# Bullsbrook Turf Farm Expansion
# Lot 8 Raphael Road, Bullsbrook

---

**Mr John Maas**

**Report and recommendations**
**of the Environmental Protection Authority**

**Environmental Protection Authority**
**Perth, Western Australia**
**Bulletin 1052**
**June 2002**

ISBN. 0 7307 6686 1
ISSN. 1030 - 0120
Assessment No. 1067

# Summary and recommendations

Mr John Maas (Bullsbrook Turf) proposes to expand the existing turf farm at Lot 8 Raphael Road, Bullsbrook from 12 hectares (ha) to 26 ha. The proposal is within the Ellen Brook catchment. The turf farm has two centre pivot irrigators (pivots 1 and 2) with a combined irrigated area of 26 ha. The proponent currently has 8 ha of turf under pivot 1 and 4 ha of turf under pivot 2. The proposed additional 14 ha of turf will be grown under pivot 2. This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal.

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

**Relevant environmental factor**

It is the EPA's opinion that 'water quality – export of nutrients to the Ellen Brook catchment' is the environmental factor relevant to the proposal which requires detailed evaluation in this report.

There were a number of other factors which were relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

**Conclusion**

The EPA has considered the proposal by Bullsbrook Turf to expand the existing turf farm at Lot 8 Raphael Road, Bullsbrook from 12 ha to 26 ha.

The proposal is within the Ellen Brook catchment where a key environmental concern is the export of nutrients to the Ellen Brook and ultimately, the Swan River. The level of assessment for this proposal was set at Consultative Environmental Review (CER) in 1996.

Since the level of assessment was set, the EPA has released the *Environmental Protection (Swan and Canning Rivers) Policy 1997* (EPA, 1998) which recognizes that substantial reduction across the catchment in current phosphorus loads is required. The EPA therefore expects that land managers and developers will demonstrate that they have minimized their individual contribution to nutrient export from the catchment.

The EPA is aware of the changes made by the proponent to this proposal in response to concerns about nutrient export. The changes primarily relate to the management of fertilizer and watering regimes and the preparation of a Nutrient Irrigation Management Plan (NIMP) which prescribes how the proponent will ensure it manages and monitors its fertilizer and irrigation applications to prevent significant export of nutrients.

The proponent is to be commended for developing a program which makes use of existing nutrient-rich groundwater. It has been predicted that by using nutrient-rich groundwater as a source of phosphorus, and by managing the phosphorus fertilizer program, there will be a nett removal of phosphorus from groundwater of 5 kg/ha/yr.

The proponent has also estimated that by reducing the amount of nitrogen applied and by using fertigation equipment and regular applications, nitrogen requirements of the turf can be matched to application rates and therefore the amount of nitrogen available for leaching will be reduced to around 9 kg/ha/yr.

Overall, the improved management of both the new and existing turf areas, which can be given effect by this proposal to expand the turf farm proceeding, will result in a nett reduction of phosphorus and nitrogen contributions. Thereby contributing to a reduction of nutrients across the catchment. The EPA therefore considers this proposal is consistent with the *Environmental Protection (Swan and Canning Rivers) Policy 1997* (EPA, 1998).

It is the view of the EPA that this proposal represents a benchmark for best practice operating procedures and the use of appropriate equipment to reduce nutrient export by managing fertilizer and irrigation applications. The application of this type of approach to management and use of equipment has merit in all catchments where major irrigated horticulture developments occur as it is one effective way of ensuring that this type of development is not contributing to degradation of wetlands and waterways.

The EPA is aware that this proposal will require a groundwater abstraction licence from the Water and Rivers Commission (WRC). It is the EPA's understanding that the NIMP prepared by the proponent can be given effect as a condition of this licence. Hence, the ongoing management and monitoring of this proposal, to ensure the NIMP is implemented, can occur as a component of the WRC licencing process without the need for a specific condition to be applied under the provisions of the *Environmental Protection Act 1986*.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4, and the NIMP is given effect through the application of conditions on the groundwater abstraction licence to be issued by the WRC.

## Recommendations

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister notes that the proposal being assessed is for the expansion of the Bullsbrook Turf Farm at Lot 8 Raphael Road, Bullsbrook, from 12 ha to 26 ha.
2. That the Minister considers the report on the relevant environmental factor as set out in Section 3.
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4 and the Nutrient and Irrigation Management Plan is given effect through the application of conditions on the groundwater abstraction licence to be issued by the WRC.
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

## Conditions

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Bullsbrook Turf to expand the existing turf farm at Lot 8 Raphael Road, Bullsbrook from 12 ha to 26 ha is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) that the proponent shall implement the proposal as detailed in the recommended conditions in Appendix 4; and

(b) a Note that the proponent is required to apply for a groundwater abstraction licence to be issued by the WRC and that conditions on the licence will address the implementation of the Nutrient and Irrigation Management Plan.

# Contents

**Page**



**Table**



**Figure**



**Appendices**

# 1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the environmental factors relevant to the proposal by Mr John Maas (Bullsbrook Turf), to expand the existing turf farm at Lot 8 Raphael Road, Bullsbrook from 12 hectares (ha) to 26 ha.

The level of assessment was set at Consultative Environmental Review (CER) in 1996 when it was the expectation of the EPA that the proponent would conclusively demonstrate that phosphorus export could be contained to 1 kg/ha/year. Nitrogen targets were not specified. Since the level of assessment was set, the EPA has released the *Environmental Protection (Swan and Canning Rivers) Policy 1997* (EPA, 1998) which recognises that substantial reduction across the catchment in current phosphorus loads is required, however it doesn't prescribe levels for phosphorus or nitrogen export.

The current proposal differs from the original proposal that had a level of assessment set in 1996 in the following ways:

- the proponent has changed;
- no poultry manure is going to be used. Poultry manure typically contains 1.3% phosphorus and can contain up to 15% nitrogen (WRC, 2001) and its use would have increased the nutrient export caused by this proposal;
- the turf farming operations will be set back at least 50 metres from a watercourse that runs through the property, with the dryland buffer being revegetated with locally occurring species; and
- a draft Nutrient and Irrigation Management Plan (NIMP) has been prepared (and was released in the CER) which details the management of phosphorus and nitrogen applications to limit nutrient export and predicts an expected nett removal of phosphorus from groundwater.

The CER for the *Expansion of Bullsbrook Turf Farm, Lot 8 Raphael Road Bullsbrook* (Bullsbrook Turf, 2002) was released for a four-week public review period from 18 March to 15 April 2002.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the environmental factors relevant to the proposal. The Conditions to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 presents the EPA's conclusions and Section 6, the EPA's Recommendations.

Appendix 5 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process and which have been taken into account by the EPA appear in the report itself.

# 2. The proposal

Mr John Maas (Bullsbrook Turf) proposes to expand the existing turf farm at Lot 8 Raphael Road, Bullsbrook from 12 ha to 26 ha. Lot 8 has a total area of 58 ha with a creek line in the northern part of the property which flows once every 3 to 4 years when winter rainfall is high. The area proposed for expansion of the turf farm was cleared for cattle grazing and general agriculture at least 20 years ago. No clearing is required for this proposal. The proposal is within the Ellen Brook catchment.

The proponent currently has two centre pivot irrigators (pivots 1 and 2) on the property with a combined potential to irrigate an area of 26 ha (Figure 1). At present, there is 8 ha of turf under pivot 1 and 4 ha under pivot 2. The proposed additional 14 ha of turf will be grown under pivot 2.

The Water and Rivers Commission (WRC) is responsible for the management of all Western Australia's surface and groundwater resources. The proposal will require a groundwater licence from the WRC for an annual 449,500 kilolitres (kL), which would be an increase from the current licence which allows an annual 193,500 kL.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 1 of the CER (Bullsbrook Turf, 2002).

**Table 1: Summary of key proposal characteristics**

| Element | Description |
|---|---|
| Turf production area:<br>• existing<br>• proposed (total) | <br>• 12 hectares<br>• 26 hectares |
| Groundwater licence:<br>• existing<br>• proposed (total) | <br>• 193,500 kilolitres per annum<br>• 449,500 kilolitres per annum |
| Clearing | no remnant vegetation will be cleared |
| Revegetation | The turf farming operations will be set back at least 50 metres from the edge of the banks of the watercourse, and the buffer area will be revegetated with locally occurring species. |
| Use of poultry manure | uncomposted manures will not be used |
| Fertiliser nutrient inputs to 26 hectares (2 crops)<br>• nitrogen – pivot 1<br>• nitrogen – pivot 2<br>• phosphorus – pivot 1<br>• phosphorus – pivot 2 | (all values are approximate)<br>• 540 kilograms per hectare per year<br>• 640 kilograms per hectare per year<br>• nil<br>• 50 kilograms per hectare per year |
| Nutrients removed in turf rolls (2 crops)<br>• nitrogen<br>• phosphorus | best estimate indicates:<br>• 600 kilograms per hectare per year<br>• 40 kilograms per hectare per year |
| Nutrients to environment from 26 hectares<br>• nitrogen<br>• phosphorus | best estimate indicates:<br>• 9 kilograms per hectare per year<br>• 5 kilograms per hectare per year **removed** from groundwater |

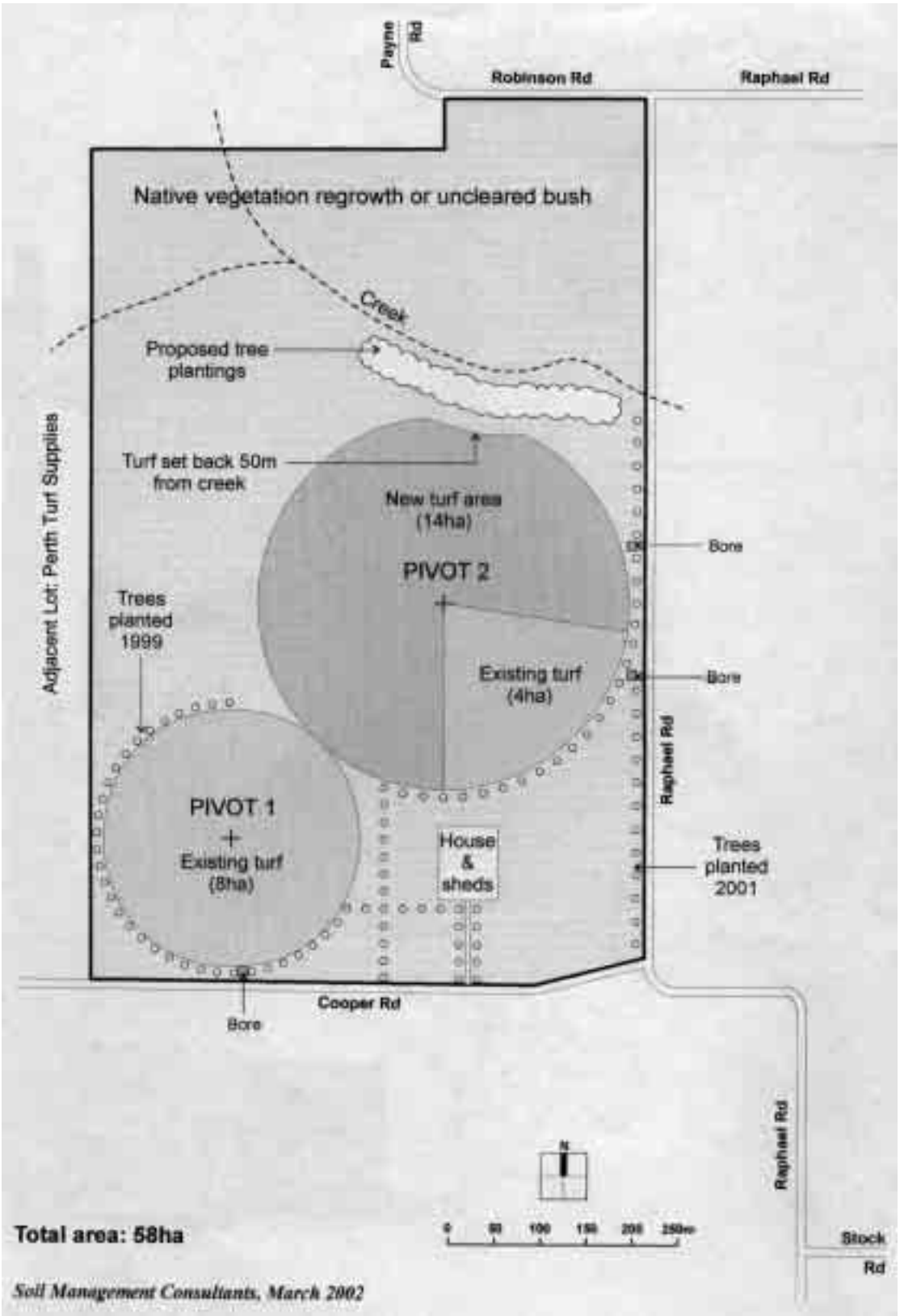


***Figure 1: Bullsbrook Turf Farm, Lot 8 Raphael Road, Bullsbrook***

No modifications have been made to the proposal since the CER was released for comment.

# 3. Relevant environmental factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the relevant factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below.

It is the EPA's opinion that 'water quality – export of nutrients to the Ellen Brook catchment' is the environmental factor relevant to the proposal that requires detailed evaluation in this report.

The above relevant factor was identified from the EPA's consideration and review of all environmental factors generated from the CER document and the submissions received, in conjunction with the proposal characteristics.

Details on the relevant environmental factor and its assessment are contained in Section 3.1. The description of this factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of the relevant factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

A summary of the assessment of the environmental factors is presented in Appendix 3.

## 3.1 Water quality

**Description**

The proposal is located within the environmentally sensitive Ellen Brook catchment. The key environmental concern is the potential for export of nutrients to Ellen Brook.

The Ellen Brook catchment is the largest coastal subcatchment of the Swan-Canning River System, with an area of 720 square kilometres contributing an average of 37 million cubic metres of runoff into the river annually. Whilst this is only 6% of water input into the Swan River, 36% of total phosphorus in the Swan River comes from Ellen Brook, more than any other catchment in the Swan-Canning River system. Ellen Brook also contributes about 7% of the Swan River's total nitrogen load.

High levels of phosphorus can cause eutrophication of water bodies that can lead to toxic algal blooms, which threaten wildlife and fish communities (WRC, 2001). Nitrogen that has leached into the groundwater can cause health problems in humans, wildlife and stock. Excess nitrogen applications can also increase soil acidity.

**Submissions**

Concerns were raised in submissions that groundwater monitoring was not proposed. The submitters considered that an adequate number of appropriately positioned groundwater monitoring bores would provide suitable information to be able to distinguish nutrient export from surrounding land use activities, and those from the Bullsbrook Turf Farm.

**Assessment**

The EPA's environmental objective for this factor is to maintain, and in the long term, improve the quality of groundwater to ensure that existing and potential uses, including ecosystem maintenance, are protected, in accordance with the objectives of the *Swan Canning Cleanup Programme Action Plan* (Swan River Trust, 1999), the *Environmental Protection (Swan and Canning Rivers) Policy 1997* (EPA, 1998) and the principles of the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council, 2000).

To ensure that the proposal meets the EPA's objectives for Groundwater Quality, the proponent plans to manage and monitor its nutrient applications through a Nutrient and Irrigation Management Plan which will address:

1. nutrient management;
2. irrigation;
3. water resource protection;
4. pesticide use and storage;
5. monitoring and reporting;
6. contingency plans; and
7. revegetation of the dryland buffer adjacent to watercourse with locally occurring species.

The EPA understands that the NIMP prepared by the proponent can be given effect as a condition of the groundwater abstraction licence issued by the WRC. The WRC will establish an operational strategy to ensure that the elements of the NIMP are being carried out. The ongoing monitoring and auditing of the implementation of the NIMP will therefore be undertaken by the WRC as part of its groundwater abstraction licencing approvals.

*Phosphorus*
To meet the EPA objective of maintaining or improving water quality the proponent intends to manage phosphorus by:

- eliminating poultry manure from the fertiliser program;
- using the existing nutrients in irrigation water to provide all of the phosphorus for 8 ha of turf under Pivot 1, reducing fertiliser phosphorus inputs to this area from the previous level of 112 kg/ha/year to nil;
- using a controlled-release phosphorus fertiliser (MagPhos) for establishment and maintenance of the new turf area, with phosphorus applied at 50 kg/ha/year to two crops; and
- exporting nearly all of the applied phosphorus in turf rolls, at the rate of at least 40 kg/ha/year.

The proponent predicts that using the groundwater as a source of phosphorus for pivot 1 (8 ha) and managing the phosphorus fertiliser program for the expanded pivot 2 (18 ha) will result in the nett removal from groundwater of 5 kg/ha/year of phosphorus that could otherwise eventually report to Ellen Brook.

*Nitrogen*
To meet the EPA objective of maintaining or improving water quality the proponent intends to manage nitrogen by:

- eliminating poultry manure from the fertiliser program, which will reduce the average application of fertiliser nitrogen by 380 kg/ha/year, from the previous level of 990 kg/ha/year;
- using the nutrients in irrigation water to provide about one-sixth of the nitrogen for 8 ha of turf under pivot 1;
- an average of at least 90% nitrogen-use efficiency by use of fertigation (foliar sprays) to apply fertiliser nitrogen on a fortnightly basis;
- irrigation with centre-pivot irrigators that deliver water accurately and uniformly; and
- export of nitrogen in turf rolls at a rate of 600 kg/ha/year.

It is estimated by the proponent that nitrogen export to the environment will be 9 kg/ha/year.

The WRC has advised that it considers the fertiliser management component of the NIMP is acceptable. Taking into account the proponent's proposed management of nitrogen and phosphorus applications which, if implemented, will bring about a nett removal from groundwater of 5 kg/ha/year of phosphorus and reduction in nitrogen export to the environment to 9 kg/ha/year, the EPA considers that the proposal is consistent with the *Environmental Protection (Swan and Canning Rivers) Policy 1997* (EPA, 1998).

*Groundwater Monitoring*

The proponent does not intend to undertake groundwater monitoring around the property because the proponent considers that regional influences of nutrient rich groundwater will still be evident even after the new fertiliser management program has been established. The monitoring proposed in the draft NIMP involves a combination of fertiliser audits, nutrient budgets, grass clippings analysis and soil analysis. It is the proponent's view that groundwater monitoring will not be able to confirm whether this proposal is a significant contributor to the nutrient enrichment of the local or regional groundwater.

The WRC does not support the position of the proponent not to undertake groundwater monitoring.

In considering the management of this proposal the EPA is aware of the merit of both points of view on whether to conduct groundwater monitoring.

Groundwater monitoring can be seen as onerous in a situation where regional influences would make it unlikely that a monitoring program conducted by an individual proponent would demonstrate that there is either a substantive reduction, or further contribution by the individual to groundwater nutrient enrichment. In the case of this proposal, the EPA is also aware that there is a risk the proponent may be unjustly deemed responsible for localised nutrient increases, on the basis of its own monitoring program, even though there may be strong evidence that the proponent is meeting its commitments to irrigation and fertilizer management.

If groundwater monitoring is required by the WRC, the monitoring plan should be designed such that changes in groundwater can be identified as being from localised rather than regional influences. This would ensure that, in the case of any detrimental impacts being identified, a decision as to whether the proposal should be allowed to continue would not be affected by regional influences on groundwater.

However, a well designed monitoring program may be successful in establishing a benchmark for the property, and the proponent may be able to use such a program to prove conclusively that the proposal is not contributing to further nutrient enrichment. The issue of nutrient enrichment of the Ellen Brook catchment is of such importance that monitoring which contributes to the level of baseline knowledge of catchment processes may be warranted.

The EPA notes that the WRC has responsibility for determining the requirements of the proponent to undertake groundwater monitoring through conditions applied to the groundwater abstraction licence. The EPA supports the proponent's monitoring program proposed in the draft NIMP, which involves a combination of fertiliser audits, nutrient budgets, grass clippings analysis and soil analysis, as a primary means of managing nutrient export. The EPA considers the nature and extent of any additional monitoring of groundwater by the proponent should be directly relevant to this proposal.

**Summary**

Having particular regard to the:

(a) proponent's prediction that using the groundwater as a source of phosphorus and managing the phosphorus fertiliser program will result in the nett removal from groundwater of 5 kg/ha/year of phosphorus;

(b) the proponent's prediction that nitrogen export to the environment will be reduced to 9 kg/ha/year through improved management of nitrogen applications to the existing and new turf areas. This will be achieved by substantially reducing nitrogen application rates by 380 kg/ha/year and the proponent's use of regular fertigation to ensure nitrogen applications are balanced with turf crop requirements; and

(c) NIMP that will be prepared and implemented for the proposal and the ability of the WRC to apply conditions to the groundwater abstraction licence that will ensure the proponent implements the NIMP, undertakes the proposed monitoring and meets its requirements for predictions for nutrient export,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

# 4. Conditions and Commitments

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

## 4.1 Recommended conditions

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Bullsbrook Turf to expand the existing turf farm at Lot 8 Raphael Road, Bullsbrook from 12 ha to 26 ha is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) that the proponent shall implement the proposal as detailed in the recommended conditions in Appendix 4; and

(b) a Note that the proponent is required to apply for a groundwater abstraction licence to be issued by the WRC and that conditions on the licence will address the implementation of the Nutrient and Irrigation Management Plan.

# 5. Conclusions

The EPA has considered the proposal by Bullsbrook Turf to expand the existing turf farm at Lot 8 Raphael Road, Bullsbrook from 12 ha to 26 ha.

The proposal is within the Ellen Brook catchment where a key environmental concern is the export of nutrients to the Ellen Brook and ultimately, the Swan River. The level of assessment for this proposal was set at Consultative Environmental Review (CER) in 1996.

Since the level of assessment was set, the EPA has released the *Environmental Protection (Swan and Canning Rivers) Policy 1997* (EPA, 1998) which recognizes that substantial reduction across the catchment in current phosphorus loads is required. The EPA therefore expects that land managers and developers will demonstrate that they have minimized their individual contribution to nutrient export from the catchment.

The EPA is aware of the changes made by the proponent to this proposal in response to concerns about nutrient export. The changes primarily relate to the management of fertilizer and watering regimes and the preparation of a Nutrient Irrigation Management Plan (NIMP) which prescribes how the proponent will ensure it manages and monitors its fertilizer and irrigation applications to prevent significant export of nutrients.

The proponent is to be commended for developing a program which makes use of existing nutrient-rich groundwater. It has been predicted that by using nutrient-rich groundwater as a source of phosphorus, and by managing the phosphorus fertilizer program, there will be a nett removal of phosphorus from groundwater of 5 kg/ha/yr.

The proponent has also estimated that by reducing the amount of nitrogen applied and by using fertigation equipment and regular applications, nitrogen requirements of the turf can be matched to application rates and therefore the amount of nitrogen available for leaching will be reduced to around 9 kg/ha/yr.

Overall, the improved management of both the new and existing turf areas, which can be given effect by this proposal to expand the turf farm proceeding, will result in a nett reduction of phosphorus and nitrogen contributions. Thereby contributing to a reduction of nutrients across the catchment. The EPA therefore considers this proposal is consistent with the *Environmental Protection (Swan and Canning Rivers) Policy 1997* (EPA, 1998).

It is the view of the EPA that this proposal represents a benchmark for best practice operating procedures and the use of appropriate equipment to reduce nutrient export by managing fertilizer and irrigation applications. The application of this type of approach to management and use of equipment has merit in all catchments where major irrigated horticulture developments occur as it is one effective way of ensuring that this type of development is not contributing to degradation of wetlands and waterways.

The EPA is aware that this proposal will require a groundwater abstraction licence from the Water and Rivers Commission (WRC). It is the EPA's understanding that the NIMP prepared by the proponent can be given effect as a condition of this licence. Hence, the ongoing management and monitoring of this proposal, to ensure the NIMP is implemented, can occur as a component of the WRC licencing process without the need for a specific condition to be applied under the provisions of the *Environmental Protection Act 1986*.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4, and the NIMP is given effect through the application of conditions on the groundwater abstraction licence to be issued by the WRC.

# 6. Recommendations

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister notes that the proposal being assessed is for the expansion of the Bullsbrook Turf Farm at Lot 8 Raphael Road, Bullsbrook, from 12 ha to 26 ha.
2. That the Minister considers the report on the relevant environmental factor as set out in Section 3.
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4 and the Nutrient and Irrigation Management Plan is given effect through the application of conditions on the groundwater abstraction licence to be issued by WRC.
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

# Appendix 1

## List of submitters

**Organisations:**

Conservation Council of Western Australia Inc.

Ellen Brook Integrated Catchment Group

West Bullsbrook Residents & Ratepayers Association

Wildflower Society of Western Australia (Inc.)

**Individuals:**

none

# Appendix 2

## References

Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australia

Bullsbrook Turf (2002) *Expansion of Bullsbrook Turf Farm, Lot 8 Raphael Road Bullsbrook.* Consultative Environmental Review.

Department of Environmental Protection and Water and Rivers Commission (2001) *Environmental Guidelines for the Establishment and Maintenance of Turf and Grassed Areas.* Water and Rivers Commission, East Perth, Western Australia.

Environmental Protection Authority (1998) *Environmental Protection (Swan and Canning Rivers) Policy 1997.* Environmental Protection Authority, Perth, Western Australia.

Swan River Trust (1999) *Swan Canning Cleanup Programme, Action Plan.* Swan River Trust, East Perth, Western Australia.

# Appendix 3

**Summary of identification of relevant environmental factors**

| Preliminary Environmental Factors | Proposal Characteristics | Government Agency and Public Comments | Identification of Relevant Environmental Factor/ Issue |
|---|---|---|---|
| BIOPHYSICAL | | | |
| Terrestrial vegetation | Property has been previously cleared and no clearing of remnant vegetation is required. | No comments received. | Proposal includes replanting of locally occurring species along watercourse. More deep rooted vegetation will assist the salinity problem.<br>**This factor does not require further EPA evaluation.** |
| Wetlands and watercourses | Watercourse runs through northern end of property.<br>Potential direct impact to watercourse vegetation from turf farming activities.<br>Nutrients could enter watercourse. | **Public:** Irrigation under Pivot 2 may increase the potential for nutrient export to the adjacent creek. | Turf farming operations will be set back at least 50m and dryland buffer will be revegetated.<br>Management of nutrients discussed below.<br>**This factor does not require further EPA evaluation.** |
| POLLUTION MANAGEMENT | | | |
| Surface water quality | Surface water in the vicinity of Lot 8 is currently high in phosphorus.<br>Potential for increased nutrient and pesticide export into surface water from operation of the turf farm. | No comments received. | NIMP will be implemented.<br>**This factor does not require further EPA evaluation.** |
| Groundwater quality – nutrients and pesticides | Groundwater in the vicinity of Lot 8 is currently high in phosphorus.<br>Potential for increased nutrient and pesticide export into groundwater and the Ellen Brook Catchment. | **WRC and Public:** Groundwater monitoring should be done.<br>**Public:** Export of nutrients in turf rolls just transfers the pollution problem. | **Considered to be a relevant environmental factor to be discussed in Section 3.1 of the report.** |
| Groundwater quality – water abstraction | Potential that increased water abstraction will have negative impact on environment.<br>Current groundwater licence for 193,500 kL allows for ecosystem maintenance. | **Public:** WRC should review groundwater licence if continued low rainfall.<br>Proposal will result in a combined increase in water use both on and off the farm.<br>Turf should not be encouraged in hot Mediterranean climate. | The WRC has indicated that groundwater is available for the additional turf area.<br>Groundwater abstraction done under licence from WRC.<br>**This factor does not require further EPA evaluation.** |

# Appendix 4

## Recommended Environmental Conditions

Statement No.

RECOMMENDED CONDITIONS AND PROCEDURES

# STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

BULLSBROOK TURF FARM, LOT 8 RAPHAEL ROAD, BULLSBROOK, SHIRE OF SWAN

**Proposal:** The expansion of the existing turf farm at Lot 8 Raphael Road, Bullsbrook from 12 hectares to 26 hectares, as documented in schedule 1 of this statement.

**Proponent:** Mr John Maas

**Proponent Address:** 108 Franklin Road, WANNEROO WA 6065

**Assessment Number:** 1067

**Report of the Environmental Protection Authority:** Bulletin 1052

The proposal referred to above may be implemented subject to the following conditions and procedures:

## Procedural conditions

### 1 Implementation and Changes

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.

1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.

1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is not substantial, the proponent may implement those changes upon receipt of written advice.

## 2 Proponent Nomination and Contact Details

2-1 The proponent for the time being nominated by the Minister for the Environment and Heritage under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment and Heritage has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

2-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.

2-3 The nominated proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

## 3 Commencement and Time Limit of Approval

3-1 The proponent shall provide evidence to the Minister for the Environment and Heritage within five years of the date of this statement that the proposal has been substantially commenced or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment and Heritage will determine any dispute as to whether the proposal has been substantially commenced.

3-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment and Heritage, prior to the expiration of the five-year period referred to in condition 3-1.

The application shall demonstrate that:

- the environmental factors of the proposal have not changed significantly;
- new, significant, environmental issues have not arisen; and
- all relevant government authorities have been consulted.

Note: The Minister for the Environment and Heritage may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

**Procedures**

1 Where a condition states "to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority", the Chief Executive Officer of the Department of Environmental Protection will obtain that advice for the preparation of written advice to the proponent.

2 The Environmental Protection Authority may seek advice from other agencies, as required, in order to provide its advice to the Chief Executive Officer of the Department of Environmental Protection.

**Notes**

1 The Minister for the Environment and Heritage will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environmental Protection over the fulfilment of the requirements of the conditions.

2 The proponent is required to apply for a licence to take groundwater for this project under the provisions of Section 5c *Rights in Water and Irrigation Act 1914*. This licence will address:

- Nutrient and Irrigation Monitoring;
- Groundwater monitoring; and
- Annual compliance report.

# Schedule 1

**Bullsbrook Turf Farm, Lot 8 Raphael Road, Bullsbrook, Shire of Swan (Assessment No. 1067)**

The proposal is to expand the existing turf farm at Lot 8 Raphael Road, Bullsbrook from 12 hectares to 26 hectares.

Lot 8 Raphael Road has a total area of 58 hectares with a creek line in the northern part of the property which flows once every 3 to 4 years when winter rainfall is high. The area proposed for expansion of the turf farm was cleared for cattle grazing and general agriculture at least 20 years ago. No clearing is required for this proposal.

The proponent currently has two centre pivot irrigators on the property with a combined irrigated area of 26 hectares. At present, there is 8 hectares of turf under pivot 1 and 4 hectares under pivot 2. The additional 14 hectares of turf will be grown under pivot 2.

The key proposal characteristics are shown in Table 1.

**Table 1: Key Proposal Characteristics**

| Element | Description |
|---|---|
| Turf production area:<br>• existing<br>• proposed (total) | <br>• 12 hectares<br>• 26 hectares |
| Groundwater licence:<br>existing<br>proposed (total) | <br>• 193,500 kilolitres per annum<br>• 449,500 kilolitres per annum |
| Clearing | no remnant vegetation will be cleared |
| Revegetation | Turf farming operations will be set back at least 50 metres from the edge of the banks of the watercourse, and the buffer area will be revegetated with locally occurring species. |
| Use of poultry manure | uncomposted manures will not be used |
| Fertiliser nutrient inputs to 26 hectares<br>(2 crops)<br>• nitrogen – pivot 1<br>• nitrogen – pivot 2<br>• phosphorus – pivot 1<br>• phosphorus – pivot 2 | <br>(all values approximate)<br>• 540 kilograms per hectare per year<br>• 640 kilograms per hectare per year<br>• nil<br>• 50 kilograms per hectare per year |
| Nutrients removed in turf rolls (2 crops)<br>• nitrogen<br>• phosphorus | (all values approximate)<br>• 600 kilograms per hectare per year<br>• 40 kilograms per hectare per year |
| Nutrients to environment from 26 hectares<br>• nitrogen<br>• phosphorus | (all values approximate)<br>• 9 kilograms per hectare per year<br>• 5 kilograms per hectare per year **removed** from groundwater |

# Appendix 5

**Summary of Submissions and**
**Proponent's Response to Submissions**

## 1. Groundwater Monitoring

*Groundwater monitoring is essential. An adequate number of appropriately positioned groundwater monitoring bores will provide suitable information to distinguish nutrient export from surrounding land use activities and those from the Bullsbrook Turf Farm. The EPA should insist on a groundwater monitoring program.*

*Groundwater monitoring results should be available for public inspection.*

*It must be demonstrated conclusively that phosphorus export from the turf farm can be contained to less than 1 kg/ha/year. The monitoring system should meet EPA approval.*

While accepting the logic for groundwater monitoring, the experience of *Soil Management Consultants* is that consideration must be given to **external influences** such as activities on neighbouring properties, depth of sampling, historical nutrient enrichment of regional groundwater and localised changes in groundwater flow, that can **complicate interpretation of groundwater monitoring data** and make it **difficult to accurately pinpoint the sources of nutrients**. Examples of this are given below.

**Example 1**: At a proposed agistment centre in Wandi, baseline data for groundwater monitoring bores were not consistent with the pattern of horse accommodation or fertiliser application. The **highest level of total N (28mg/L)** in groundwater samples was recorded **after a period of more than 6 months when there had been no horses in the paddocks and no fertilisers used** The difference in total N for samples from duplicate shallow bores (15 and 28 mg/l) was greater than the allowable level of nutrient enrichment of groundwater (3mg/l) that was specified by WRC. It was believed that **developments on a neighbouring property** that stabled horses, cleared land and applied fertilisers for pasture establishment may have **largely contributed to elevated nutrient levels** in groundwater samples from the subject property.

**Example 2**: Large variations over a short distance in the nutrient concentrations of shallow groundwater samples were recorded by *Soil Management Consultants* at a site in West Swan. Samples of the perched watertable taken at three locations along a **boundary fence separating a turf farm and a horse agistment property** had concentrations of **nitrate-N between 1 and 51mg/l,** and concentrations of **P between 0.1 and 3.8mg/l**.

**Example 3:** Properties adjacent to *Bullsbrook Turf* to the north, south and east have stock grazing, and another turf farm shares the western boundary. A one-off sampling exercise was conducted for spring and drain water samples from surrounding properties. Sampling sites were:

(1) a spring-fed pool near the northern boundary of the adjacent turf farm
(2) water in a man-made excavation to the south of site 1
(3) a spring-fed pool on the property opposite the entrance to Bullsbrook Turf
(4) water flowing in a drain at the corner of Stock and Raphael Roads

**Nutrients in spring and drain water samples taken in November 2000 from properties surrounding Bullsbrook Turf**

| Site | pH | EC<br>mS/m | Soluble P<br>mg/L | Ammonium-N<br>mg/L | Nitrate-N<br>mg/L |
|---|---|---|---|---|---|
| 1 | 4.7 | 21 | 0.45 | 0.76 | 0.13 |
| 2 | 3.9 | 59 | < 0.1 | < 0.1 | 0.11 |
| 3 | 5.3 | 41 | 0.94 | < 0.1 | 0.13 |
| 4 | 6.7 | 48 | 0.46 | < 0.1 | 0.17 |

Three of the four samples have elevated P levels, consistent with **regional nutrient enrichment of groundwater in the Ellen Brook catchment**, largely due to the extensive amount of agricultural development and generally poor soils of the area. The nutrient concentrations in these spring and drain water samples are very similar to the average flow-weighted concentrations of nutrients in Ellen Brook for the period 1987-1991, which were 0.43mg/L for soluble P, 0.17mg/L for ammonium-N and 0.15mg/L for nitrate-N (*Swan River Trust*, 1993).

**Example 4**: Bore water samples (superficial aquifer) from *Bullsbrook Turf* and the adjacent turf farm have nutrient concentrations ranging from <0.1 to 2.5 mg/l of P, and from <0.1 to 6.6 mg/l of nitrate-N.

**Example 5**: Large variations in groundwater quality, especially for nitrate-N, have been reported previously for monitoring programs carried out by Geological Survey of WA (for example: Groundwater Quality Parameters for the Applecross Peninsular., reported in The Impact of Residential Urban Areas on Groundwater Quality, CSIRO Water Resources Series No.3). In 1984 **monthly means for nitrate-N from 35 bores varied from 6 to 18mg/l, with standard deviations of between 6 and 28mg/l.**

Given the potential problems associated with collection and interpretation of shallow groundwater monitoring data, *Soil Management Consultants* recommends that the **monitoring program** at *Bullsbrook Turf* should be based largely on a **combination of fertiliser audits**, accurate **nutrient budgets** for each grass species, **grass clippings analysis** to assess the level of supply of nutrients and **soil analysis** to confirm that excessive levels of leachable P have not accumulated prior to winter.

## 2. Increased water use on and off the turf farm

> *In the event of continued low annual rainfall, the Water and Rivers Commission should review the water licence and its effect on the surrounding area.*

The Water and Rivers Commission will review the water licence annually.

**3. Appropriateness and sustainability of lawn and its associated high water use**

> *The population of Perth is using water in an unsustainable manner and turf is a major user of water. In addition to the 224,500 kL of water for the turf farm expansion, an additional 450,000 to 500,000 kL will be used to maintain the turf somewhere in Perth. The CER has not fully assessed the impacts of the proposal on Perth's water useage.*
>
> *A turf industry should not be developed in the hot Mediterranean climate of Perth – this turf farm should not be expanded.*
>
> *The CER does not address issues of regional impact or sustainability. Perth and Swan Coastal Plain regions already have excessive (non-sustainable) areas of turf and lawn.*

Much of the area proposed for turf farm expansion will be used for **production of new turf varieties** (eg Zoysia grass, improved couch and buffalo cultivars) that have **much lower nutrient, water and mowing requirements** and better colour retention over winter compared with the current popular couch cultivars. They offer the potential for **greater sustainability to landscaping with turf**.

*Bullsbrook Turf* is **one of only three turf farms that is licenced** to produce these new varieties. One of the new couch grasses has been identified as having **export potential to South-east Asia**, specifically for use on golf courses in Malaysia. Experience in Queensland indicates that this grass has greater wear resistence combined with low nutrient and water requirements for **use on high class sportsfield turf**.

It was pointed out in a submission that the combined value of turf, irrigation and nursery (etc) industries is worth about $800m and employs 14000 people directly. The **new turf varieties** to be grown at *Bullsbrook Turf* might allow even further expansion of these industries by introducing grass species that **improve considerably the environmental sustainability of turf** for landscaping.

**4. Exporting of nutrients from the Ellen Brook Catchment in turf rolls**

> *Exporting of phosphorus (40 kg/ha/year) and nitrogen (600 kg/ha/year) in turf rolls from Bullsbrook to another area of Perth is just transferring the pollution problem.*
>
> *The CER has not addressed the nutrient impacts of turf beyond the farm gate. EIA must include analysis of the consequences of more turf lawns on the Perth and broader Swan Coastal Plain region. It is unacceptable that the exporting of phosphorus for eventual discharge elsewhere in the environment is seen as an environmentally sound practice.*

The annual export of nutrients in turf rolls from *Bullsbrook Turf* is estimated to be 40 kg/ha of phosphorus and 600 kg/ha of nitrogen. These nutrients are totally bound up in the organic matter of turf and are not in a soluble form that could be released to the environment. Subsequent turf management is the responsibility of the new owner.

Given that Australia is presently a free-enterprise democracy, home owners can choose freely their preferred style of landscaping. Turf farm expansion at Bullsbrook is aimed at meeting an existing demand for produce, at a level of turf production and control that allows for close to 100% nutrient use efficiency and greater protection for the environment.

## 5. Creek Management

*Irrigation under pivot 2 may increase the potential for nutrient export to the adjacent creek.*

The proposed expansion of the turf farm will result in a **large reduction to the current rate of nutrient input**, as summarised in the table below, and commitment to an **on-going management and monitoring program** through a Nutrient and Irrigation Management Plan (NIMP).

**Comparison of previous and future nutrient inputs and nutrient outputs for an expanded Bullsbrook Turf**

| | **NITROGEN** | | | **PHOSPHORUS** | | |
|---|---|---|---|---|---|---|
| **Reduction in fertiliser input for turf under pivot 1** | **(estd) 225 kg/ha per crop** | | | **56 kg/ha per crop** | | |
| **NUTRIENTS per YEAR** | **Fert** | **Water** | **Total** | **Fert** | **Water** | **Total** |
| | kg/ha per year | | | kg/ha per year | | |
| **Previous Pivot 1** | 990 | 100 | 1090 | 112 | 40 | 152 |
| **Future Pivot 1** | (540) | 100 | (640) | Nil | 40 | 40 |
| **Future Pivot 2** | (640) | Nil | (640) | 50 ** | Nil | 50 |
| **Average fertiliser inputs** | (609) | | | 35 | | |
| **Exported in turf rolls** | | | 600 | | | 40 |
| **Estimated impact off-site of future program on 26ha** | **Nett export of 9 kg/ha of Nitrogen per year #** | | | **Nett removal of 5 kg/ha of Phosphorus per year from groundwater** | | |

** P in slow-release form

However the large reductions in fertiliser use and the commitment to a NIMP **will only be achieved if expansion is approved**.