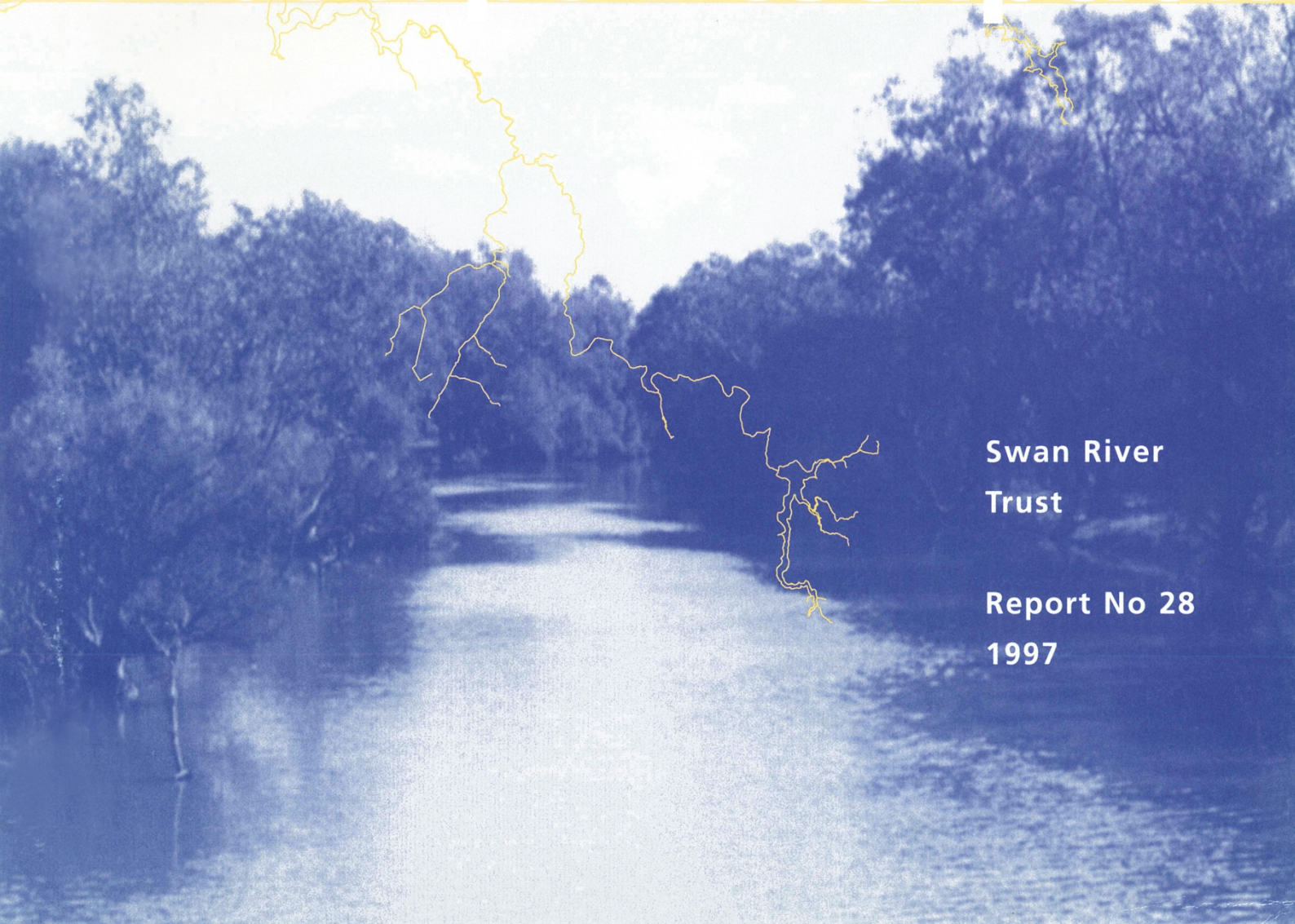
Swan River System

Landscape Description



Swan River Trust

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Report to the Swan River Trust

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Preface

The Swan River Estuary and its tributaries are integral to Perth's cultural and environmental identity. The river system has a natural beauty which must be preserved and managed for the enjoyment of all West Australians, as well as for visitors to our State.

The Swan River Trust's 1988 *Swan River Management Strategy* contains six recommendations relating to landscape management including a proposal to prepare a landscape plan for the river.

This landscape description is the first step towards implementing the vision to respect the Swan River setting as a prime community resource through planning and development processes. The landscape description is designed to encourage and assist the protection and enhancement of the character and beauty of the environment by highlighting the main landscape elements. This document presents detailed resource and landscape character descriptions for the Swan and Canning Rivers and their major tributaries. Biophysical elements, past and present land use and sites of significance are all summarised. Detailed reference lists are provided for future studies. The descriptions will be used as a resource on which sound landscape management techniques and policies can be developed in conjunction with the Ministry for Planning and local government authorities.

Retaining these natural and cultural elements makes the Swan River unique and defines its regional identity. This landscape description is a significant step towards achieving our vision of retaining a healthy and attractive Swan River system.

Summary

The Swan River Trust has a vision to respect the Swan River System as a prime resource through planning and development processes. To achieve this, the Trust has implemented a staged program to define the landscape and develop necessary planning actions for the Swan Region.

The *Swan River System Landscape Description* is the first step towards achieving landscape protection. Initial work has divided the river system into 23 precincts. Resource information pertaining to the Swan and Canning Rivers has been collected including geology, topography, vegetation, hydrology, flooding, public access, recreational elements and nodes, as well as changes to the environment from a land use perspective. Local history and cultural significance has also been summarised.

The inventory also provides a description of each precinct in terms of dominant landscape features, viewscapes and important elements in the environment. Maps of sites of significance have been prepared for each precinct. The classification of the landscape types has required a methodology to be developed. The landscape types are classified in groups according to their industrial, suburban or natural character, whichever is considered the dominant character of the landscape.

Landscape elements that are conforming and non conforming to the present landscape character types are outlined in this document. This is an objective description and it will be up to a group of experts to determine whether the present landscape character is one that needs to be retained or enhanced. The landscape character boundaries will be used as a basis for determining 'an area of influence' to guide the community, government and individual landowners in making sound management planning decisions about the river environment.
The *Swan River System Landscape Description* is a working document that will provide background information for the formulation of landscape and development control policies. It is envisaged that these policies will be developed by a working group of experts and other stakeholders including Aboriginal representatives, community groups, and river users' representatives. The draft policies would be revised as required.

The final stage is planned to involve the development of a program for implementing policies and assessing their effectiveness. The policies will need to empower the community, landowners and decision making agencies to be responsible for the conservation of natural and cultural elements of the river system.

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1.0 Introduction

The Swan and Canning Rivers and their immediate surroundings can be considered the most important landscape features of the Perth Metropolitan Region. The Swan River system landscape has changed since European settlement and is subject to ever increasing pressure for change. The river holds 'icon' status and has become a focus for the quality of the perceived environment in the metropolitan region. Previous studies of the Swan River landscape have been of some use in defining issues and pressures for change; however there has been no comprehensive inventory of the resource. This study seeks to describe the Swan River landscape and its area of influence as the basis for a more comprehensive and lucid landscape conservation strategy.

The *Swan River System Landscape Description* will serve as a foundation for developing a coherent strategy for the Swan River landscape. In developing a strategy the Swan River Trust seeks to involve the community to set values and assign priorities managing future development. The Swan River Landscape Program will need to be supported by all of government and implemented as a part of their daily responsibilities. Local government has traditionally focused upon urban design and terrestrial landscapes rather than acknowledging the river as a landscape setting of which their municipality is but one important part. It is expected that the Trust will assume the role of advocate for the development of a landscape conservation strategy for the Swan River system and to improve cooperation through all levels of government and between the public and private sectors.

Defining Landscape

Any analysis of a landscape requires an appreciation of the conceptual aspects of landscape in its entirety, for example the entire Swan and Canning River system and also an appreciation of its component viewsheds and landscape units which carry their own local significance.

Appleton (1980) noted that '*Landscape* is not synonymous with environment, it is the *environment perceived,* especially visually *perceived'.* Unlike other aesthetic objects, such as buildings and paintings, landscape is not a discrete object; rather it is an unwieldy aesthetic object with an indeterminate form (Bourassa, 1994). Landscape is more than physical features. It is the interpretation, interaction, and emotions generated by the experience of the environment's natural and cultural elements. The Swan River system is made up of a series of settings or a sequence of viewsheds. The landscape setting is defined by an area and its geology, landform, vegetation, built form, human activity, and climate and their influences on its processes.

The values associated with landscape protection are complementary to those values traditionally ascribed to environmental protection, including economic efficiency, clean air and water, species protection, availability for public enjoyment and sustainability. The community appreciation of the landscape resource is a synthesis of individual perceptions, some acute, some subliminal, others based upon historical and childhood appreciations of activities and cultural values. The landscape can be appreciated at a local level or for its regional significance. Rather than competing, these overlapping parameters enhance the power of the landscape to affect individual lives and the appreciation of the broader community.

Perception and Interpretation of Landscape

Just as there is a broader community perception of the Swan River landscape and its importance, there are localised community perceptions of precincts along the river. For example, the limestone cliffs at Blackwall Reach, Bicton, are an important landscape element to most people who use the area whether they have a conscious appreciation or not. The limestone cliffs provide a range of experiences such as awareness of nature, recreation, spiritual significance and/or a reference point for local identity. Individual experience of Blackwall Reach will vary but, for all, the cliffs and their appearance would be a key or important landscape feature. The values attributed to the broader Swan River System resource are well expounded even though they may yet to have been documented. Local values and perceptions of the river landscape have varied support and sometimes compete, especially in the face of development proposals.

There is a wide range of literature on methods of rating value judgments of people in relation to the landscape and natural resources, for example Leopold (1969) and Prinease and Allen (1992). Value judgments can provide useful information for the development of guidelines, for the assessment of land use development proposals and assigning relative values.

Landscape perception may also be defined by visual, geographical, social and cultural influences. The many personal experiences of the Swan River have led to broad support for landscape conservation; however this support has been based upon many different personal unrecorded but nevertheless important perceptions of the landscape. Fredrick Steiner (1991) noted the need for an emotional investment with the landscape to conserve the environment.

1.0 Introduction

The importance of a site reflects not just a physical link to the land, but also a spiritual or emotional link. People are more likely to conserve and preserve a place that has some sort of significance to them. By utilising the enthusiasm people have for particular sites, the Swan River Trust will be able to work with them to enhance and maintain the integrity of the landscape.

Values have changed over time and the effect of this has been to change the landscape. This is especially pronounced with the Swan River.. Removal of the coralline bar at Fremantle Harbour, Mosman Park quarries, rubbish disposal sites, dredging and general urban development have all shaped the present Swan River landscape. Community attitudes have has changed from the initial desire of Europeans to alter the natural landscape surrounding the river. It is important to understand the value processes that have brought about the contemporary Swan River landscape. What remains of the original natural landscape is fragmented throughout the study area. Where land has retained its basic topography or biological character it is mainly by chance, rather than consideration for environmental or aesthetic values. Aesthetic decisions are in general made at an intuitive level, defined by the cultural upbringing of an individual. In the colonial period, much of the natural landscape was regarded as unattractive by Europeans and development took place with little regard to the environment and aesthetics. A typical settlers perspective is reflected by Samuel Taylor, a visitor from Sydney, who in 1829 wrote of the Swan River Colony where *'you have one of the most delightful demi-panoramic view, I suppose, in the world; but this is all that could be said of it. Not a blade of grass to be seen - nothing but sand, scrub, shrubs and stunted trees, from the verge of the river to the tops of the hills'* (In Stannage, 1979). The continual influence of people whose values were formed in different environments, and the inability to recognise the intrinsic value of the unfamiliar landscape, have resulted in the dramatically modified landscape of the present day Swan River system. With changes in social values, it is now recognised that the Swan River system landscape is important for many reasons including local identity, cultural use, development and intrinsic values. The shift in community values toward the system are probably best reflected by George Seddon, whose works have contributed to raising awareness of the experience of the Swan River landscape, its uniqueness and value, and society's changing perceptions.

In *Swan River Landscape* (1970) he promoted the care and management of the natural landscape rather than replacing it with an alien one. In more recent works he suggested that when planning for a 'sense of place', it should be asked 'Whose sense? and Whose place?' (Seddon, 1995).

Nyungars identify many elements of the Swan River system as being of special spiritual significance, giving a sense of ownership and identity with their surroundings. Richard Wilkes demonstrates the Nyungar awareness of landscape experience in *Bulmurn - A Swan River Nyoongar.* In this novel, Bulmurn, a medicine man, encounters a sacred cave in the Darling Ranges after killing a *bikuta* or red rock kangaroo. *'As Bulmurn approached the kill, he suddenly felt a strange and unique feeling, one that conveyed the message to him that this was a place he belonged to...Even though he had never been to this place before, he felt comfortable, as though it was his place. He felt he belonged here, that he had been in this sanctuary before perhaps in a different spirit form'.* Despite significance changes to the landscape, many Nyungars continue to access the river for sustenance, knowledge, and spiritual renewal, and practise distinctly Nyungar cultural associations with the river environment.

1.1 Aims and Objectives

1.1.1 Context and background for the Project

Previous land use plans and studies reflect the changing values of the community. The earliest recorded Perth town plan was printed in London, by J. Arrowsmith from a document given to the Colonial Office by the first Surveyor -General, John Septimus Roe, in 1833 (Stephenson, 1975). This early city centre plan is typical of the European desire to superimpose foreign ideals onto the indigenous landscape. The ever changing values of the community and planners are documented in plans and analyses by Bold (1938), Oldham (1961) and Seddon (1971). They have noted the change in values from entire disregard for existing natural landscape aesthetics, to the need to 'beautify' the indigenous landscape to European ideals, and to the more recent acknowledgment of the natural landscape beauty and developing local identity.

Much of Perth's unique natural landscape has given way to recent rapid development requirements resulting in unstructured and featureless urban growth. In the past, the inland wetlands were Perth's natural identity. These have been repeatedly infilled for urban development and their uniqueness and importance for conservation and scenic value been unrecognised. By recognising that the landscape has an important part to play in creating a local identity, we can coordinate development to protect those features which will enhance the landscape and diversity.

Perth's cultural landscape has been shaped by a multicultural population, resulting in a distinctively Australian landscape. Often significant cultural or identifiably ethnic landscape features have been superimposed on the physical landscape. For example, the Upper Swan area has a distinctively European cultural landscape with the vineyards and European building styles. The flatness of the Swan River Plain and remnant vegetation are recognisably local, but the land use reflects a distinctive European influence. It is important that these influences are recognised and taken into account when determining the desired landscape types.

Particular focus on the management of the Swan River system came in 1943 when the Swan River Advisory Body was formed. Later in 1958, when the Swan River Conservation Act was passed the Swan River Conservation Board was formed to address environmental and recreational issues within the management area.

Today the present Swan River Trust is responsible for administering the *Waterways Conservation Act 1976* and the more specific *Swan River Trust Act 1988*.

The Swan River Trust believes that effective protection and proper management of the valuable river landscape resource should be achieved by careful planning to ensure long term community benefit.

In 1988, the Government of Western Australia released the *Swan River Management Strategy* for the future care and management of the river. The strategy was a landmark in that it recognised the need for development control which took into consideration the landscape of the Swan River system. It received national recognition in the 1989 *Australian Heritage Awards.* The report made a number of recommendations for further work including the development of a clause 5AA Policy (Metropolitan Region Scheme), model town planning schemes, and a management program for the river system. It contains six recommendations relating to landscape management including a proposal to prepare a landscape plan for the river.

In October 1990, the Swan River Trust held *The Swan River Landscape Conference.* The conference was well attended by participants from State and local government, landscape consultants, teachers and university lecturers and interested individuals. The conference brought people together to help determine important landscape components of the river, identify issues affecting the landscape and interested groups, and suggest how landscape problems could be addressed. It prepared the way for development of the landscape plan.
The Swan River Trust has now completed the landscape resource description and is preparing to develop policies which can be implemented by the Trust and local government authorities with community, expert and stakeholder consultation.

1.2 Vision, Purpose and Application

In developing a strategy for landscape protection, Swan River Trust aims to cater for a range of uses and diverse values and to promote sustainability in the management of the landscape. The *Swan River System Landscape Description* provides a landscape resource description and landscape interpretation, from which the next stage of landscape evaluation and criticism can be developed and implemented. The Swan River Trust has begun the project by defining the status of the contemporary Swan River system landscape through the collection of resource information pertaining to the Swan and Canning Rivers, on geology, topography, hydrology, vegetation, land use and sites of cultural significance. The landscape has been classified according to whether it is natural, suburban, industrial, recreational or rural in character. Significant viewscapes and conforming and non conforming elements have also been identified.

From this baseline description, the Swan River Trust, in conjunction with relevant stakeholders, can prepare a landscape planning policy which can be implemented by the Swan River Trust and local government authorities. The Swan River Trust will collaborate with the community to determine what landscape elements are important in evoking a favourable experience, and what landscape characters need to be enhanced, retained or modified. The landscape description, of necessity, has involved breaking the total experience into smaller physical elements. Describing the total experience is not possible at this stage because the experience is different for every individual. The final policy document will provide the basis for policies and guidelines for foreshore management to be incorporated into planning schemes so that the community's individual and collective 'perceptions and experiences' of the landscape can be protected and accommodated in the course of future development. It is acknowledged that managers and planners already investigate the environmental effects of any proposed changes to the Swan River landscape, but it is also necessary to determine how new developments will change the visual resource of the landscape. Then predicted changes must be quantified in a form acceptable to the community and decision makers. It is the planners' and managers' role to ensure that the community's sense of place and ownership, and enjoyable river landscape experience, is maintained.

1.2.1 Purpose of Landscape Program

The Swan River System Landscape Program has been developed in the context of an overall purpose to:

- Identify and explain dominant landscape features of the ‘river setting’ to aid awareness and understanding, and identify necessary planning actions for the Swan Region.
- Through a consultative process, outline appropriate development design and protect landscape features and enhance river setting.
- Improve the manner in which the river landscape is considered by State and local government in the planning assessment process,

1.2.2 Program Application

The Swan River System Landscape Program will provide the basis for plans and policies which guide the Swan River Trust, Western Australian Planning Commission and local government authorities on:

- development control
- zoning and use
- river management

to maintain the landscape amenity of the river setting and recognise the importance of the natural and built form and viewscapes of the Swan River Management Area and immediate lands which affect the river's viewshed or setting.

1.2.3 Program Vision

To respect the Swan River setting as a prime community resource through planning and development processes by:

- Maintaining a sense of place which nurtures and enhances the river's natural, historical and cultural sites of significance.
- Improving the community's visual and physical access to the river environment.
- Providing for expression of the local and regional context of places in the setting and acknowledging diversity of landscape character.
- Promoting sustainability in the management of the landscape.
- Catering for the range of uses for the river.

1.2.4 The Staged Process

The Swan River System Landscape Program will be achieved in stages. This present document is the implementation of the first stage.

Stage One - Swan River System Landscape Description

This comprehensive resource document describes the landscape of the Swan River System in precincts, and can be used to design strategies for its future management and protection by:

- Describing the resources of the Swan River system landscape, defined by geology, topography, water bodies, vegetation, and the built and social environment.
- Developing a landscape description methodology.
- Describing the elements which make up the Swan River landscape.
- Identifying the dominant landscape characters of the Swan River system.
- Identifying significant viewscapes of the Swan River system.
- Identifying conforming and non conforming elements of the Swan River landscape.
- Identifying opportunities and constraints for enhancement of the landscape for discussion in the next stage.

Stage Two - Methodology Design and Testing

The Swan River Trust will implement the next stage of the landscape program by outlining a methodology to develop and implement planning policies as part of the third stage. A pilot program will be implemented to identify whether further information will be required to develop landscape policies for the entire Swan River system. The pilot program will test the scope and effectiveness of the methodology. Stage Two will:

evelop a brief which will include (but is not limited to):

- The legislative administrative content of the policy plan including objectives, issues, policy measures and implementation requirements.
- The methodology for preparing the policy plan and the process to assess the effectiveness of the plans and policies.
- The proposed organisation of the study.
- The process of liaison with the State government agencies, and local government authorities in the preparation of the policy plan.
- The process of consultation with stakeholders and the general community in the preparation of the policy plan.
- The range of skills and experience required to undertake the study.
- Test the scope and effectiveness of the brief in relation to two precincts and make recommendations with reference to:
- The boundary of the precinct or 'area of influence' for planning purposes.
- Landscape character and river setting protection.
- The statement of intent in terms of the priorities for recreation, landscape, nature conservation, access and other relevant matters.
- Policy provisions including, but not limited to, appropriate land use controls, building design, height and setback provisions, landscaping guidelines, provision for public access, traffic and parking, flood management and protection, and pollution and erosion control.

Stage Three - Development and Implementation of Policies

Implementation of the tested project brief will allow the development of policies that require State and local government to take more account of the 'river setting' or 'area of influence' in assessment of planning applications:

1. Defining the 'area of influence' or river setting.
2. An assessment of the visual resource for each precinct developed from the *Swan River System Landscape Description* including:

    - Explaining planning significance of the river setting in visual terms.
    - Explaining planning significance of the river setting for future development.
    - Assigning priority to landscape elements.
    - Establishing a cultural and heritage inventory.

3. An examination of local planning scheme controls and suggested modifications to more appropriately protect the river, setting in the course of development.
4. An examination of existing policies of the Swan River Trust, WA Planning, and local governments and other agencies which impact on future development.
5. Development, through consultation, of planning and development control guidelines relating to:

- land use
- building design and height
- landscaping requirements
- provision for public access
- traffic and parking
- flood management and protection
- pollution and erosion control

6. Implementation of the policies and evaluation of their effectiveness.

1.3 How to use this document

This document is intended to describe the Swan River system landscape resource. Section 3 contains definitions of landscape in the context of natural resource planning. The term is used in many contexts by different disciplines so it is necessary that natural resources planners agree on their understanding of the landscape paradigm and on the methodology to be used in assessing landscape. The resource inventory in Section 6 outlines the evolution of the natural environment of the Swan Coastal Plain and begins with an overview of the significance of the landscape for Aboriginal people, considers colonisation by the British, and concludes with the effect upon perception and treatment of the landscape of successive waves of migrants.

The Swan and Canning Rivers have been divided into 23 precincts to allow detailed analysis of the resources and the biophysical and cultural elements. In addition, landscape characters and significant viewscapes have been described for each precinct. Some elements do not conform to the present-dominant landscape character types and these have been identified. It is recommended that planners and land use managers take into account the landscape interpretation when making decisions on land use. Once landscape protection policies are developed decisions about development on the river can better respect the river for its resource value.

Users of this document are asked to read not only the precinct applicable to their site of interest but also the descriptions of adjoining precinct, so that the specific sites can be considered in a regional context. Management polices and plans can be developed to conserve and. enhance the resource. This study may serve as an interim guide to planning decisions; however it is important that landscape policies for the river setting are developed with reference to government, experts and the community.

2.0 Where to from Here?

It is important in future work to identify desired outcomes for the Swan River landscape. These outcomes will be based upon the resource analysis, community values and the economic imperative for sustaining an attractive and healthy river landscape. These outcomes can be achieved through government policies, guidelines, development controls and protocols which encourage an all of government and whole of community approach. Areas of river will need to be assessed and considered for conservation listing. Local management plans for river precincts should be prepared to ensure compatibility of development within the area of influence' for the landscape.

The program will recommend a mechanism for empowering the community, landowners and decision making agencies to be responsible for the conservation of natural and cultural elements of the river system.

Defining the 'area of influence' or river setting

The Swan River Trust will define 'an area of influence' within which recommendations on conserving the natural and cultural elements of the Swan River environment should be implemented. The area of influence, based on the identified natural and cultural elements, is to be determined by using the information in this landscape description, and by applying mapping techniques and a sensitivity assessment. It is recommended by Siero *et al* (1992) that the boundary of the river setting should in general run from the nearest ridge line thereby defining a visual envelope. This will determine the broad limits to the view from the water, and it is, less precisely, the land zone from which the river and its setting is actually or potentially visible. The boundary does not aim to be exclusive as there are elements outside the boundary which can be significant to the river landscape.

Principles and developing guidelines and policies

Before developing guidelines and policies on the landscape resource of the Swan River planners must identify landscape principles for their policies. A synopsis of existing policies and plans relating to the precincts should be compiled. Draft policy statements should be circulated so that the community and other stakeholders are involved in the landscape planning and management process.

It is envisaged that these policies will be developed by a working group of experts and other stakeholders including Aboriginal representatives, local government, river users and other community representatives.

The draft policies would be revised as required but their basic aim should be to promote development which protects and complements the river landscape in a way which is ecologically and socially sustainable.

To facilitate planning, dominant landscape characteristics have been broadly outlined for each precinct. Conforming and non conforming elements have been identified. The working group will determine whether the present landscape characteristics in a precinct should be retained, enhanced, mitigated or preserved and guidelines for these areas prepared accordingly. Local precinct issues could be addressed through strategic guidelines. Siero *et al* (1992) recommended a number of principles which should be considered when developing policies.

- Equity of access to the river, including both physical and visual access. At present, there is physical access to most but not all of the foreshore, but it varies in quality and ease of access. In contrast, visual access is very uneven and it must be noted here that visual access to the river, does not necessarily mean 'river views', rather being able to experience the fringing vegetation of the river and surrounding land uses and not to feel alienated from the river. Clearing vegetation so people can view the river has been a problem and is destructive of the river landscape and is seen by the Swan River Trust as inappropriate. The Swan River Trust has supported protection of access to the river which includes the provision of pedestrian access, and lookouts and scenic roads to access significant views of the river.
- Landscape policies need to be conservation orientated. The policies should aim to reduce inputs to air and water pollution and to maintain habitat and diversity. There is a high level of awareness of these goals in the scientific community and the broad community, and this will need to be backed up by effective implementation.
- A guiding principle for a good landscape policy is that the landform and geology should be respected, even articulated (Siero *etal,* 1992). Where limestone cliffs are exposed, these should be conserved, and if building is considered necessary, structures should be set back from and complement the natural form. Floodplains are important river features and a necessary part of the river ecology. Intensive development and infill results in flat, unattractive and uniform landscape. Removal of the floodplain results in the loss of valuable and ecologically important floodplain flora and fauna.

- Policies should ensure that distinctly regional and local character is maintained and that the relationship between the natural and built environment is harmonious. The planting of endemic flora will enhance the local identity of the area. Unfortunately there are many examples of building where height and style detract from the landscape form or character. Sierio *et al* (1992) recommended strategies to improve the design of developments, for example by bestowing awards on successful examples of good planning for the landscape.
- Areas of outstanding visual importance merit stringent protection. These need to be identified but could include The Terrace at Mosman Park, Devils Elbow, Canning Beach Road view and Alfred Cove. Special vantage p'oints and those views we encounter in everyday travel also need protection and possibly sensitive enhancement, and this should be coordinated by the managing bodies.

The policies should also recognise that landscape design and management is very location-specific. What is suitable for one location may be unsuitable for another because of visual impacts, land use patterns, existing and future anthropogenic modifications, and the perception and values of local residents. Having identified major landscape types, planners can evolve specific landscape guidelines in consultation with the community and other stakeholders. At the precinct level, the views of the local community will be especially important. However, the regional significance of any precinct must also be recognised and it is the responsibility of the Swan River Trust to ensure that local recommendations are not incompatible with a regional perspective.

Coordination of policy

The Swan River Trust, in conjunction with WAPC and local governments is a key agency in the land development and planning process in relation to the Swan River system landscape. At present there is no comprehensive policy approach to protecting and managing the Swan River landscape setting and development impacts are, at best considered on merit and in an adhoc manner.

By developing and stating the Governments planning intent for the Swan River landscape, including land within the 'area of influence' these agencies will establish a foundation for coordinated development policy across all levels of government and focused on achieving desired outcomes. Local government town planning schemes need to better address their section of the Swan River landscape through considering land uses, building codes and land management practices which meet regional and local outcomes.

Table 1 sets out example issues which shape regional and local response to the river landscape. There is a wide range of literature on methods of rating value judgments of people in relation to the landscape and natural resources, for example Leopold (1969) and Prinease and Allen (1992). People's value judgments can provide useful information for the development of guidelines, and for the assessment of land use development proposals.

Fredrick Steiner (1991) noted the need for an emotional investment with the landscape to conserve the environment. The importance of a site reflects not just a physical link to the land, but also a spiritual or emotional link. People are more likely to conserve and preserve a place that has some sort of significance to them. By utilising the enthusiasm people have for particular sites, the Swan River Trust will be able to work with them to enhance and maintain the integrity of the landscape.

Landscape design and management is very location specific. What is suitable for one location may be unsuitable for another because of visual impacts, land use patterns, existing and future anthropogenic modifications, and the perception and values of local residents. Having identified major landscape types, planners can evolve specific landscape guidelines in consultation with the community and other stakeholders.

Table 1: Example Issues which may be considered when developing regional and local guidelines

- The need to ensure equity of access, including both physical and visual access.
- The need for the protection and conservation of endemic flora.
- The need to encourage the use of indigenous flora or drought tolerant species.
- The need to retain and improve public access to the foreshore in a manner which is sympathetic to the river landscape.
- The need to address the loss of rural character along the river.
- The need for protection of wildlife corridors along the waterways.
- The need for management of storm water runoff and fertiliser and wise water use.
- The need to raise awareness of the importance of wetlands, mudflats, and damplands.
- The need to establish public awareness of flood prone land and its role in the ecology of the river.
- The need consider effective erosion mitigation solutions with landscape design principles taken into consideration.
- The need for the recognition and protection of heritage and cultural sites.
- The need to address the aesthetic design of stormwater outlets, retaining walls and other riparian structures.
- The suitability of construction materials, colours and treatments.
- The suitability of styles and dimensions of buildings and other constructions.
- The design of signs and other interpretive materials.
- The suitability of and construction of private jetties in an area.
- The preservation and improvement of riparian amenity in the local area.
- The intensity of development in an area, such as minimum site area, maximum site coverage, maximum number of storeys, maximum floor area ratio and minimum distances from the site boundaries.
- The need to improve the appearance of properties as seen from the river.
- A positive future for the Swan River landscape.

At the precinct level, the views of the local community will be especially important. However, the regional significance of any precinct must also be recognised and it is the responsibility of the Swan River Trust to ensure that local recommendations are incompatible with a regional perspective.

The guidelines should ensure that the desirable character of the landscape is reinforced and the undesirable alleviated. This will require identifying the attributes which are rewarding and pleasing to the viewer. But the standards which should be applied are not easily established. For example, urban planners have great difficulty in interpreting 'good urban design'. The Urban Design Taskforce (1994) suggested this definition which defines 'Good urban design is concerned with visual meaning, functional efficiency and broad access to change in cities and towns.

It does not depend on universal principles or national codes but is grounded in local characteristics and needs, so much so that it is often hard to notice, being distinguished by a natural fit with site and context. Urban design manifests itself in many ways, but it is always centred on the quality of the public realm'. If the interpretation of good urban design is up to urban designers and regulators, defining an attractive landscape is the responsibility of those who develop and implement landscape policies.

3.0 Landscape – Definitions and Paradigm

When planning and describing the landscape it is necessary to define the term 'landscape'. Appleton (1980) neatly encapsulated the concept by proposing that *'Landscape* is not synonymous with *environment,* it is the environment *perceived,* especially visually perceived'. Landscape is an aesthetic object which is the result of the interaction of the perceiver and the object. The *environment* comprises the physical attributes of an area and is not the result of the subject's selective interpretation. A *scene* is a section of the landscape which is viewed. The biophysical and cultural features of the landscape include the waterform, landform, soils, vegetation, fauna, land use and cultural features.

Steiner (1991) defines landscape as all the natural features such as fields, hills, forests, and water that separate one part of the earth from another part. Usually a landscape is that portion of land or territory which the eye can comprehend in a single view, including all its natural characteristics. Landscape character is the nature or identity of the landscape (O'Brian and Ramsay, 1992). It is the combination of the natural and cultural elements and their processes. For example, the physical elements may be an estuary and the processes would be the tidal forces which shape the estuary. Cultural elements include the land use of the environment, such as the use of fire by Aboriginals to flush the fauna from bush. An appreciation of an object or landscape is the combination of all sensory experiences, which include visual, auditory, tactile and olfactory experiences.

Visual landscape character can be described by four component elements, which are texture, colour, form and line (Revell, 1991). Texture is the visual surface characteristics of the landscape features. Colour is the perception which allows the differentiation between objects based upon the concentration of hue. Form is the shape or structure of the landscape feature. Line is the extension of a point, such as a shoreline. This document does not address the other aesthetic landscape character elements, for example the auditory landscape would be described using form, periodicity and intensity. These are difficult descriptors to incorporate due to their temporal nature and the large area the project encompasses. The landscape is not just individual elements, rather it is a composition of a number of landscape elements and these elements may be dynamic. Compositional attributes will include forms of different elements, contrasts between elements, relationships between elements, and spatial definition.

It is also important to note that the landscape is dynamic and involves movement, sounds and smells. The psychological interpretation of a landscape by a viewer is determined by such elements as the mystery or potential information of a scene and the expectation that more information will be revealed around the corner.

The ease with which a landscape can be comprehended by the viewer as a result of the diversity of its composition is known as the complexity of the landscape. Often the more complex a landscape the more interesting it is to the viewer; however an extremely complex landscape can be an unpleasant and daunting experience. Kaplan (1987) recognised that coherence or the capacity to predict a scene or the ease with which information in the scene can be organised into a small number of 'chunks', is an important factor in landscape perception. The level of comfort with the perceived landscape is determined by its legibility or the appearance that one could explore the landscape without getting lost. It is a landscape factor which has a special effect on preference (Kaplan, 1987).

How an individual perceives the landscape will be the result of a combination of factors. Zube *et al* (1982) suggested that an interpretation of the landscape may partly be the result of intuition which instinctively recognises those elements in the environment which are useful for survival, such as lush vegetation and areas of shelter. Cultural rules are transmitted socially and are often symbolic interpretations of landscape which ensure the self perpetuation of the social structure. An example is the ordered, romantic and balanced Arcadian landscape which many people of European cultures find attractive (Yang and Broun, 1992). A third factor in the mode of perception is the personal strategy which overrides the cultural rules and is creative, such as an artist's originality in presenting an environment. It is also important to note that the individual will perceive a landscape according to where he is in the landscape and how he is interacting with the environment. Every individual will use these modes of interpretation to varying degrees and for this reason the same environment will be a different landscape for each individual, providing a different aesthetic experience. An individual will interpret what he perceives as the landscape. The types of interpretation of the landscape identified by the Australian Heritage Commission (1992) include: as nature, as place, as history, as wealth, as ideology, as system and as problem.

These can be encompassed in the broad categories of economic values, historic values, scientific paradigm and a sense of place. The individual will place a value on the landscape according to how he interprets what he perceives. River Landscape Program can be used as a step towards Statewide waterways landscape protection.

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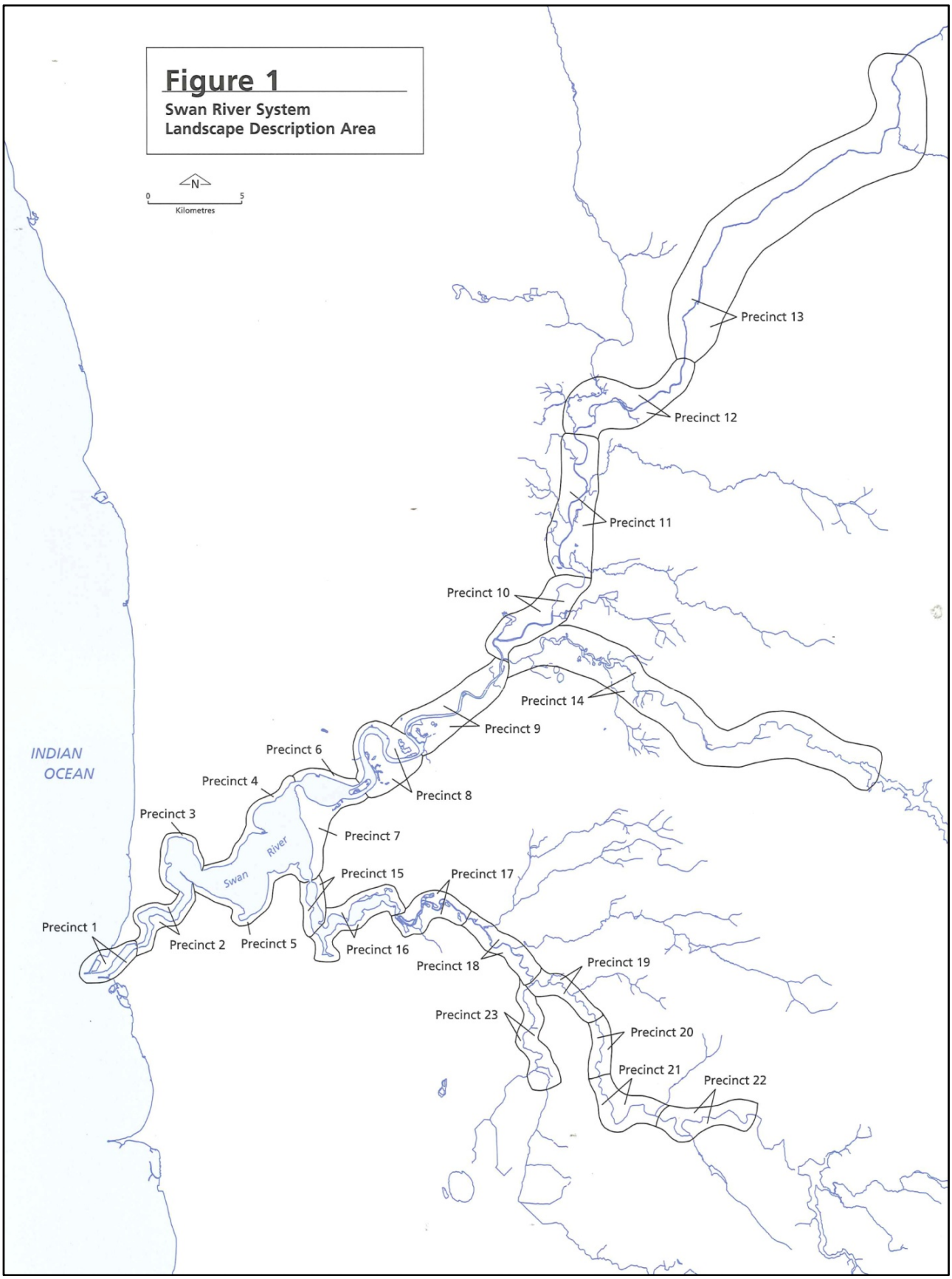
Figure 1
Swan River System
Landscape Description Area
N
0
5
Kilometres
INDIAN
OCEAN
Swan
River
Precinct 1
Precinct 2
Precinct 3
Precinct 4
Precinct 5
Precinct 6
Precinct 7
Precinct 8
Precinct 9
Precinct 10
Precinct 11
Precinct 12
Precinct 13
Precinct 14
Precinct 15
Precinct 16
Precinct 17
Precinct 18
Precinct 19
Precinct 20
Precinct 21
Precinct 22
Precinct 23

4.0 Study Area

The study area includes the Swan River estuary and the land areas adjoining these waters which are considered as being part of the visual features which impact on the estuary environment.

The study area includes the Swan River estuary from the Fremantle Harbour groynes upstream to Upper Swan at the confluence of the Moondyne Brook; the Southern River from Canning River confluence upstream to its source; Wungong Brook from its confluence with the Southern River upstream to Allen Road Crossing; and the Canning River from Canning Bridge upstream to its confluence with Stinton Creek. The study area is shown in Figure 1. The study area does not include more minor tributaries of the Swan River and it is hoped that the project could be expanded to areas outside the management of the Swan River Trust.

5.0 Method

The study area was divided into 23 workable precincts. The precincts are sections of river which are roughly similar in size and each precinct is not necessarily a homogenous landscape, rather it is likely to contain various different elements and scenes. Surveys were carried out by boat where possible and also by foot in late 1995 to early 1996. This allowed data to be collected from the point of view of the river user and the foreshore user. It is important to recognise that an attempt was made to use descriptive and factual language and limit the use of emotive words to describe the landscape. Landscape criticism, and evaluation classifying elements as attractive or unattractive, should be done by a team of people and this will be addressed in the next stage.

5.1 Resource Description

For each precinct the physical and cultural resources were identified. Data was collected on different physical, natural and man-made elements by surveying the sites, and from other sources. Specific references sourced for each precinct are listed at the end of each precincts section. As shown in Table 2, cultural elements such as historical changes, conservation areas and precinct significance to Aboriginal people and the wider Australian community are also summarised. Significant cultural sites including some sites of historical and Nyungar significance are mapped. Sites of significance are defined as those areas which demonstrate some or all of the following characteristics: an important emotional link for society, rareness, intactness, excellence of type, cultural or historical importance, association with a particular cultural, historical or social period, association with a significant historical personality, or natural features which are ecologically or intrinsically important.

Table 2: Resource information for Swan River landscape precincts

1.	**Biophysical Processes**
	a) Geological Processes
	b) Hydrological Processes
	i) Water features
	ii) Bathymetry
	iii) Flooding
	iv) Erosion and accretion
	c) Vegetation Communities
	i) Native
	ii) Exotic
2.	**Historical Land Use and Resulting Environmental Changes**
3.	**Present Land Use and Social Patterns**
	a) Present Land use & Patterns
	b) Recreation Nodes
	c) Public Access
4.	**Sites of Nyungar and Wider Australian Community Significance**
	a) Nyungar Significance
	b) Other Significance
5.	**Conservation Areas**
	c) Wetlands
	d) System 6

5.2 Landscape Interpretation

5.2.1 Precinct Description

To describe the landscape within the precinct, it was first necessary to identify the elements in the landscape. An inventory of elements was identified and is listed in Table 3. Examples of the types of elements described in each precinct description are grouped into seven categories of Waterform, Riparian, Landform, Geology, Vegetation, Riparian Land Use and Cultural Land Use.

Table 3: Examples of biophysical and cultural landscape elements

Biophysical Inventory	Elements	Cultural Inventory	Elements
WATERFORM	• Open water • Rivers • Streams • Rapids • Confluences	**RIPARIAN** **LAND USE**	• Banks - built walls - levees - retaining structures • Other structures - navigation markers - wharfs - promontories - boat moorings - jetties - marinas - overwater buildings - crossings
NATURAL **RIPARIAN ZONE**	• Natural banks - Spits - Beaches - Islands - Marshes - Swamps		
LANDFORM	• Dunes • Foothills • Plains • Headlands • Cliffs • Promontories • Isthmuses • Caves • Hills	**LAND USE**	• Buildings - residential - commercial - rural - industrial - suburban - urban • Other amenities - kiosks - toilets - barbecues - picnic areas - play equipment • Formal recreation - parkland - reserves - buildings - clubs - ovals • Other structures - signs - powerlines - railway lines • Pedestrian access - water access - paths -walkways - dual use pathway • Vehicular access - barriers - overspill - roads • Agriculture/rural - Type of agricultural/use - Historical artefacts - Significant sites
GEOLOGY	• Soil type • Geological appearance		
VEGETATION	• Natural - samphire - reeds - scrubland - open woodland - forest • Exotic - lawn - weedy field - agriculture - lawn and trees - formal gardens - residential		

The elements were described using four main attributes which are line, texture, colour and local form. Examples of the types of attributes for each of the element categories are shown in Table 4.

Table 4: Landscape element attribute descriptors

Elements	Line	Texture	Colour	Local Form
WATERFORM	geometric elongated rounded meandering sinuous nesting	foaming rough smooth glassy		broad flat open closed shallow deep
NATURAL RIPARIAN ZONE	gradual junction abrupt junction line of junction	rough smooth		closed shape slope
LANDFORM	horizontal parallel bands curved ridges terraced nesting vertical	coarse smooth dusty rough		steep rounded flat inclined plains dune-like spurs
GEOLOGY	geometric line of dominant elements	rough smooth sticky clays		form of any visually dominant elements
VEGETATION	layers vertical horizontal storeys	rough smooth scrubby prickly peeling bristly soft dusty	unusual	low stunted towering clumps solid shrubby open wide branching
RIPARIAN LAND USE	geometric vertical horizontal	building materials rough smooth reflective soft hard roof fencing	conforming non conforming colours	round rectangular solid size height style
CULTURAL LAND USE	geometric horizontal vertical	building materials rough smooth reflective fencing, etc.	conforming non conforming colours	round solid size height style un-sealed

The elements in the landscape were considered in context with each other under the headings of Compositional Attributes, Natural/Cultural Integrity and Landscape Condition. The way the landscape elements integrate is shown in Table 5.

Table 5: The integration of landscape elements

Compositional Attibutes	Natural/Cultural Integrity	Landscape Condition
• FORM • SPATIAL DEFINITION • SCALE • HARMONY – non-conforming elements • FOCALITY • DIVERSITY	• CONSISTENCY OF CHARACTER • COMPLETENESS of natural/cultural elements • ETHNIC IDENTITY	• LANDSCAPE – well-being, urban pride, renewal, degradation, blight, erosion

5.2.2 Dominant Landscape Character

The dominant landscape characters have been determined to assist the policy and planning process. The **landscape character** is the nature or identity of the landscape (O'Brian and Ramsay, 1992). It is the combination of the natural and cultural elements and their processes. The landscape character types are described below. The dominant landscape character for the area was assessed by survey and each precinct mapped. The boundaries on where a landscape character ends are often arbitrary however, in many cases there is a clear change in land use which can be used as a boundary. Often there are elements which do not conform to the overriding landscape character and these elements were noted.

Natural landscape is that which appears to be relatively natural, with the dominant vegetation being endemic to the site and the landform being relatively unaltered. The site will also have minimal development with the only land use being passive recreation or low impact structures. Unfortunately, the very nature of the Swan River is that there are few sites that have had minimal anthropogenic impact. The term natural landscape character was deliberately chosen as it has positive connotations. If a site appears to be natural it has the potential to be rehabilitated to improve the naturalness of the landscape.

Relative to the surrounding landscape characters many of these 'natural' sites appear as 'remnants'. However, a 'remnant landscape character' has less positive connotations than a 'natural landscape'. It is this potential for improving the landscape which is important for the planning process and the ownership of the natural elements which helps create a sense of place.

Arcadian landscape is the man-made landscape which has either altered a natural landscape in way that appears to be natural or has been tamed. This is not particularly common in Perth as the indigenous vegetation is more typically left as 'bushland'. Sections of parklands with remnant vegetation could be considered arcadian as many trees are pruned to 'improve' their form, such as South Perth Foreshore melaleuca and flooded gum stands. This is the conscious 'improvement of the landscape' to create a more ordered natural environment. More commonly entire 'European' landscapes have been created to appear 'Naturalistic' such as Supreme Court Gardens and University of Western Australia south of Hackett Hall. These landscapes are attractive to the European ideal - the trees have been carefully planted and pruned so as to appear natural (hand of man concealed), however no natural environment is so well ordered and proportioned.

The **modified landscape** is the rather derelict landscape that has been previously used and now is abandoned. The dominant vegetation is typically weeds and any remnant indigenous vegetation. Buildings and other structures have been typically cleared, but the soil of the building pads and discarded building material often remains. The modified landscape is typically an empty block that is awaiting redevelopment such as the Burswood peninsula.

The **suburban landscape** is characterised by those elements which are so familiar to the Perth population, streets of houses each with their own garden, shopping centres, carparks, administrative buildings, power poles, parklands and other amenities. The suburban landscape in the study area ranges from high density housing estates to large blocks with single houses. The relative youth of the city enables easy identification of the age of the suburbs, with dominant housing styles evident and characteristic of the time of establishment. Increasingly, riverfront properties are becoming more prestigious, and ribbons of high value properties are now edging the river landscape with lower value properties only blocks away.

The **urban landscape** is characterised by the dominance of the city skyscrapers. In Perth, this landscape is distinctive in that the high rise skyscrapers mainly house offices and rarely are residential. The style of the buildings reflects the non residential uses with balconies and small gardens not being prevalent. This is slowly changing with the local council supporting inner city residential buildings; however these are mainly on the edge of the city centre due to economic factors. Other features of the urban landscape are the large carparks, communications infrastructure on buildings, and converging freeways and road infrastructure. Street art is often on a large scale or may take the form of patterned footpaths. One feature of the Perth urban landscape is the shopping malls, which are solely for pedestrian access and are typically lined by retail outlets.

The **industrial landscape** is becoming increasingly rare in the study area. It is characterised by industrial, functional style buildings and sheds. Often, smoke stacks and high tension powerlines dominate the skyline. In many cases after the industry has relocated from the area, the industrial buildings are retained and the landscape still has an industrial element such as the East Perth power station in the Claisebrook area.

The **parkland/recreational** landscape has been classified as those areas of open space with recreational facilities and infrastructure which typically have maintained lawn. The landscape is different from the natural landscape as areas have typically been cleared for recreational activities, dual use pathways have been provided and often there are permanent sporting club facilities such as club houses and infrastructure. The vegetation may range from indigenous species to entirely exotic plantings.

The **rural landscape** is identified by having broad- acre blocks with low residential density and some form of agricultural practice. Around the Swan River study area the rural activities are high intensity horticulture, grazing and horse agistments. The properties generally have ribbons of indigenous vegetation the land was not useful for agricultural purposes and these patches of indigenous vegetation are usually infested by weeds. Some properties have remnant mature trees within the paddocks.

5.2.3 Significant Viewscapes

Most precincts have locations which allow a large portion or significant element of the surrounding landscape to be viewed. These viewscapes are indicative of the precinct's local identity, and important for creating the user's association with a site. These viewscapes are often topographically high points, or areas with low density vegetation, however 'improving' significant viewscapes by pruning or clearing trees is not supported by the Swan River Trust. The presence of significant sites makes the viewscape an important feature of the landscape, for example the view of the South Perth foreshore from King Park has the Old Mill as an important focal point. The viewscapes have been identified so that planners may consider the need to maintain or enhance the views when creating local action plans or policies and these viewing points are shown on the maps. The viewscapes can be panoramic or linear and can be viewed both to and from the river.

5.2.4 Conforming and Non Conforming Elements in the landscape

Prominent man-made elements which are important for maintaining the present landscape character have been noted. An example of a rural conforming element may be a traditional farm house or storage sheds. Those elements that do not conform to the present landscape character have been identified. These non conforming elements may themselves be attractive, however they are at odds with the present landscape character. A non conforming element may be an obtrusive building located on a very flat floodplain area. It is also important to note that the present landscape character may be considered undesirable by the planners.

5.2.5 Recommendations for maintenance and enhancement of the present landscape character

For each precinct, those elements of the landscape that detract from the present landscape have been identified and suggestions for their enhancement, removal or maintenance have been made. These suggestions are only a guide and starting point for debate by future planners and communities and are by no means indicative of Swan River Trust policy.