

Land use geoscience — informing policy decisions in Western Australia

by

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Land use planning is intended to ensure that land in Western Australia is used efficiently and sustainably for the benefit of the community. Increasing awareness in the community of the importance of the natural environment has led to an increase in emphasis on environmental protection in land use planning. However, the benefits of bringing geoscience into the land use planning arena are often not appreciated by planners and the wider community, resulting in insufficient consideration of issues such as resource access and protection, geoheritage, and geohazards.

The strong contribution of the resource industry to the Western Australian economy has long been recognized by government, and it is formally acknowledged in the State Planning Policy. The 2003 State Sustainability Strategy defined sustainability as ‘meeting the needs of current and future generations through an integration of environmental protection, social advancement and economic prosperity’. Traditionally, land use geoscience in Western Australia has focused upon mineral and petroleum resource-related issues to facilitate the economic development of the State, although there is a growing awareness of other potential applications.

The booming State economy in recent years has generated a large increase in demand for urban and rural residential land and industrial land, particularly in Perth and the South West. These developments are encroaching upon areas that have traditionally supplied basic raw materials needed by the construction industry, and higher value mineral deposits such as titanium–zircon and bauxite mineralization. Major public-infrastructure programs such as the Perth to Mandurah Railway and the Perth to Bunbury Highway have driven strong additional demand for basic raw materials such as sand and limestone, and have accelerated the depletion of existing deposits, particularly south of Perth. At the same time, there has been increased activity to conserve biodiversity through measures such as Bush Forever sites, and the addition of land to the conservation estate. Many of these proposed Bush Forever sites and conservation areas contain basic raw materials, known mineralization, or have potential for mineralization.

The Geological Survey of Western Australia (GSWA) on behalf of the Department of Industry and Resources (DoIR) informs government of these issues in several ways. A memorandum of understanding with the Western Australian Planning Commission enables DoIR to provide comment on subdivision proposals to facilitate the consideration of mineral resource interests in land use planning in urban fringe areas. Furthermore, Section 16(3) of the Mining Act 1978 requires that a change of tenure from Crown Land to private land cannot occur without the approval of the Minister for Resources, and governments have for many years required the agreement or support of DoIR prior to making changes to land tenure. The aim of Section 16(3) was to avoid, or at least minimize, conflicts impacting present or future access to resources.

A current example of changes in land tenure is the proposed inclusion into the Western Australian conservation estate of 54 whole and partial pastoral leases purchased by the government. DoIR has systematically assessed the mineral prospectivity of each of the proposal areas, and has been working closely with the Department of Environment and Conservation and holders of mining tenements on these leases to achieve a balance between the desired conservation outcomes and the need to encourage economic development in these regional areas.

In some cases, GSWA carries out geological investigations ahead of planned development to assist in sequential land use planning. Two recent examples of this are in the Baldvis explosive reserve area where there is a need to optimize the extraction of sand resources ahead of planned residential development, and on the western outskirts of Kalgoorlie where drilling is planned to ensure that no gold mineralization will be sterilized by planned industrial development.

A strategic approach has been taken on several resource issues, including basic raw material supply and the titanium–zircon mineral industry on the Swan Coastal Plain. DoIR has been the lead agency in developing the draft State Lime Supply Strategy. The Strategy aims to define areas that are of strategic importance to the State for ensuring a continuing supply of limesand and limestone for the agricultural, mineral processing, and construction industries. Importantly, the strategy has the support of other government agencies such as DEC and the Department for

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Planning and Infrastructure, as both recognize the need for such long-term planning.

A recently completed study of the sand resource potential in the greater Kalgoorlie region has identified a large area north of Woolgangie that has the potential to supply the Goldfields with construction sand and gravel in the long term, once existing supplies closer to Kalgoorlie are depleted or constrained through land access issues. GSWA also recently commenced work on upgrading environmental geological mapping on the Swan Coastal Plain. This will greatly assist the task of quantifying potential long-term basic raw-material supplies in the greater Perth and South West region. A series of maps of titanium–zircon mineralization on the southern Swan Coastal Plain, released last year, are already contributing towards land use planning in the region by providing a prompt for other government agencies, land developers, and landowners, who have sometimes been unaware of these valuable resources. These studies can, and do, provide direct input into both local issues and regional planning strategies.

Other avenues for informing government policy include comments on geology, existing mining operations, and mineral and petroleum potential, and the production of resource maps as an input to regional and local-government planning strategies, and town planning schemes. These documents ensure that the relevant authorities take mineral and petroleum resource issues into account at the early stages of planning before specific development proposals arise. From time to time, GSWA also participates in various government-planning technical advisory groups and committees, and has played a leading role identifying suitable areas for special purposes such as the proposed site for the Square Kilometre Array telescope, military training areas, and community facility and recreation areas.

Geoheritage is an emerging issue for land use geoscience in Western Australia that recognizes our responsibility to take care of and protect valuable geological phenomena for the scientific and educational benefit of future generations. Initially, GSWA adopted all nominations for Geoheritage sites from the Geological Society of Australia, and these localities can be viewed on DoIR's internet site through GeoVIEW.WA. GSWA is formalizing the nomination and selection process for all geoheritage sites in the State, and has embarked upon the process of securing reserve status for a few significant and potentially vulnerable sites. The locations, and significance, of geoheritage sites are now being incorporated in advice provided to other government agencies.

Another poorly appreciated aspect of land use geoscience in Western Australia is geohazards. Earthquake and tsunami risk are the responsibility of Geoscience Australia. A recent example of a swimming pool collapse in karstic terrain in the northern suburbs of Perth reminded the community of the potential for subsidence in some areas. Mapping of the location of karstic terrain is currently underway as part of the geological mapping of the Swan Coastal Plain, and should assist in planning to mitigate the risks associated with development in such areas. Geoscience can also provide another perspective on the long-term risks associated with climate change such as the increased risk of flooding and coastal erosion. Comments on these potential risks, and the potential basic raw-material requirements that may be needed to mitigate them have been made to planning authorities when considering areas for future urban development.

In summary, land use geoscience has an important role in informing government on geological, and particularly mineral resource-related, economic issues that need to be taken into account when formulating policy and making land use decisions.