

Guiding Perth's Growth: A Regional Perspective

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Abstract

This article examines historic and current regional planning efforts undertaken in the Perth, Australia metropolitan region that have defined its current development form. Using case study analysis, the article discusses the major plans that have influenced the region, environmental constraints to urban development, corridor planning techniques, and future planning initiatives. Key to the Perth context is the primarily British-style planning process that is used in Western Australia. Findings reveal that corridor planning will continue to provide the primary regional planning framework, and planning in the Perth region will take a more interdisciplinary approach with respect to environmental concerns.

Introduction

The purpose of this article is to critically examine regional planning in Perth, Western Australia. Using case study methodology, the research shows that Perth's current urban form has been influenced significantly by a number of urban planning efforts that have had a direct influence over urban expansion issues, and will continue to be influenced by similar planning efforts. The paper will also attempt to explain the rationale that underpins the various strategies and theories that have been used throughout regional planning history in Perth.

The context of this paper is adequately described in G. Seddon's *Sense of Place*:

Perth and Fremantle began as two small townships with twelve miles of bush between, but they are now parts of a continuous metropolitan complex that runs around both sides of the Swan and Canning estuaries and beyond. For historic reasons, they are dis-

tinct administrative units, and are likely to remain so, but they will come increasingly under the sway of regional planning.
(Seddon 1972, 253)

This research provides a comprehensive perspective of urban planning in the Perth region, which has not previously been documented. While there are several reports and papers detailing the accomplishments of individual planning initiatives in the region, this paper shows how several influential planning initiatives have affected Perth's urban form and will play a large part in its future growth and development. The research also reveals the unique Australian planning model that is well suited to support regional planning efforts.

Geography and Context of Perth

Perth is located in the State of Western Australia, Australia. Western Australia is Australia's largest State in terms of total land area, accounting for almost 1/3 of the entire Australian continent; however it is quite isolated from the country's eastern population and power centres of Sydney, Melbourne, Brisbane, and Canberra. The total population of Western Australia is approximately 2.4 million persons, with about 80 percent of these living in and around the Perth Metropolitan Region. Western Australia is the country's least populated State (Finlay et al. 1998). Figure 1 provides an overview of the Australian continent, with the State of Western Australia, and the City of Perth.

Perth is situated on the Swan River in the Swan Coastal Plain, a narrow coastal belt extending from Jurien in the north to Dunsborough in the south. Perth has a Mediterranean climate with warm dry summers and mild wet winters. There are two major landscape units that Perth is situated on. To the west is the Swan Coastal Plain, developed by sedimentary deposits of the Perth Basin. To the east is the Darling Plateau, consisting of granitic rocks approximately 2.5 billion years old.

Soil types and locations play a vital role in the Perth Metropolitan Region. Soils help to shape the region by determining what land uses can or will occur in certain areas. The three main types of soils that are found in the Perth Metropolitan Region are Aeolian soils (sandy and requiring heavy fertilization), Swamp soils (arable, but suffering from water-logging problems) and Alluvial soils (ideal for agricultural purposes) (Seddon 1972).

This geographically diverse area is home to an immensely diverse variety of flora and fauna. Over 1,200 native species, subspecies, and varieties of plant have been identified on the Southern Swan Coastal

Plain in the Perth Metropolitan Region. Many of them have been declared rare, endangered, or given some sort of preservation priority. In addition to this, many species are unique to the Perth area alone, requiring additional preservation attentions (State of Western Australia 1998b).

Figure 1. The States of Australia



Source: United States Central Intelligence Agency 1999.

The Shaping of Perth

Australian cities are very unique in relation not only to each other, but to other cities throughout the world. First, the majority of Australians are urban; approximately 80 percent of Australians live in cities. Similarly, the bulk of Australians reside in capital cities, which have a very distinctive identity; they are the government, service, and administrative centers of their respective state. They have a wide variety of job

opportunities and lifestyles and usually dominate their region, and in most cases, the entire state. It is also important to note that most all of the major Australian cities are port cities, which is typically where they acquired their administrative, and to some degree, service identities. Furthermore, Australian cities were colonized very late in history (1800-1830), and were not developed out of a rural-to-urban migration pattern. Rather, most of the rural towns in Australia have been developed to service urban areas. In addition to being agriculturally focused, they provide service and transport to travellers moving between urban areas (Griffin 1999).

Early History: Nineteenth Century Perth

In August of 1829, Captain James Stirling arrived in the vessel *Parmelia* on the shores of Australia, establishing the City of Perth. The reason for the choice of the site was that in the future, "it would provide a complement to a port at Fremantle at the further end of a beautiful estuary [the Swan River] and be convenient for access to the agricultural districts inland" (Perth City Planning Department 1969, 1).

Perth was inaugurated as a town on the 12th of August 1829, consisting of 300 persons. An area of three square miles was reserved for the townsite. The initial layout "was of necessity hasty, and a proper survey was not made until 1938, which is generally considered the first plan of Perth" (Perth City Planning Department 1969, 1).

By 1848 the population had grown to approximately 2,770, with the town's expansion pushing to the north and northwest, which made the draining of swamps and lakes in that area essential as a "matter of health and revenue" (Perth City Planning Department 1969, 3). The work was eventually carried out in 1854, after land had been reserved for drainage purposes. The reclaimed land held several structures, including the Perth Railway Station and its yards (Perth City Planning Department 1969).

In 1850 colonists petitioned to employ convicts as a labor force (colloquially referred to as the "Convict Era"). The first convicts arrived that same year, and continued to arrive until 1868. The Convict Era saw great productivity; streets were levelled and paved, and more substantial brick buildings were constructed. In 1850 the Colonial Hospital was built, in 1854 Perth Town Hall was built, in 1859 the first part of the Government House was constructed, and in 1866 a bridge from Fremantle to Perth was built, linking two ports and two cities (Perth City Planning Department 1969).

The 1880s brought with it the discovery of rich gold fields further inland at Yilgarn and Kalgoorlie, prompting a period of expansion and prosperity as of yet, unexperienced. Between 1891 and 1901 the population of Perth jumped from 8,400 to over 27,000 and by 1903 the area of Perth and its suburbs covered approximately 40 square kilometres (25 square miles).

By the 1890s all railways and roads converged on the Perth metropolitan area, acting as a magnet for business, industry, and employment. While this was of great advantage to Perth, it had the effect of limiting the development of any other large center (with, perhaps, the exception of Kalgoorlie) and made almost any attempt at decentralization impossible (Perth City Planning Department 1969).

During the late 1800s period of rapid growth and high housing demand, land use had no direction or control, the result being that neighbouring land was subdivided with little or no coordination. These parcels of land were cut up into as many blocks as possible, making each original land grant readily distinguishable from the next due to very different street patterns. The resulting street pattern became a patchwork of thoroughfares, which were often in conflict with the present urban form of the region and present needs created by the automobile, which demand a north-south flow for the major traffic arteries (Perth City Planning Department 1969).

Regional Planning in the 1920s

Scott (1995) notes that regional planning in the United States evolved from two main philosophies of the 1920s, privately funded planning organizations and publicly funded planning organizations. Private wealthy civic organizations typically funded regional planning groups, as in the case of the Committee on the Regional Plan of New York and its Environs, and the Chicago Regional Planning Association. Their diverse interests included providing increased civic beauty, capital improvement projects for business purposes, and improved park systems. The early public regional planning groups were often formed to provide a collaborative framework for state, county, and municipal officials to work within. These public planning agencies addressed common problems such as transportation, sewage treatment, and water supply, all at a regional scale. As described by Lewis Mumford (1925), "the regionalist attempts to plan such an area so that all its sites and resources, from forest to city, from highland to water level, may be soundly developed, and so that the population will be distributed so as to utilize, rather than nullify or destroy its natural advantages."

As federal assistance for planning became available, the popularity of public regional planning agencies flourished, and many private regional planning agencies were disbanded to avoid duplication of services, among other reasons. However, one of the primary difficulties experienced by public regional planning agencies (starting in the 1950s) was their inability to directly influence local units of county and municipal government. While some agencies, such as the Detroit Metropolitan Area Regional Planning Commission, were able to foster a cooperative spirit, others shifted to an advisory role and provided technical committees to solve regional problems such as transportation, recreation, and industrial development.

In the 1960s regional planning experienced a resurgence, primarily due to federal interest in their services. The federal government saw creating regional planning agencies as a means toward promoting and managing its programs. In 1962 the United States Supreme Court's decision in *Baker v. Carr* provided an indirect emphasis for the importance of regional planning commissions (Scott 1995). This case gave federal courts the right to review the distribution of seats in a state legislature and state voting districts. In effect, this decision shifted legislative powers from primarily rural to primarily urban interests, thereby influencing the issues to be acted upon. Urban issues would gain attention, and the role of regional planning agencies would be re-emphasized.

Regional Planning in Perth

While the regional planning movement was underway in the United States, Perth had no formal planning agency until it appointed the Town Planning Board in 1929 (Bycroft 1974). The need for planning both Perth and the nearby town of Fremantle led to the creation of an Honorary Royal Commission of the Legislative Council, but not until 1951. The commission first reported in 1952, and as a result, Professor G. Stephenson, and the Commissioner of Town Planning, Mr. J.A. Hepburn, released the Stephenson-Hepburn Report in 1955.

The Stephenson-Hepburn Report of 1955

The Stephenson-Hepburn Report of 1955 was a comprehensive study of the Perth and Fremantle region. These two cities comprise Western Australia's state capital and major seaport. The report based itself on several premises, one of which was that the region would continue to grow at a greater rate than the rest of the state.

The Stephenson-Hepburn Report carefully considered future population growth, for both the region and the state. Between 1901-1950, the growth rate of Western Australia was higher than that of Australia and the growth of the region outpaced the growth of the state. The Stephenson-Hepburn Report assumed an average annual growth rate of 3 percent for the future population of the region, placing the region's population at 1.0 million by 1985. Overall, the plan allowed for 1.4 million in the metropolitan region by the end of the century, almost exactly on target.

The report showed an increasing degree of centralization within the state, and also assumed that this would continue to occur. However, the region itself had a separate trend of decentralization, especially with the establishment of Kwinana as the region's main industrial area in 1952 (Wilson et al. 2004). The Swan River acted as a southern barrier to the south for development, forcing most of the new growth to occur north of the river. The report stated, "it is strongly advocated that a firm line should be drawn as a limit to the lateral expansion of the main built-up area, and that encouragement should be given to decentralisation within the region as well as within the State" (Stephenson and Hepburn 1955, 7). Later in the report, as the corridor plan concept is explained, it is obvious that the Stephenson-Hepburn Report has had major influence in guiding planning for the region into the 1980s and 1990s.

The report asserted that, "the greater the concentration of a people in an urban area, the greater the need for open space." Stephenson and Hepburn took into account past and future growth and recommended that there be ample open space provided after the estimated needs of building development had been met. The plan recommended that there be three types of open spaces provided for the public. The first of these was the "Local Open Space" (i.e. between 3.0-4.7 acres), which was intended to be reasonably close to all homes. These proposed open spaces included children's playgrounds, small public gardens, primary school playing fields, and small public playing fields. The second type, the "District Open Space," was meant to serve a larger population. The recommended standard was 5.5 acres per 1,000 persons. The third and final space, the "Regional Open Space," was designed to serve the needs of the entire region. This type of open space establishes no minimum standard, but aims to set aside areas contained within the region that are unique, such as ocean beaches, the Swan River, areas of landscape, and large central parks. The report concluded that there was a shortage of public parks and playing fields, and those that did exist were not equally distributed, which drove Stephenson and Hepburn's recommendation for the three different open space types.

The report also recognized a vital new trend, the decreasing number of persons per registered automobile. In 1930 the ratio was 8.2 persons per vehicle, and by 1953 there were 4.9 persons per vehicle (Stephenson and Hepburn 1955). The trend continued, and by 1972 there were 2.4 persons per vehicle (Seddon 1972). The plan suggested that the then present road system was inadequate to handle the growing traffic volume. The report predicted a population of about 1.4 million persons using five times the number of automobiles that were then in use, as well as utilizing as many as eight new major regional highways totaling 85 miles in length. The plan considered it essential that a suburban railway system radiating from the central area be established. The ultimate goal of this system was to help relieve present and future road congestion.

Additionally, the plan called for a control of housing densities. Housing is an important and large land requirement for an urban area. The plan acknowledged that single-family detached homes were the predominant dwelling type and would likely continue to be. Stephenson and Hepburn concluded that residential areas adjacent to the city center were likely to accommodate up to nearly 250 persons per hectare (100 persons per acre). In more recently developed areas, the density dropped to just under 40 persons per hectare (about 15 persons per acre), and in the Hills Region and other geographically restricting areas, the density was as low as ten persons per acre.

The Stephenson-Hepburn Report ultimately recognised implementation as one of the major obstacles to overcome, but argued that, "the so-called cost of planning is negligible in comparison with the cost to the community of haphazard growth" (Stephenson and Hepburn 1955, 18). Thus, the Stephenson and Hepburn Report served as a fundamental plan of action for guiding growth in the Perth region. In particular, it set the stage for corridor planning in the late 1960s.

Corridor Planning's Introduction in 1967

According to Bycroft (1974), consideration of the corridor form of development first occurred during the 1967 to 1970 period when the Town Planning Department reappraised the Stephenson and Hepburn concept of a centralised form of a city. During this same period the Australian Planning Institute (API) held its 43rd Annual Congress in Perth, where the Metropolitan Regional Planning Authority (MRPA) released its publication: *Perth: Region and People* which set out two possible concepts for urban growth: "cluster" and "corridors." For three primary reasons, the corridor plan gained support over the cluster plan.

The first reason for selecting the corridor plan concept was that the physical land form of the Perth region was better suited for corridor planning. The primary influences included the geological boundaries of the Indian Ocean to the east and the Darling Plateau to the west. The second reason was that a corridor plan could adequately provide a mix of urban and open space land use opportunities desired for the region. The third reason for selecting the corridor plan concept was that it was more economically efficient from a transportation standpoint. Figure 2 shows a detailed map of the present-day Perth Metropolitan Region (Countrywide Publications 2004) in order to provide a better perspective for the following discussions.

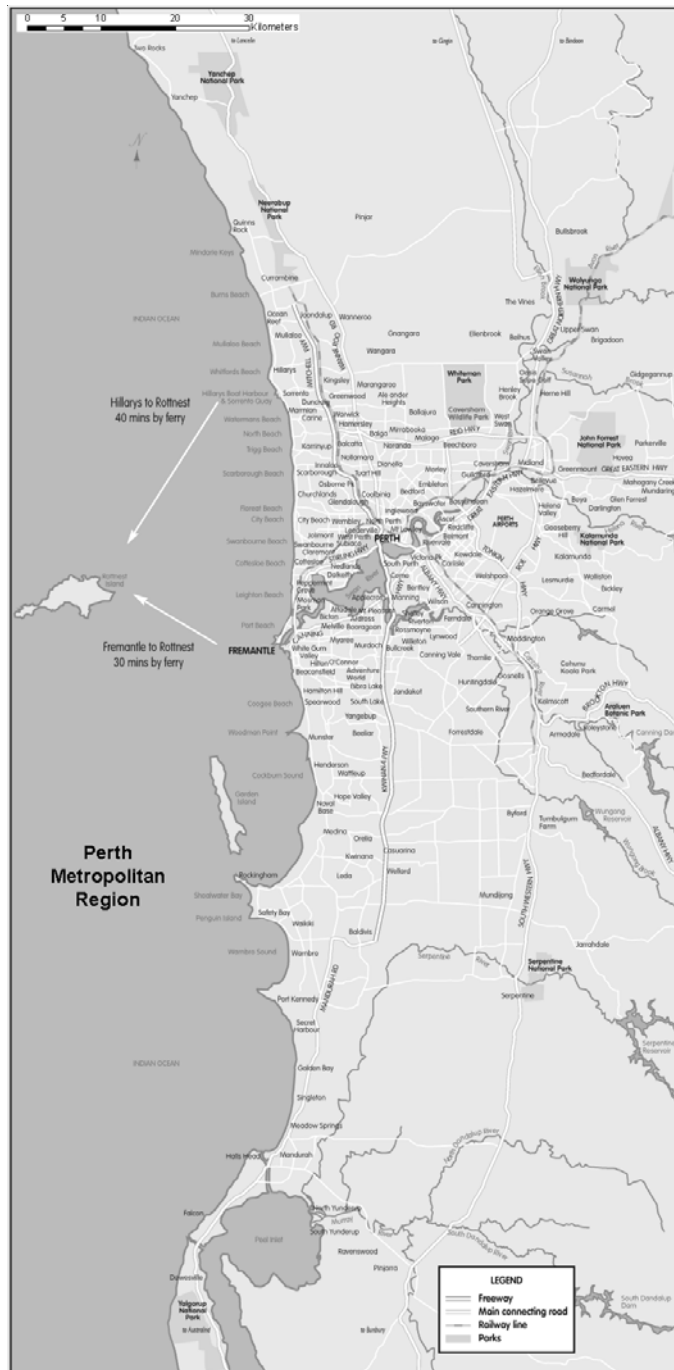
The Corridor Plan presented several important points. First, it argued that each new urban corridor would be largely a self-sustaining unit with its individual identity and with its own special geographic location, population mix, and workforce base. Furthermore, the central area would develop with specialised retail, cultural, and recreational functions with an employment level of around 90,000 people. There would be sub-regional centers, which would absorb much of the increase in workforce and meet many of the daily needs of the nearby population. Additionally, the plan argued that the corridors were not expected to significantly expand in units of 100,000 to 150,000 people beyond 1989. Finally, the plan argued that corridor development would allow for more efficient expansion of public transport, particularly with the population grouped along major bus and rail lines (State Planning Commission 1985). MRPA formally adopted the Corridor Concept in February of 1969, and released *The Corridor Plan for Perth* in November of 1970 (Bycroft 1974).

Purposes of the Corridor Plan

The Corridor Plan intended to be a framework to accommodate anticipated future development in the Perth Region. The main purpose of the Corridor Plan was to ensure maximum economic efficiency in future regional development. In addition, it sought to preserve the essential character of the non-urban areas. The plan also indicated that it had harmony with the Perth Regional Transportation Study in that both reports agreed that corridor planning provided the most economic transport systems for the area (Bycroft 1974).

From the beginning, the Corridor Plan laid out specific objectives including:

Figure 2. The Perth Metropolitan Region



Source: Countrywide Publications 2004.

1. The plan will build on the existing urban structure and capitalize on present uses;
2. The plan will allow for expansion without increasing the length of the journeys because the people can travel to the sub-regional centers developed in the corridors. There is the increase in possibility of the more economic expansion and use of public transport;
3. The plan anticipates the need to continually increase the capacity of inner-core communications; and
4. The plan creates the opportunity for the regional center to develop specialized functions to augment the facilities provided by the sub-regional and service centers (Bycroft 1974).

In the preamble to the report MRPA states that the first task of planning is to prevent urban sprawl. "This type of sporadic suburban scatter is expensive to develop and wasteful in its requirements for public utility, transport, and social services" (Bycroft 1974, 28).

Elements of the Corridor Plan

The underlying rationale of corridor planning is to create "a string of self-contained cities" (Seddon 1972, 258). The Corridor Plan, recognizing the economic, physical, and climatic features of the region, proposed corridors of expansion to extend Northwest, Southwest, East and Southeast of the urban core. The plan also proposed sub-regional centres to be developed in each of the corridors at the nearby towns of Lake Joondalup, Rockingham, Midland, and Armadale (Bycroft 1974). These sub-regional centers were intended to act as counter-magnets to the attraction of the central business district (CBD) in Perth.

The corridors are arms of urban expansion, approximately five miles wide, pushing out from the urban core along strong linear routes. The plan called for development that is divided into self-sufficient communities separated by breaks of open spaces, rather than one massive and continuous development. "Essentially the plan was presented as an answer to the probable pattern of social and economic activity in the community in the years ahead" (Bycroft 1974, 32).

A corridor to the northeast was not favored because of the unique character of the Swan Valley. Here there are more than 5,500 acres of vineyards, representing nearly 75 percent of the total area of viticulture in Western Australia (WA). The plan sought to protect the valley's

dominant role in the grape and wine-producing industry in WA. Allowing residential (or any other) development would create pockets of vineyards which, it was feared, could possibly lead to a collapse of the entire industry (Bycroft 1974).

Between the proposed corridors there were to be large non-urban wedges suitable for agricultural, institutional, or recreational uses that require extensive amounts of land and not typically suitable for location in urban areas. The rest would remain as vacant land. The Corridor Plan also called for a need to build centers outside the CBD of sufficient size with enough employment opportunities to attract the potential growth away from the CBD, but not to the extent that the CBD would deteriorate (Bycroft 1974).

The Northwest Corridor

In 1985 the State Planning Commission projected that the Northwest Corridor would need to accommodate 289,000 persons (or 21 percent of the Perth region's total population) by the year 2001. This corridor is strategically located adjacent to the northern beaches, providing it with a powerful market force. Major investments in the City of Wanneroo Offices, the Wanneroo Hospital, and other significant services have been key in bringing residential development to the major Sub-Regional Centre of Joondalup (State Planning Commission 1985).

The Eastern Corridor

By 2001, the Eastern Corridor was expected to reach a population of 160,000 (or 12 percent of the population). This corridor's development is somewhat restrained or limited by the large reserves of state forests, water catchment areas, national parks, agricultural areas, and regionally significant landscapes to the east (State Planning Commission 1985). The main objectives of the Corridor Plan aim to locate future "urban" and "industrial" growth on the periphery of the Midland Sub-Regional Centre, located in the Eastern Corridor. The Corridor Plan also aims to maintain "special rural zones" in this corridor to protect its landscape qualities.

The Southeast Corridor

The Southeast corridor was predicted to reach a population of 299,000, or 22 percent of the total population, by the year 2001. This area experienced some of the most rapid growth of the region from 1970 to 1985.

Unlike the Northwest Corridor, urban centers were already established to build in. These included areas such as Cannington, Maddington, Gosnells, Kelmscott, and Armadale. The Corridor Plan established Armadale as the Sub-Regional Centre for this corridor. Over a 2-year period (1983-1984) the retail space in Armadale doubled, making it a regionally significant area. The entire corridor, including the Sub-Regional Centre, has been linked to the Perth Central Area by rail since the 1980s.

The Southwest Corridor

The Southwest corridor was expected to reach a population of 180,000 by the year 2001, accounting for 13 percent of the population. This corridor houses some of the oldest areas around the region, such as the shipping industries of Fremantle, the Sub-Regional Centre of this corridor. Much of the coastline has been taken over by industry, but many fine coastal areas are still reserved for recreational uses. The heavy industrial area of Kwinana, a regional industrial area, is also located here.

State Planning Commission: Successes and Failures of the Corridor Plan

In 1985, a report conference was held in Perth to review the Corridor Plan and its specific corridors, because successes and failures of the Corridor Plan were becoming apparent (State Planning Commission 1985). It could be argued that the failures began with the original publication of the plan and presumably the population projections contained within the plan. During the time period in which the Corridor Plan was developed, Perth was experiencing rapid growth. From 1955 through 1977, Perth experienced a 50 percent increase in population.

The Corridor Plan predicted that the population of the region would reach 1.4 million by 1989, but it will probably not do so until approximately 2005, 16 years later than expected. Of these 1.4 million approximately 53 percent were expected to live in the "Urban Core" and the remaining 47 percent would reside in the outer corridors. By 1985, these projections were undoubtedly in question, with a mere 32 percent of the population residing in the "Urban Core" and the remaining 68 percent living in the corridors.

Thus the Corridor Plan mis-predicted where people would choose to live. Throughout Australia, over 66 percent of the population lives within

20 miles of the coast. This is significant because the most fertile agricultural lands are also found within these same areas. The most reliable agricultural lands (those with at least 15 inches of rainfall per year) are mainly found within 150 miles of the coast (Seddon 1972). In addition, these lands serve as the primary water catchment areas that service the urban areas. With a three-way demand (residential, agricultural, and, water resources) being placed on a relatively small area of land, planning the future properly is imperative.

The Corridor Plan would only work, according to Seddon, if the outlying areas actually did become sub-regional centers. This means that the centers must be places where people work, sleep, and want to spend much of their leisure time, rather than "second-rate dormitory towns with limited cultural facilities" (Seddon 1972, 258).

As of 1985, the overall effectiveness of the Sub-Regional Centres was in question. It appeared that the original population projections in the Perth Central Area were acceptable; they had predicted that by 1984, 90,000 people would reside in this area, and in reality 81,000 did. However, planners also predicted that the Sub-Regional Centres would provide the majority of employment opportunities outside of the Perth Central Area. In fact, the majority of employment opportunities outside of the Perth Central Area were actually located in the areas adjacent to the "Urban Core," such as West Perth, North Perth, Leederville, Nedlands, and Victoria Park. Similarly, only 22 percent of the workforce was actually working in a corridor location in 1985, and the average distance travelled to work had progressively increased from 7.7 km in 1971 to 9.5 km in 1981, not decreased as the Corridor Plan had proposed.

Metroplan of 1985

Since the early 1970s, the Corridor Plan guided the development of the region, and has served as the major framework for guiding Perth's population to just over one million persons. Metroplan is the framework that plans to accommodate another one million persons in Perth. Current forecasts indicate that the Perth regional population will reach 2 million persons somewhere around the year 2021. With this growth comes an expected demand for almost 400,000 new residences and the urban infrastructure associated with them.

In 1985 the government commissioned an independent group to review the Corridor Plan and the Metropolitan Region Scheme, a coordinated planning effort between state and local agencies. As a result,

one of the major changes included planning for an additional 8,500 hectares of potential urban land, bringing the total to 37,500 hectares, which was almost a 1/3 increase. Some of the reasons for this include a higher population forecast, a need to maintain flexibility in changing needs for urban land, and low housing yields. Most of this additional land is located on the outer areas of the existing corridors. This was an important element of the planning process because it recognized the need for a more modern planning framework for the Perth metropolitan region, which led to the development of Metroplan by the Western Australia Department of Planning and Urban Development (DPUD 1990).

In agreement with the review group's findings, Metroplan concluded that a more consolidated urban form was both desirable and possible. Undoubtedly, new urban land will be needed to house the future population. The plan consists of initiatives designed to provide new homes closer to jobs and amenities. As many as 80,000 additional units in established suburbs may be built over the next 30 years. However, this would only account for 20 percent of the future regional requirements.

Metroplan Develops Six Major Themes

Review and study of the regional development plan was completed in 1987 and concluded that a development pattern based on corridors was still the favoured structure for guiding growth in the metropolitan region. This type of development was believed to best complement the region's natural attributes and already existing infrastructure. Six major themes for development are proposed in Metroplan:

Theme 1. Planning for further development of the Perth Central Area as the state's principal center and the region's largest employment center. The Perth Central Area is the hub of a region, and the center of the regional transport system and current rail investments. The central area workforce is expected to increase over the next 30 years, possibly even doubling to 170,000 by the year 2020.

Theme 2. Containing the spillover of commercial development from the Perth Central Area into adjacent inner suburbs. By making a commitment to commercial growth, greater pressure will be placed on Perth for secondary office development and retail expansion along busy arterial roads, especially in the inner suburbs. By guiding this growth into well-located centers, more efficient use can be made of the employment and transportation opportunities.

Theme 3. *Encouraging Regional Centres to develop a diversity of functions and to serve large suburban population catchments.* Thirteen centers are currently designated as "Regional Centres" by Metroplan. Of these, eight are targeted by the government as "Strategic Regional Centres" (Armadale, Canning, Fremantle, Joondalup, Midland, Morley, Rockingham, and Stirling). The identification and encouragement of a limited number of these large centres will help enable them to develop the size and intensity required to attract a variety of activities necessary to support the local population. These eight centres have been selected based on their compatibility with other aspects of Metroplan, including the regional road system, public transportation investment, and urban consolidation.

Theme 4. *Promoting railway station precincts as preferred centers for office location and other employment-generating activities.* The suburban rail network has the potential to provide employment locations with fast, high quality transportation to the suburbs. In addition to employment, commercial development will be promoted at railway stations through planning strategies. Finally, amenities and recreation opportunities will be promoted near railway stations.

Theme 5. *Facilitating employment growth in the developing suburbs. A growing population in new urban areas will be able to support a larger and more diverse employment base.* This will allow people to work closer to their homes, reducing peak hour commuter travel. Planning strategies can take advantage of this by: 1) planning land assembly for large industrial sites; 2) focusing commercial development in the "Strategic Regional Centres" of Rockingham, Armadale, Midland, and Joondalup; and 3) focusing development near public transportation systems.

Theme 6. *Retaining and developing the Kwinana Industrial Area, with environmental safeguards, as the region's major industrial area.* This aspect of Metroplan aims to ensure that the Kwinana Industrial Area remains as the region's primary location for major industrial and port-related development.

Metroplan's Reconfiguration of the Corridor Plan

The previous section of this research identified several main goals of the Metroplan document. In order to implement these goals, Metroplan identifies several priority objectives as being key to success. Central

to the regional planning effort is the accommodation of future growth. To accommodate this future growth, the three established corridors (Northwest, Southwest, Southeast) will be widened, and a new Northeast Corridor will be established north of Midland. Policies already in place will continue to protect the Swan Valley, ensuring that it will not be urbanized. These policies may even be strengthened if necessary, to protect the Valley's character (DPUD 1990).

The following priority objectives of Metroplan are discussed in the next several sections: open space wedges, urban density and form, Central Perth, the Strategic Regional Centres, and transportation.

Retention of the Rural and Non-Urban Wedges

The Corridor Plan called for large areas of open space to be located between the corridors. These areas, or non-urban wedges, play a very important role. They provide connections between different ecological systems, such as connecting the coast to the coastal wetlands. The non-urban wedges are mostly public places and the review group concluded that these major open spaces could be utilized, through careful planning, by urban uses that require large land holdings. For example, cemeteries, golf courses, sports facilities, university campuses, and telecommunications facilities provide suitable uses.

Metroplan recognizes the importance of the non-urban and rural wedges that help maintain open rural character outside of developed areas. Another benefit of maintaining these wedges is that they provide distinct edges for urban corridors, helping to prevent dissimilar and random development. These areas of land represent the principal water recharge area for much of the region. Other hazards in the other non-urban wedges include loss of natural bushland, clearing land for cattle grazing, contamination of surface and ground water, and pressure for new development (DPUD 1990).

Implementing Urban Density and Form Changes

In order to accommodate the non-urban and rural open space areas, Metroplan identifies certain areas as more suitable for higher density development than others. The first of these areas is the Perth Central Area. Previous planning documents, such as the Western Australia Planning Commission's (1990) Residential Densities and Housing Mix policy, suggest that Central Perth would be a livelier and more attractive city center if its residential population were increased. One attempt to promote this is the East Perth Urban Renewal Project, which is

adding a residential section to the city center. The second areas that are well-suited for higher density residential development are the regional centers. Since higher density commercial development is also emphasized in these areas, it provides residents with easy access to services, employment opportunities, and public transportation. There are several more areas that are also deemed suitable for higher density development, including public transportation nodes, railway station precincts, tertiary institutions (colleges and universities), employment centres, and major leisure facilities.

Perth Central Area

Central Perth is the focus for retail, administrative, government, cultural, and tourist activities for the region, in addition to being the largest employment center. Major growth in retail activity and government services is not envisioned, but new investment in commerce, leisure, and cultural activities may help reaffirm the importance of Central Perth.

Pedestrian amenities, such as the introduction of plants and gardens at Forrest Place, the Hay Street Mall and the Murray Street Mall are also important. Metroplan acknowledges that the links between the Swan River and the commercial core need to be strengthened. In order to maintain pedestrian access, priority will be given to walking and less emphasis will be placed on auto access. Public transportation provides a more efficient alternative for bringing people into Central Perth as opposed to maintaining a high level of private auto access.

By improving and extending the public transportation services (and especially the rail lines) in conjunction with the gradual elimination of central area automobile parking spaces, the public transportation system will be the dominant means of transport in the city centre. In addition to this, "park-and-ride" car-parks in the suburbs help to eliminate traffic congestion in the Central Area.

Strategic Regional Centres

Although the Perth Central Area is the dominant retailing centre, it is expected to become less dominant in the future. By the year 2021, as much as 80 percent of the work force is estimated to be employed in the suburbs. The five sub-regional centers first proposed in the Corridor Plan have already established themselves as town centers with a range of employment opportunities. As the population grows around

these centres, they have the opportunity to become even more significant employment centres.

The eight Strategic Regional Centres (Fremantle, Midland, Joondalup, Armadale, Rockingham, Canning, Morley, and Stirling) will be the most important retail areas outside of the Perth Central Area. By developing these centers further, there will be a more balanced distribution of retail and commercial activity. By strengthening these centers it should be possible to improve the prospects for public transportation.

The Government will support the development of Strategic Regional Centres in several ways. One way is to locate the Commonwealth and State Government offices that need suburban locations in the Strategic Regional Centres. The government will also collaborate with local governments in developing structure plans and the development of a distinctive character for each centre through quality townscaping and civic design. Another way the government will support the centers is through its land assembly powers. These powers can be used to improve access, parking, and the environmental qualities of the centers.

Transportation

Road reserves, car-parks, railways, airports, and port installations account for almost 1/3 of the land in developed urban areas such as Perth. Perth is somewhat unique in that its development took place in large part after the introduction of the private motor vehicle. As a result, Perth "acquired a well-deserved reputation as a city that has learned to live with, and plan for, the motor car" (DPUD 1990, 62). So far this has allowed for high levels of personal mobility without causing excessive traffic congestion, urban blight, pollution, and decline in livability, which other cities around the world have experienced. If current use is extended into the future, ownership and use of private motor vehicles would more than double traffic volumes by 2021.

To improve accessibility, guide growth, and reduce pollution, Metroplan identifies several key strategies. First, Metroplan proposes to upgrade and extend the suburban rail system in order to improve accessibility to the Central Perth Area, the Strategic Regional Centres, and other growth locations throughout the region. Another method of improving accessibility is through upgrading bus services. Bus service will extend to new areas, and bus road lanes, along with bus priority measures, will help improve the efficiency of the bus system and the accessibility to suburban areas. Improving the environment for cyclists and pedestrians will also help improve accessibility, safety, and ease of movement. Another measure is the development of public transport inter-

changes at the Regional Centres. This will help to link the car park, suburban rail, and bus systems, thereby creating a Region-wide transportation network.

Perth's Bushplan of 1998

Both the Corridor Plan and Metroplan consistently identify the preservation of the natural environment in and around Perth as a major priority. In order to further strengthen the language contained within these documents, a standalone preservation document, known as Perth's Bushplan, was developed to guide conservation activities from a planning perspective.

Already more than 13 percent of the entire Perth Metropolitan Region is preserved for the purposes of preservation, parks, and recreational uses according to the State of Western Australia (1998b). Produced specifically for the preservation of natural areas in and around Perth, Perth's Bushplan acknowledges the importance of protecting and retaining the regionally significant bushland, associated wetlands, landscapes, flora, and fauna. In addition, it calls for (where still possible) retaining "at least ten percent of the area of each of the original vegetation complexes of the region" (State of Western Australia 1998b, xi).

The Bushplan was introduced in 1998 and is a collaboration of several government agencies: the Department of Conservation and Land Management (CALM), the Department of Environmental Protection (DEP), the Water and Rivers Commission (WRC), the Ministry for Planning (MIP), and the additional work of community members. The Bushplan was originally a part of the Metropolitan Region Scheme (MRS) System 6 Report, a less comprehensive document that identified and measured preservation efforts for specific sites of land (State of Western Australia 1998b).

Objectives of Perth's Bushplan

Perth's Bushplan has four major objectives (State of Western Australia 1998b):

1. To develop a plan that meets the needs and aspirations of the community of Western Australia for the appropriate protection of bushland of regional significance in the Swan Coastal Plain portion of the Perth Metropolitan Region;

2. To recommend a conservation system that is, as far as is achievable, comprehensive, adequate and representative of the ecological communities of the region;
3. To propose a range of measures to enable the implementation of Perth's Bushplan recommendations for the protection of regionally significant bushland; and
4. To bring greater certainty to the processes of land use planning and environmental approvals by the early identification and protection of areas of regional conservation value.

Bush Forever 2002

Bush Forever is a document that aims to implement many of the objectives identified in Perth's Bushplan, and replaces the MRS System 6 Report. The plan identifies 51,200 hectares (about 126,000 acres) of regionally significant bushland for protection. The plan attempts to preserve at least ten percent of each of the 26 significant vegetation complexes. The target level of ten percent was identified because it represents "the minimum internationally accepted level to ensure a species will survive" (State of Western Australia 2002, 91). The World Conservation Union also recommends this level of commitment. Implementation will occur over a period of ten years, with \$100 million in funding. This initiative is being headed by the Ministry for Planning, but is a coordinated effort of many different agencies and interest groups, as it is a national policy.

Perth Region 1998: Annual Report

The previous sections of this paper discussed special studies and reports for long-range planning efforts in the Perth region (i.e., the Corridor Plan, Metroplan, and Perth's Bushplan). Continual planning efforts are also important to consider, such as the Metropolitan Region Scheme and the Metropolitan Development Program, which affect daily planning activities within the Perth region.

The Metropolitan Region Scheme (MRS) is the legal framework that allows the government to guide and control land use and property development. The MRS zones broad categories of land use that local governments use to create more detailed town planning schemes. Since planning is designed to be flexible and accommodate change, the MRS is reviewed and amended on a continual basis. The MRS is

amended accordingly by the Ministry for Planning (State of Western Australia 1998a).

Since 1993, the Ministry has used a Major Amendment Program to alter several broad categories of the MRS, including environmental planning, transport planning, urban expansion, and major redevelopment initiatives. During the 1998-1999 reporting year the MRS amended or introduced several important aspects.

The first amendment considered under the Major Amendment Program was a Groundwater Protection Amendment, specifically for the areas near the southwest and southeast corridors. This amendment introduced a new Rural-Water Protection Zone into the MRS. This was the first new zone to be added to the MRS since 1963. The introduction of this amendment meant that 4,818 hectares of land (approximately 11,900 acres) were rezoned to Rural-Water Protection and that an additional 1,650 hectares (approximately 4,000 acres) would be reserved as water catchment areas. This ensures that future land use in these areas will be compatible with long-term groundwater requirements. New urban land and industrial land will not be permitted on these Rural-Water Protection zones.

Another major amendment to the MRS alters the regional road system by reducing road reserve requirements. The typical road reserve requirement in many areas was between 30 to 50 meters (100 to 165 feet) in width, but was reduced to 23 to 30 meters (75 to 100 feet) in width, with the goal of minimizing the "effects of regional road reservations on property and free up land for redevelopment where it is clearly not needed for future road widening" (State of Western Australia 1998a, 34).

There were several other amendments introduced through the Major Amendments Program. These included an urban renewal project in Northbridge (directly north of Central Perth) to make land uses in the area more compatible, rezoning of land for parks and recreation, and the rehabilitation of a contaminated site in Bellevue. In addition, the ministry also reviewed a proposal for a new Northeast Corridor. The ministry analysed the historic demographic changes in this proposed corridor and prepared structure plans for various population scenarios ranging from 10,000 persons to 60,000 persons.

The ministry also reviewed several transportation issues over the past year. First, the ministry prepared a report titled, *Improving the Viability of Additional Passenger Ferry Services on the Swan and Canning Rivers by Integrating Transport and Land Use Planning* (State of West-

ern Australia 1998a), which proposed increased river ferry use as part of a region-wide public transportation system for Perth.

Metropolitan Development Program 2003

Another element of the continual planning process for the Perth region is the Metropolitan Development Program (MDP), which aims to identify lands and infrastructures needed in the coming five years for urban development. The most substantial growth will occur in the Middle Sector (areas near the Perth CBD), the Northwest Corridor and the Southwest Corridor. About 35,000 new residential lots are anticipated in these areas by 2007, with 17,000 expected in the Southwest Corridor. Since 1998, the Middle Sector has yielded the most residential lots (2,500 per year), but this number is expected to decrease. The region's population is at 1.4 million currently, and is expected to reach 1.6 million by 2007. In order to accommodate the anticipated population increase, the MDP has identified nearly 500 land release project areas, but almost half have at least some constraints to development.

The Planning Process in Western Australia

To this point, important planning initiatives that have shaped the Perth metropolitan region have been discussed outside of the legislative context. To gain a better appreciation and understanding of their importance it is also necessary to understand the Australian planning process and its hierarchy. The planning process in Australia (and the State of Western Australia) is a primarily British-style planning process and is slightly different from the one that is used in the United States. Planning in Western Australia is administered at three levels: The Minister for Planning, the Western Australia Planning Commission, and the 144 local governments (State of Western Australia 1996).

The Minister for Planning is the State Government's elected representative that is responsible for town planning, and has the ultimate authority over planning in the state. The Minister's responsibilities include:

- overseeing the administration of planning agencies;
- maintaining and reviewing planning legislation;
- managing statutory and strategic planning matters;

- approving statutory region schemes and local town planning schemes; and
- determining appeals submitted to the Minister on planning matters.

The Western Australia Planning Commission is the second level of planning administration. The commission has state-wide responsibilities for planning, and is responsible for urban, rural, and regional land use planning and land development matters. The commission's roles include:

- responsibility for the making and administration of regional planning schemes, all subdivision decisions, and the administration of, and amendments to, the Metropolitan Region Scheme;
- providing advice to the Minister for Planning;
- making decisions on behalf of the Commission on planning matters, through planning committees; and
- providing recommendations to the Minister on local government town planning schemes, including giving consent to advertise local town planning scheme amendments.

The local governments are the third and least powerful level of planning in Western Australia, following in the tradition of British-style planning. Local governments are responsible for town planning in the local community. Local governments that are located within the boundaries of the Perth Metropolitan Region are required to ensure that their town planning schemes are consistent with the Metropolitan Region Scheme. The significance of this is that the Metropolitan Region Scheme will take precedence over local government planning activities. Even in cases where appropriate development is approved locally, the State Planning Commission may retain development control if the development is deemed to be regionally significant. The Planning Commission encourages local governments to comment on subdivision proposals, and they may make planning policies for guidance on subdivision development matters.

This hierarchy of government is important to understand because it is in direct contrast with the home rule philosophy of government, and urban planning, adopted in the United States. With respect to the home rule concept, Scott (1995) states that,

having fought long and strenuously for freedom from the interference of state lawmakers in municipal affairs, American city dwellers, it sometimes seemed, feared encroachment on home rule even more than they dreaded impending water shortages, pollution of the streams and lakes in which they swam, or acrimonious disputes among local governments over highway routes and intercity transit services.

(516)

An important result of the British-style planning model is that regional planning efforts hold more authority in Australia than the fragmented home-rule philosophy seen in the United States, which favors upholding local municipality control.

One of the most recent changes in the urban planning process in Australia is the Planning Legislation Act of 1996, which made a significant impact on the planning process. The purpose of the act is to bring planning and environmental assessment procedures together at an early stage of the zoning process, and to better integrate the two processes. Previously, town planning and environmental legislation had no formal or legal links. Now, environmental assessment in the planning process is conducted "up front" at the land rezoning stage. The act also requires responsible parties to consult the Environmental Protection Agency (EPA) during the rezoning process. One of the stated indirect benefits of this merger is to give communities greater confidence in the land use planning process, since environmental factors will have been given proper consideration long before any development occurs.

Analysis and Observations of Regional Planning Efforts

This paper presented a sequence of long-range planning initiatives pertaining to the Perth Metropolitan Region dating back to the 1930's, covering a time period of approximately 70 years. The last sections will evaluate key planning issues that the Perth Metropolitan Region (and Joondalup) has taken towards guiding its growth, and assess whether the last 70 years of corridor planning activities have had the desired impact on the urban form of the region. The corridor planning elements that will be addressed include the rationale for corridor planning, the success of the Strategic Regional Centres, operation of the public transportation system, the inner suburbs, and the environmental controls used. These factors will be evaluated because they have

played important roles in regional planning in the Perth Metropolitan Region.

The Rationale for Corridor Planning

Until the Stephenson-Hepburn Report of 1955, planning measures did not guide Perth's growth. The challenge of the Corridor Plan (resulting from the Stephenson-Hepburn Report) was to decide how to best coordinate such a widely dispersed population, especially considering the low population densities. Corridor planning was a reactive approach to guiding the growth of the region and introduced the need to retain the non-urban wedges of open space, meaning that two possibilities would result in either further outward expansion as population increased, or the necessity to encourage infill development, ideally with higher residential densities. Currently, both of these activities are occurring through regional corridor planning efforts.

Strategic Regional Centres: Joondalup

The Strategic Regional Centres are the key to ensuring that corridor planning is successful; they have to act as strong counter-attractions to the Perth CBD. They are based along major public transportation routes, in most cases the suburban rail system. The Strategic Regional Centres are supposed to provide a variety of employment, residential, commercial, leisure, and cultural opportunities.

The following observations apply only to the Joondalup Strategic Regional Centre unless otherwise mentioned. As mentioned throughout this article, Joondalup is one of the Strategic Regional Centres identified first by the Corridor Plan, and then again by Metroplan. It has done some things well and others not so well. The heart of Joondalup is located immediately adjacent to the Joondalup train station on the Currambine line of the suburban heavy rail system. Throughout most of the day, access to Joondalup by train is high with trains arriving and departing every 15 minutes.

Within walking distance of the train station is a major employment centre with numerous employment opportunities. To the north is the main professional employment district. There are a number of regional legal firms and financial institutions located here. Also in this area are several government facilities (city hall, courthouse, and police station) and various other businesses including small retail shops, pubs, and restaurants. These jobs are all within ten minutes walking distance of the train station. Just steps to the east of the Joondalup

train station is the Lakeside Shopping Centre, which offers a variety of employment opportunities, however most are low-paying service sector jobs. Further to the east, approximately 15 minutes walking distance from the Joondalup train station is the main retail district, which offers an enormous variety of traditional retail-commercial goods and services. This section of Joondalup is probably the least pedestrian-oriented. Parts of this district have sidewalks and parts of it do not, forcing pedestrians to walk on the roadway or take their cars.

The major leisure areas in Joondalup are the beaches. Both Mullaloo and Burns beaches are only several minutes drive from the centre of Joondalup. Both of these beaches can also be accessed by bus via the bus/train interchange at the Joondalup station. Another recreational/cultural facility is the Joondalup Arena, which is located further to the north of the Lakeside shopping centre. This is approximately a 15 to 20 minute walk, but crosses heavy automobile traffic.

Joondalup also includes major educational facilities, as suggested by the previous regional plans. The Edith Cowan University campus is located 15 minutes walking distance west of the train station. The Joondalup TAFE, another tertiary educational institution, is also located to the west, and both are approximately a 15 minute walk from the Joondalup train station.

Overall, Joondalup meets most of the requirements of a Strategic Regional Centre. It is very much a pedestrian-friendly environment, with a few minor exceptions, and provides a number of cultural, educational, and employment opportunities. The most critical observation is the lack of housing opportunities, as there are virtually none within 15 minutes walking distance from the Joondalup train station. Joondalup is relatively new, being built almost entirely since the 1970s. It is obviously designed for the private motor vehicle, and the single-family detached housing unit. Aside from a few second-floor, above-retail residential units, there is nowhere to live within reasonable walking distance of the Joondalup train station. Joondalup is not large enough to employ all of the population catchment surrounding it, meaning that people must get to work by some other means. Almost certainly this other mode of transportation is the private motor vehicle.

Overall, Joondalup is successful as a Strategic Regional Centre, and has seen some obvious benefits from the thorough planning activities that have occurred over the years. These benefits include regional educational facilities, attractive public transportation, substantial employment opportunities and several cultural/leisure attractions.

Public Transportation

Perth has a region-wide transportation network that utilises busses, ferries, and a heavy rail system. The suburban heavy rail system is probably the most frequently used mode of public transportation. Service is fast, frequent, efficient, and clean. The system consists of four major rail lines branching out from the Perth Central Train Station that serve the corridor areas. Travel from Perth to a suburban location near the rail line is very efficient. However, bus transit serves more remote locations, and this is where the transit service begins to deteriorate. The bus service faces the challenge of catering to a widely dispersed population, whose needs vary. Travelling between major regional centres, or attempting intra-suburban travel, can be frustrating at best. The State of Western Australia (2003) has a proposal for a rail-based service connecting the major regional centers in the form of a semi-circumferential loop around Perth's central business district. This seems a plausible alternative, but feasibility studies have not yet been completed.

Original Land Grants

The report, *A Short History of Planning in Perth* (Perth City Planning Department 1969) mentions that the original land grants have caused some difficulties in establishing the desired north-south traffic flow. This is due to the fact that the original lands were subdivided without coordination between neighbors. However, from a pedestrian perspective, these are some of the most attractive suburbs, if nothing more than for the exact reason that they hinder the flow of automobile traffic. These suburbs are typically located very close to the Central Perth Area and include areas such as Leederville, West Leederville, Northbridge, and Subiaco. These suburbs are the most pedestrian-friendly and also seem to have the most character, each distinct from the others. These are the suburbs that typically have narrower streets, on-street parking, more frequent stop signs or roundabouts (for traffic calming), higher residential densities, open-air cafes, corner grocery shops, and weekend markets. From a community development perspective, the amenities that these suburbs offer (such as neighbourhood and community character) are much more important than increasing the north-south traffic flow.

Environmental Controls

There are several measures which the state and the region have taken to ensure that future development, is at the least, environmentally

sensitive. The Planning Legislation Amendment Act of 1996 seems to be one of the most proactive measures for safeguarding the environment. This act integrates the planning process with environmental management. Environmental assessments must now be conducted before any development can occur, and these assessments must be recommended satisfactorily by the EPA. This is important because Western Australia has a wide variety of plant and wildlife species, some of which are rare or endangered. These environmental systems are complex, inter-related, and valuable. This integration should act to further protect these resources.

Perth's Bushplan and Bush Forever are environmental safeguards that operate at the regional level. They aim to protect natural amenities by conserving at least ten percent of regionally significant bushland, where possible. The likelihood for success is increased for two major reasons: 1) the conservation efforts are a national goal; and 2) Australia uses a top-down planning system that makes regional decision-making more relevant and influential.

Conclusion

The Perth Metropolitan Region has evolved almost entirely under the guidance of corridor planning activities and as a result has established a very robust urban form. The seventy-plus years of corridor planning activities have developed many unique and successful communities within the region, especially with respect to the Strategic Regional Centres. Corridor planning has also proven to be a model solution for an environment that is unique, diverse, and challenging.

The Australian planning model, based on a British-style planning process, provides the influence necessary to accomplish the goals set forth in corridor planning. Urban form decisions are made at a regional level, and individual communities are required to adhere to these decisions, which results in a more cohesive regional urban form. At the regional level, this method of planning is probably more effective than the fragmented home-rule philosophy found in places such as the United States.

As the Perth Metropolitan Region approaches 1.5 million people, regional planning initiatives will continue to provide a crucial framework for the way the region, and its urban form, develops. Corridor planning will likely continue to evolve in the region, and at the same time play a vital role in preserving many of the area's significant natural resources. Strong links between the planning process and environmental safe-

guards will continue to guide the development process in the foreseeable future. Finally, as intergovernmental coordination activities increase, a more harmonious and interrelated planning process will continue to develop.

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