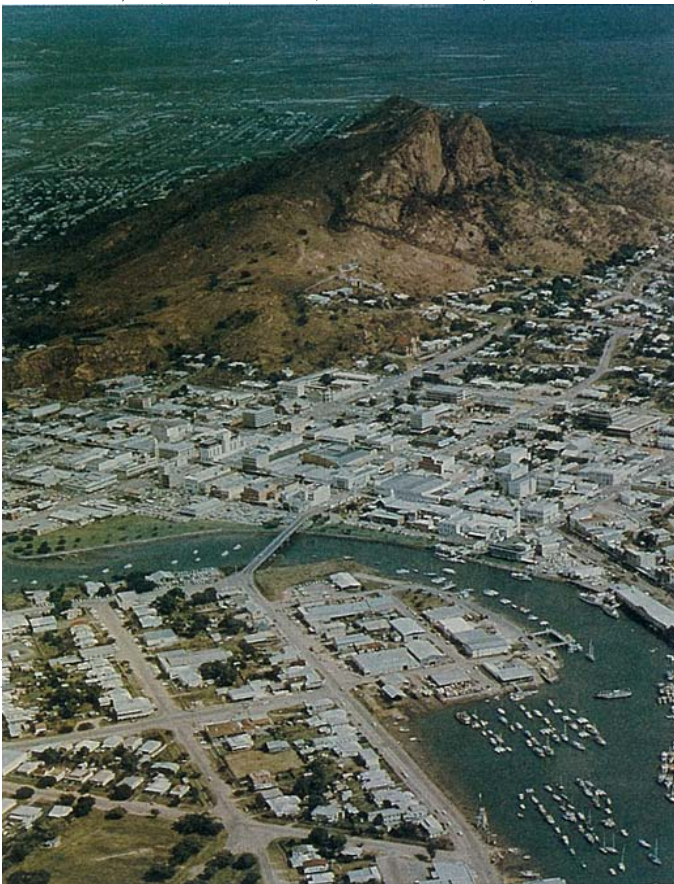
Getting grasses to grow in parks and on playing fields has its problems too—even on good soils. Without doubt buffalo grass (*Axonopus*

compressus) survives best in the parks where there is little pedestrian pressure, but it's no good for playing fields, which receive most use during the harsh conditions of the dry season. To date, blue couch (*Digitaria didactyla*) and green couch (*Cynodon dactylon*) have given the best service for these purposes.

The rainfall from year to year is too erratic to allow reliance on the town water supply for irrigating parks, playing fields, or street trees. And the underground water supplies don't help too much, as their quantity and quality vary considerably.

Soils of the Townsville area in relation to urban development. G. C. Murtha and R. Reid. *CSIRO Division of Soils Divisional Report No. 9, 1976* (in press).

'Native Plants for the Townsville Region.' Ed. R. Reid. (Society for Growing Native Plants: Townsville 1972.)



Townsville—Queensland's northern growth centre.