

SECRET HARBOUR ANSTEY Q INFORMATION PAMPHLET

**Prepared by ATA Environmental
In conjunction with JDA Consultant Hydrologists**

BACKGROUND

Anstey Q Public Open Space (POS) is located in the heart of the Secret Harbour residential estate. The POS area is approximately 10ha in size of which a substantial portion is taken up by the Anstey Q wetland.

The concept of retaining Anstey Q wetland within POS was originally proposed in the Secret Harbour Comprehensive Development Plan prepared in 1992. The detailed management concepts proposed for the POS area were then outlined in the Anstey Q Wetland Management Plan prepared by Alan Tingay & Associates in 1995. The management plan proposed that Anstey Q POS be retained with a mixture of its natural wetland and surrounding dryland vegetation plus some areas for passive recreation and the creation of a permanent lake approximately 1.26ha in size in the northern half of the POS. The management plan was approved by the Department of Environment (then Department of Environmental Protection).

Since 1995 the environmental regulations that apply to Anstey Q POS have changed to such an extent that some of the works proposed in the management plan that have yet to be undertaken no longer comply with current legislation or environmental best practice.

In addition, groundwater levels beneath the POS have changed which has caused a small but measurable change in the vegetation with some dryland species invading the central wetland area.

This information pamphlet has been prepared to review the future development of Anstey Q POS in light of current legislative requirements and in response to the potential long-term impact of lower groundwater levels on the wetland vegetation.

ANSTEY Q WETLAND

Groundwater

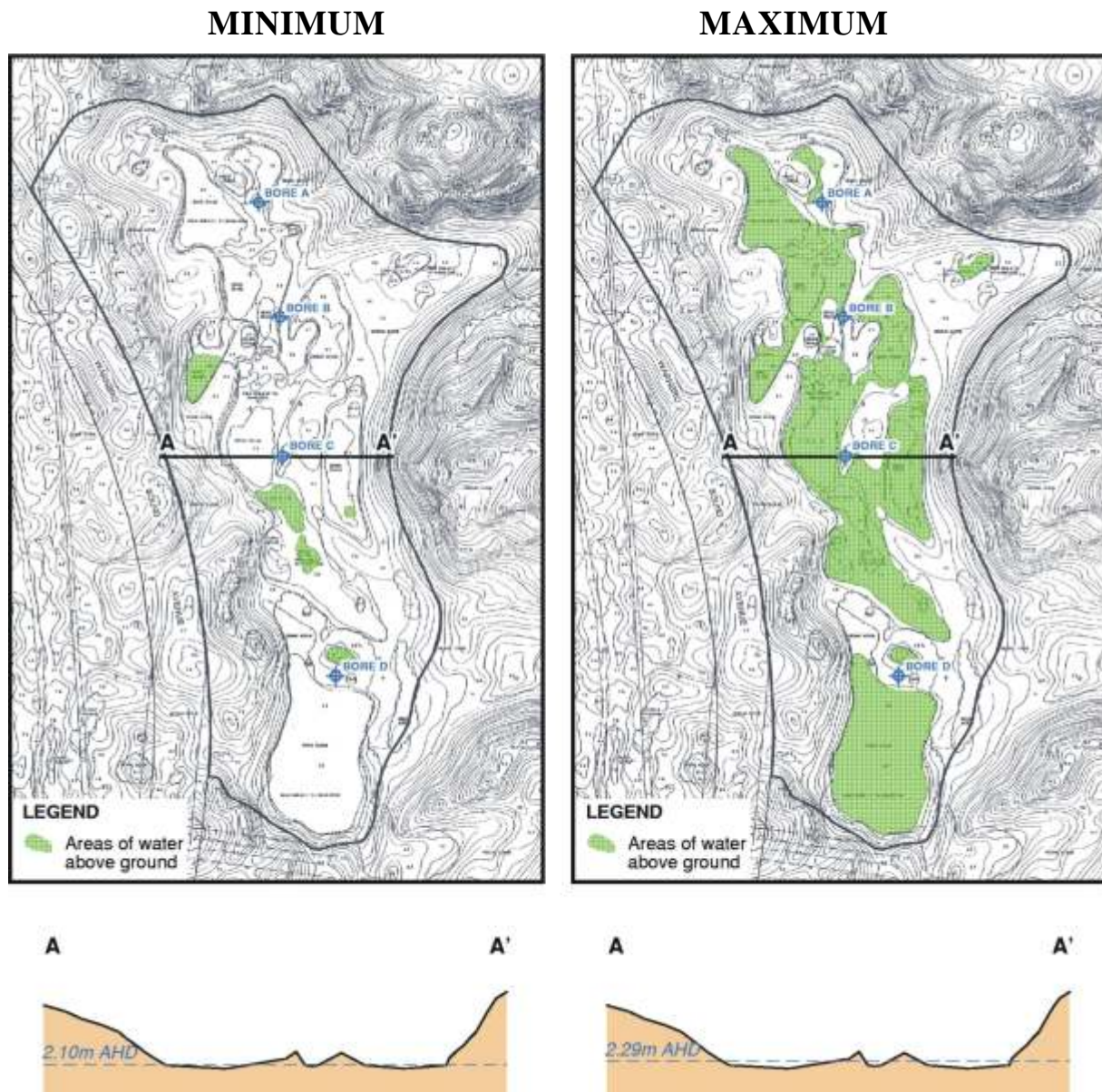
The wetland vegetation within the Anstey Q wetland is governed by the shallow groundwater that exists beneath the POS. The groundwater is part of the extensive aquifer system that exists beneath Secret Harbour. The shallow Superficial aquifer beneath Anstey Q wetland is freshwater and fluctuates in level during a year by up to 1.5m. The natural cycle can see shallow water above ground in the wettest part of the POS during the July to December. For the remainder of the year, even in wet years, the groundwater is below ground level and the wetland vegetation appears dry. In dry winters, even the wettest parts of the site can remain dry all year round.

Pre-development Water Levels (1993)

Groundwater monitoring of bores in Anstey Q wetland has been undertaken quarterly by the developer since 1992.

The water level data show that in 1993 a large proportion of the central wetland area had water above-ground during the peak water levels in October and even some water above ground during the minimum period.

Figure 1 Anstey Q Minimum and Maximum Groundwater Levels 1993



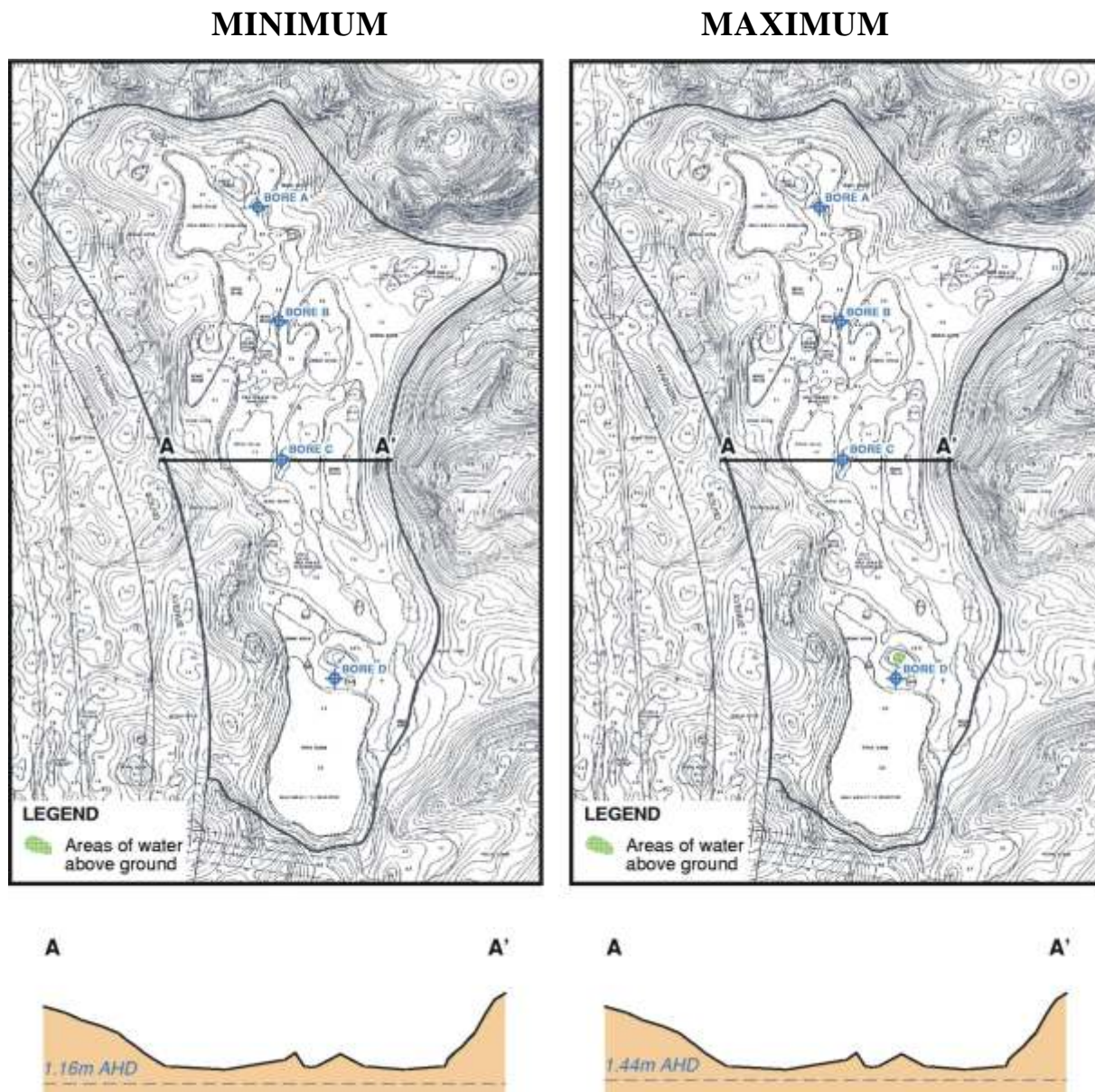
Projected Water Levels Following Urban Development

In 1993, computer modelling was undertaken to assist planning for the estate by calculating the likely impact of the development on groundwater levels. This could occur through extra rainfall recharge in winter and groundwater abstraction for irrigation in summer during years of average rainfall, it was estimated that summer levels would fall from by 0.25m and that winter watertables would rise by only 0.15m. These relatively small predicted changes in both winter and summer groundwater levels were attributed to the high permeability of the underlying soils beneath Secret Harbour. Although relatively small, the predicted increase in winter levels was considered high enough that trees were planted around the wetland to use more water.

Actual Water Levels Following Urban Development

The groundwater monitoring at Anstey Q POS has shown that, rather than an increase as predicted, the average annual maximum groundwater level has actually fallen from 2.2m AHD to 2.0m AHD. The average annual minimum groundwater level also fell from 1.6m AHD to 1.4m AHD. These reductions have had a significant impact on the water levels in the wetland. Since 1993, there have been few times when the water levels have been above ground for any months of the year (Figure 2).

Figure 2 Anstey Q Minimum and Maximum Groundwater Levels 2004



To further illustrate the lower water levels under the wetland since 1993, Table 1 shows the minimum and maximum levels in 2004 compared to those in 1993. This represents a lowering of 0.85m in the minimum and 0.94m in the maximum.

Table 1 Water Levels 1993 and 2004 (mAHD)

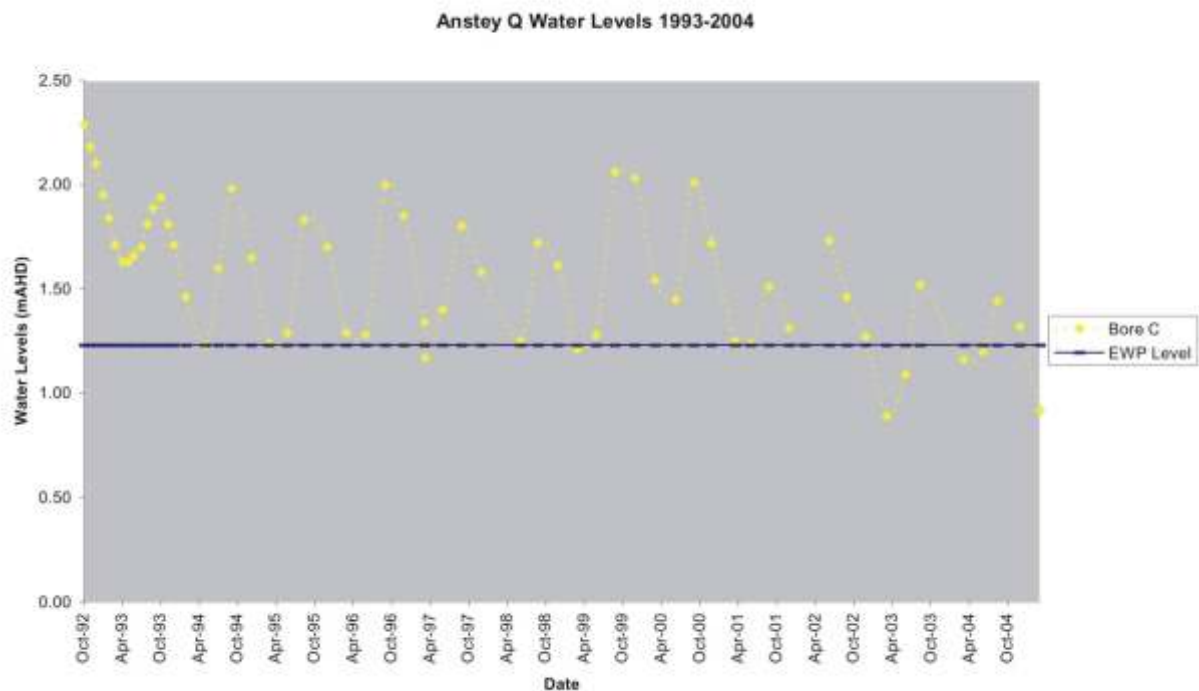
Year	Water Levels (Lowest)	Water Levels (Highest)
1993	2.10	2.30
2004	1.16	1.44
Difference	0.94	0.86

Irrigation

Groundwater is abstracted from the superficial aquifer at Secret Harbour for irrigation of the golf course and POS areas. During recent years during periods of low annual rainfall the abstraction program has been severely restricted by the requirement to not allow the water level beneath Anstey Q wetland to fall below certain critical levels known as Environmental Water Provisions (EWP). The EWPs are put in place to protect the wetland vegetation in Anstey Q wetland from the impacts of low water tables. The EWP trigger level is 1.23m AHD. The hydrologists working for the Secret Harbour development conclude that if rainfall remains similar to recent years, then groundwater abstraction by Secret Harbour for the golf course and the City of Rockingham for the POS areas will be restricted. Furthermore, the recent granting of an abstraction licence for the development of Anstey Park to the immediate north-east of the Secret Harbour development could mean that the EWP for Anstey Q wetland could be reached more frequently (Figure 3).

The reasons for the reduction in water levels is likely to be a combination of a series of drier-than-average rainfall years over the last decade and abstraction by various bore users in the area.

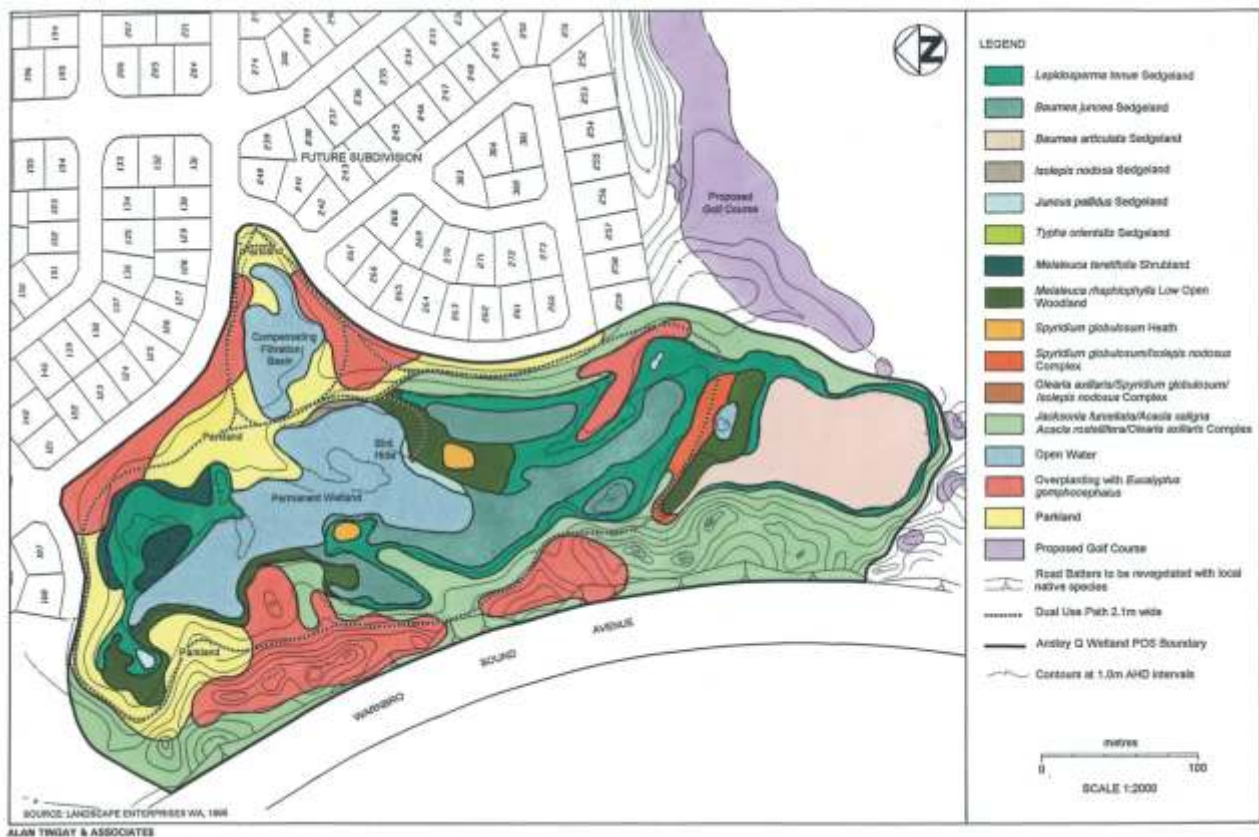
Figure 3 Water Levels 1993-2004



PROPOSED LAKE (1995)

The management plan for Anstey Q Swamp proposed to create a lake approximately 1.26ha in size. The original lake concept is shown in Figure 4.

Figure 4 Original Lake Concept 1995



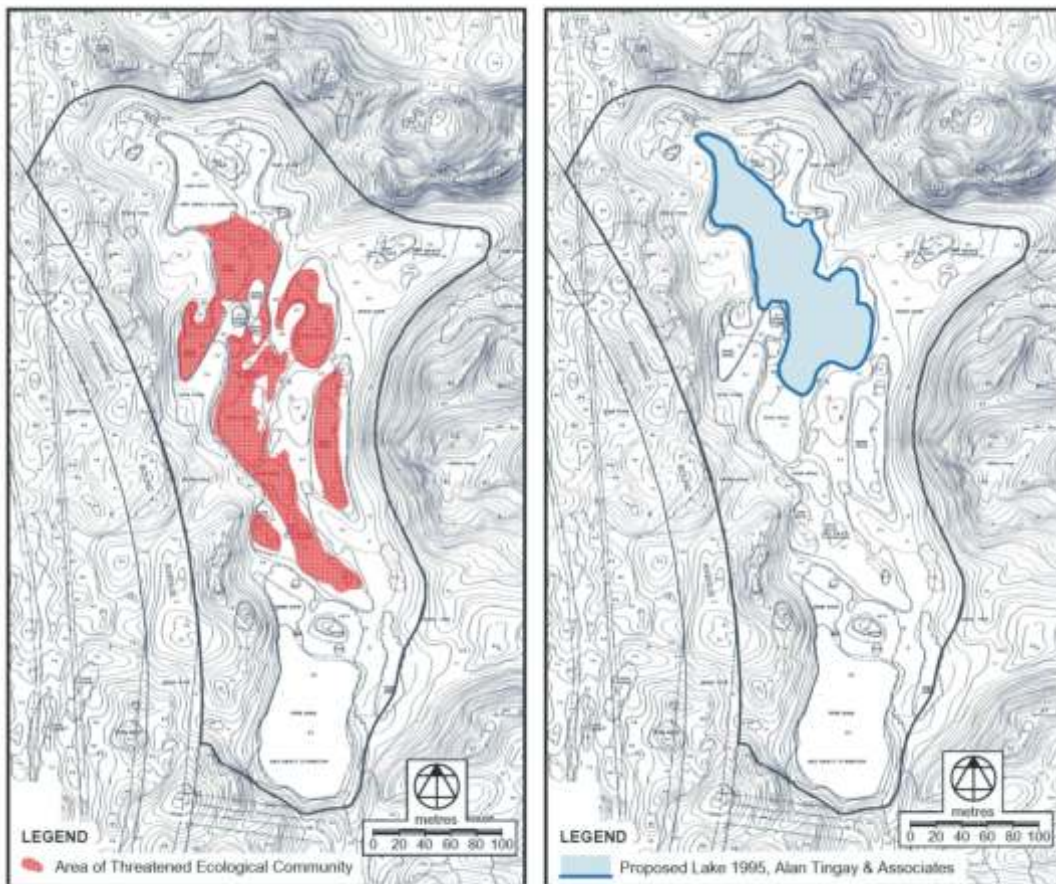
THREATENED ECOLOGICAL COMMUNITY (TEC)

The Anstey Q POS area includes the central wetland vegetation and the perimeter which is upland dryland vegetation. The wetland vegetation is relatively diverse in its composition with different species assemblages reflecting the small variations in topography and the influence of the shallow groundwater. While most of the wetland vegetation types comprise native species, the northern extremity includes dense Bulrushes (*Typha orientalis*) which are non-native.

In 1996, at the time of the approval of the management plan by the DoE, the vegetation in Anstey Q POS did not have any statutory protection in terms of having significant vegetation. This is largely because there was no State or Commonwealth legislation that afforded protection of vegetation on the basis of its conservation significance. Since 1997, the concept of Threatened Ecological Communities (TEC) was developed in Western Australia. The Department of Conservation and Land Management (CALM) has mapped all of the wetland area of Anstey Q wetland as a TEC, specifically Community 19a (Sedgeland in Holocene duneswales).

The management plan for Anstey Q Swamp proposed to create a lake approximately 1.26ha in size. To create this lake, it would be necessary to disturb approximately 1.1ha of native wetland vegetation and 0.2ha of introduced Bulrushes. The 1.1ha of native vegetation which is now recognised as a TEC is protected by the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999*.

Figure 5 Areas of TEC within Anstey Q (red) and the proposed 1995 lake (blue)



MANAGEMENT OPTIONS

Water Levels

If rainfall levels remain below average and abstraction of groundwater continues to push the levels down to the EWP trigger level then the wetland vegetation is likely to show further gradual changes to a drier condition. The options to manage this scenario are:

1. Let nature take its course and either wait for a return to wetter years or allow the wetland to gradually change to a drier condition. The argument for this position is if this trend were happening at Secret Harbour then it would likely be occurring in all wetlands in the Perth Metropolitan Region. To intervene at Anstey Q could take enormous effort that isn't warranted given that the trend would be regional.
2. Artificially sustain or recharge the water levels below Anstey Q wetland so that its long-term hydrology does not change and the wetland vegetation, which is a TEC of national significance, is not affected.

The Secret Harbour hydrologists have undertaken modelling to assess the feasibility of artificially recharging the wetland to maintain water levels considered to be appropriate to maintain the wetland vegetation. The studies found that the soils within the wetland were too permeable to maintain the recharged water for long enough to create an artificial rise in the groundwater.

Secret Harbour has worked hard to protect Anstey Q wetland from low water levels. This has been difficult during the recent dry years as the trigger level has been reached on several occasions following which Secret Harbour has taken the appropriate contingency actions in full co-operation with Department of Environment.

To assist in conserving the superficial groundwater resource Secret Harbour have voluntarily developed and implemented a Drought Management Strategy (JDA 2002). The drought management strategy was developed for the 2000/01 irrigation season. Following its success, it was refined and improved during the 2002/03 and 2004/05 irrigation seasons and is still currently being implemented. Through the drought management strategy Secret Harbour conserve water through measures such as:

- Re-shaping of bunkers to reduce the need for wetting-down
- Reduction of mowing frequency and height on fairways and light rough areas to reduce water requirements
- Introduction of a coring procedure to improve water penetration
- Installation of a wetting agent injection system to “dose” irrigation water as it is applied
- Hand watering of stressed areas rather than irrigation
- Erection of signs to explain to patrons that the course may not be as “green” as in previous seasons due to water conservation measures

Proposed Lake

In April 2004 the developers of Secret Harbour were advised by the Commonwealth that the TEC within Anstey Q was of sufficient size to be of National significance and that the Commonwealth would be unwilling to approve the clearing of 1.1ha of a TEC. On the basis that the Commonwealth's position would exclude the construction of a full 1.26ha size lake as proposed in the management plan; Secret Harbour has examined the option of constructing a much smaller lake in the northern section of the wetland. The smaller lake would only require the excavation of approximately 0.2ha of introduced bulrushes which are not part of the TEC vegetation in the wetland. The project landscape architects advise that a lake of this size would not contain much permanent water above-ground especially in summer/autumn due to the grades required for safety and the seasonal fluctuation in groundwater levels. In order for the lake to contain permanent water to the top of the lake it would need to be lined and topped up with water through the drier months.

We have sought advice on the acceptability of excavating 1.26ha of wetland vegetation to construct a lake, or a smaller amount to create a lake in the area containing introduced bulrushes from the Western Australian Threatened Species and Communities Unit (WATSCU) of CALM. CALM advised that they would not be supportive of the full 1.26ha lake and also have strong reservations about the much smaller lined lake due to potential impacts on the adjoining significant wetland vegetation during lake construction.

CONCLUSIONS

Without a lake in the northern half of the POS the threat of uncontrolled access degrading the wetland vegetation over time is still present. To reduce this threat, the focus of the management of the POS could shift to increasing public awareness about the significance of the wetland and its vegetation. Pathways could be constructed around the wetland incorporating occasional interpretive signage at strategic locations. This would increase the experience that the area was of scientific importance. The WATSCU unit at CALM has interpretive information for the particular TEC that occurs in the wetland and also information about wetlands that occur on the Rockingham-Becher Plain and are willing to assist with the development of signage and other material such as brochures that could be distributed to local residents.

The 1995 management plan proposed some grassed areas around the northern part of the POS and running down to the edge of the proposed lake. It is intended that the grassed areas could still be installed on the fringing upland areas of the POS. The perimeter dual use path would be an appropriate barrier between the irrigated grass area and the wetland to prevent couch grass entering the wetland.

This information pamphlet discusses two important and interrelated issues that will determine the future of the Anstey Q POS area. It describes the natural features of the POS that give the area its environmental significance and outlines how those features have risen in importance at the national level since the original management plan for the area was prepared and approved in 1996. It also describes how the wetland vegetation has shown evidence of drying out in the period between 1992 and 2002 and is likely to continue that gradual trend if rainfall does not increase in the future and abstraction in the area is to continue.

The two issues are interrelated because the preservation of the nationally significant wetland vegetation will be governed by the future water levels under the wetland. This information pamphlet reaches several conclusions with respect to the future development of the Anstey Q POS area. These are:

1. The importance of Anstey Q POS containing one of the largest examples of wetland vegetation that is listed by the State and Commonwealth as a Threatened Ecological Community means that proposals to excavate any amount of wetland vegetation are unlikely to gain government approval.
2. The significance of the wetland and its vegetation will be promoted by the installation of pathways around the wetland incorporating interpretive signage and the distribution of pamphlets so that the local residents and other visitors to the area can gain an appreciation for the environmental values of the POS area.
3. The minimum EWP levels for Anstey Q wetland will be maintained to protect the wetland vegetation from further drying out.