

ELF FARM SUPPLIES PTY LTD

MUSHROOM SUBSTRATE PLANT

Modification to Approved Project

Environmental Assessment



**Perram &
Partners**

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MUSHROOM SUBSTRATE PLANT

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Environmental Assessment

Report 136R2

February 2015

**CERTIFICATION OF ENVIRONMENTAL
ASSESSMENT**

PREPARED PURSUANT TO REPEALED PART 3A OF THE *ENVIRONMENTAL
PLANNING AND ASSESSMENT ACT 1979*

**ENVIRONMENTAL
ASSESSMENT PREPARED BY**

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in respect of:

**PROJECT TO WHICH PART 3A
APPLIES**

Proponent Name: Elf Farm Supplies Pty Ltd
Proponent Address: PO Box 615, WINDSOR 2756
Land to be developed: Address 108 Mulgrave Road, Mulgrave
Lot No. DP/MPS, Vol/Fol etc. part Lot 13 DP 1138749, Lot 14 DP 1138749
Proposed Development Modification to approved project and concept plan for
expansion of an existing mushroom substrate plant at
Mulgrave.

**ENVIRONMENTAL
ASSESSMENT**

An environmental assessment is attached

CERTIFICATION

I certify that I have prepared this environmental assessment
and to the best of my knowledge:

- it has been prepared in accordance with repealed Sections 75M and 75E of
the *Environmental Planning and Assessment Act 1979*,
- the information contained in the Environmental Assessment is neither false
nor misleading.

Signature:
Name:
Date:

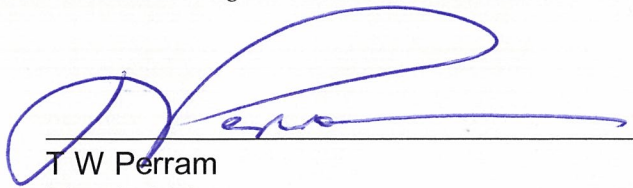

T W Perram
March 2015

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EXECUTIVE SUMMARY

Elf Farm Supplies operates a mushroom substrate production plant at 108 Mulgrave Road, Mulgrave. In 2012, the Minister for Planning granted approval to further develop the plant and for staged increase in substrate production. The company is now applying for a modification to the project approval and associated concept plan to enable introduction of newer technology in substrate production and odour management.

In summary, the purpose of the modification is to change the method of processing substrate in the pre-wet stage, to improve the technology and capability of the odour management system and other changes to improve the quality of substrate produced. The modification will progress the environmental performance of the plant to comply with its Environment Protection Licence (EPL 6229).

Alteration to proposed building work includes erecting a tunnel structure for pre-wet processing in lieu of the large shed previously proposed. Ammonia scrubbers and a biofilter will be installed in lieu of the approved bioscrubber and chimney. The length of the existing building used for Phase 2/3 processing will be increased by about nine per cent. Various air ducts and conveyors will be installed to enable the additions to function. Other storage and operating areas will be placed entirely indoors to enable improved capture and treatment of air emissions.

The new pre-wet tunnel structure will have a similar plan area and height to the buildings it will replace. The biofilter will be a swimming pool like structure extending about 2 metres above ground level.

The odour management system is being altered to improve the environmental performance of the plant. Exhaust air will be collected from various locations and ducted to the new emissions treatment plant with the aim of capturing all potentially significant sources and substantially reducing fugitive emissions. The odour management system will be installed as an initial stage to enable the majority of these improvements to be achieved as soon as possible.

An odour assessment concludes that the proposed modifications when complete will result in a highly significant reduction to existing odour emissions and impact profile. Furthermore, the air output from the biofilter will be of a treated quality and will not have the character of the untreated process air.

An acoustic report indicates that detailed design of the works will ensure noise from the altered plant will be constrained to remain within the limits contained in the current approval and licence.

1

INTRODUCTION

1.1 PURPOSE OF THE REPORT

This report has been prepared to accompany an application to the Department of Planning and Environment to modify an approved concept plan and approved development work and operations at Elf Farm Supplies' mushroom substrate plant at 108 Mulgrave Road, Mulgrave. *Figure 1* shows the location of the substrate plant.

The relevant approvals were granted by the Minister for Planning on 11 January 2012 under Part 3A of the Environmental Planning and Assessment Act. The approvals permit Elf Farm Supplies to further develop the company's mushroom substrate plant at Mulgrave; and for staged increase in substrate production. The current application seeks to modify the concept plan and project approval under section 75W of the Act¹.

In the period since the approvals were granted the company has submitted environmental plans and strategies, receiving further approval to commence construction work and to increase production to 1,600 tonnes of substrate per week. Some of the staged construction work has been completed and the plant output has been increased.

The company has continued to monitor worldwide developments in mushroom substrate production including odour control and now seeks to introduce newer technology to the Mulgrave facility. As the newer technology involves an alteration to building plans and method of operation, a modification to the project approval is needed before proceeding to the next stage of construction.

This role of this report is to describe and assess the proposed modification to the project approval and its environmental impact. It is not a re-assessment of the approved development as a whole. Reference should be made to the original environmental assessment for the Part 3A project (Perram & Partners 2010) for description and assessment of aspects of the approved project that are unaffected by the proposed modification.

¹ Although Part 3A has been repealed, its provisions remain in force with respect to existing approvals issued under that Part.



FIGURE 1 Mulgrave Substrate Plant

1.2 DEPT OF PLANNING AND ENVIRONMENT REQUIREMENTS

The Department of Planning and Environment has advised requirements for this environmental assessment as follows:

- detailed description of the existing or ongoing operations and photographs of the existing operations;
- site plans including the modifications to the existing or approved building works;
- the need for the modification application having particular regard to current odour issues;
- alternatives considered;
- likely changes to any approved staging of the development - including construction and operational stage/s;
- likely interactions between the modified Project and existing, approved and proposed operations in the vicinity of the site;
- clear identification of any changes to the approved project in terms of environmental impact i.e. noise , wastewater, stormwater.
- proposed amendments to existing conditions of approval and environmental management and monitoring measures

In addition the Department has enclosed requirements for the assessment received from the EPA. The letter from the EPA summarises the following key issues:

1. Air quality (including dust, odour, other air emissions assessment modelling and management);
2. Noise impact (including noise assessment modelling and mitigation);
3. Waste acceptance, storage, processing, reuse, management and disposal;
4. Description of outputs from process, ie (type, volume etc); and
5. Surface water and waste water management, (including surface water controls and impacts on waterways and water supply).

The EPA has also attached generic requirements for an operation of this type that have been considered where they apply to the proposed modification.

Correspondence from the Department including its requirements and EPA requirements are included as *Appendix A*.

The matters listed by the Department of Planning and Environment for inclusion in the environmental assessment are set out in *Table 1.1* together with a response or direction to where the matter is addressed in the environmental assessment.

Table 1.1 RESPONSE TO DOPE REQUIREMENTS

DOPE Requirement	Response
<ul style="list-style-type: none"> detailed description of the existing or ongoing operations and photographs of the existing operations; 	Please refer to <i>Appendix D</i> .
<ul style="list-style-type: none"> site plans including the modifications to the existing or approved building works; 	Please refer to figures 2 to 7.
<ul style="list-style-type: none"> the need for the modification application having particular regard to current odour issues; 	Please refer to section 1.4
<ul style="list-style-type: none"> alternatives considered; 	Please refer to section 1.5
<ul style="list-style-type: none"> likely changes to any approved staging of the development - including construction and operational stage/s; 	Please refer to section 2.2.2. Staging will essentially remain as approved, except that the modified odour management system will be progressively commissioned ahead of final Stage 2 works as a separate sub-stage.
<ul style="list-style-type: none"> likely interactions between the modified Project and existing, approved and proposed operations in the vicinity of the site; 	No such interactions have been identified. There are no relevant proposed operations identified on the DoPE major project list.
<ul style="list-style-type: none"> clear identification of any changes to the approved project in terms of environmental impact i.e. noise , wastewater, stormwater. 	Please refer to section 3. A primary purpose of the modification is to enable better odour management, hence the effect of the change will be to reduce environmental impact and comply with the EPL.
<ul style="list-style-type: none"> proposed amendments to existing conditions of approval and environmental management and monitoring measures 	<ol style="list-style-type: none"> 1. It is proposed is that condition 2 of schedule 2 be amended to refer to this EA as amending the 2010 EA currently referred to in the condition. 2 A further condition would require that detailed design of the modified works is to be undertaken in conjunction with an qualified acoustic consultant to verify that existing licence conditions will be met. 3. Condition 3 of Schedule 3 refers to the Environment Protection Licence. The EPL may require review to incorporate the new odour management system

The key issues identified by the EPA are summarised in *Table 1.2* together with a response.

Table 1.2 RESPONSE TO EPA 'KEY ISSUES'

EPA Requirement	Response
<ul style="list-style-type: none"> Air quality (including dust, odour, other air emissions assessment modelling and management); 	Please refer to section 3 and <i>Appendix C</i> .
<ul style="list-style-type: none"> Noise impact (including noise assessment modelling and mitigation); 	Please refer to section 3 and <i>Appendix B</i> .
<ul style="list-style-type: none"> the need for the modification application having particular regard to current odour issues; 	Please refer to section 1.4
<ul style="list-style-type: none"> Waste acceptance, storage, processing, reuse, management and disposal; 	Please refer to section 3. The application does not propose any change to the current approval with regard to waste.
<ul style="list-style-type: none"> Description of outputs from process, ie (type, volume etc); and 	Please refer to section 3 and <i>Appendix D</i> . The application does not propose any change to the current approval with regard to production outputs.
<ul style="list-style-type: none"> Surface water and waste water management, (including surface water controls and impacts on waterways and water supply). 	Please refer to section 3. The application does not propose any change to the current approval with regard to surface water, waste water, or effect on water supply and waterways.

1.3 SITE PLAN

Figure 2 is a layout plan of the site showing the outline of existing structures and approved structures as yet not constructed.

FIGURE 2 Existing and Approved Development



1.4 PURPOSE OF THE PLANT ALTERATIONS

There are several reasons for proposing alterations to the approved pre-wet and odour control process:

- ❑ As foreshadowed in the environmental assessment that accompanied the project application (Perram & Partners 2010), Elf Farm Supplies has continued to monitor worldwide technological improvements in mushroom substrate production and odour management. Developments, particularly in Western Europe, have now demonstrated that ammonia scrubbers and biofilter beds are more effective at odour removal from substrate processing than bioscrubbers;
- ❑ Elf Farm Supplies has also been developing and trialling alternative processes to permit the pre-wet stage of composting to be effectively undertaken in enclosed bunkers. This development work has been critical to obtaining more effective odour control during the pre-wet stage than trying to exhaust and treat considerable volumes of air from a large shed;
- ❑ The Mulgrave substrate plant operates under an environment protection licence issued by the EPA. Elf Farm Supplies routinely monitors odour in the substrate plant chimney consistent with its licence. Routine sampling from the chimney has shown that the plant continues to operate below the odour limit specified in the licence.

However, there has been community unrest, particularly since January 2013, with regard to odour from all sources in the Mulgrave area. Both the EPA and Elf Farm Supplies have responded to the concerns. The company has undertaken a number of repair and modification projects to the existing plant in conjunction with operational procedure changes. A July 2014 odour survey undertaken by the EPA has resulted in further improvements being required to prevent fugitive emissions from the plant, being air that escapes from non-treated sources such as through doors and vents, rather than through the chimney; and

- ❑ The approved Odour Management Plan for the site (Todoroski Air Sciences 2012) requires that consideration be given to reducing fugitive emissions by enclosing the bale wetting area and optimising the time taken and efficiency of transporting pre-wet material to the Phase 1 tunnels (section 4.2.1).

Elf Farm Supplies now requests approval to embrace the recent technological improvements as part of its action to control fugitive emissions. Fugitive emissions are controlled by sealing air escape paths and enclosing all processing operations. In the case of pre-wet processing, the requirement to effectively exhaust the significant volume of air from a large pre-wet shed so as to maintain the building under negative pressure is challenging for both engineering design and operational management.

It is therefore proposed to move to enclosed bunker or tunnel processing for the pre-wet stage of substrate production. This enables a smaller volume of air to be treated from each batch of material with a more efficient odour removal system. Elf Farm Supplies has experience with tunnel processing as this method has been successfully used at Mulgrave for Phase 1 composting for about two decades. Ammonia scrubbers and a biofilter will replace the previously proposed second bioscrubber and chimney and over time will allow the existing bioscrubber to be decommissioned and mothballed.

The proposed changes will result in all process operations, including the transfer of compost material throughout the plant, to be undertaken in enclosed buildings and covered conveyors. This will result in Elf Farm Supplies being able to minimise all significant sources of fugitive emissions.

With the construction of new pre-wet tunnels, the existing pre-wet shed will become redundant for this purpose and would allow the bale wetting and stable bedding operations to be carried out indoors, further reducing the potential for fugitive emissions.

A minor extension to the Phase 2/3 processing buildings is also proposed for the reason that it will enable substrate to have a longer residence time in Phase 2 and Phase 3 processing, which has been demonstrated to produce a higher yield and better quality mushrooms.

1.5 ALTERNATIVES CONSIDERED

As an alternative to seeking modification to the project approval, Elf Farm Supplies has considered proceeding with the next stage of development of the substrate plant as currently approved. While this is a cheaper solution in terms of construction and operational costs, the company would prefer to proceed with the proposed alterations for the following reasons:

- ❑ the proposed changes to pre-wet processing and emissions control give greater certainty that EPA concerns regarding fugitive emissions can be effectively addressed;

- ❑ tunnel processing for pre-wet will give greater consistency and control over product quality;
- ❑ successful implementation will demonstrate that the plant can move forward to increase production;
- ❑ the company is committed to a process of continuous improvement at the substrate plant including monitoring and where practicable, implementing the latest advances worldwide in substrate production technology. This commitment is included in section 8.2 of the environmental assessment accompanying the original project application (Perram & Partners 2010) and section 5 of the Odour Management Plan (Todoroski Air Sciences 2012).

2

PROPOSED MODIFICATION

2.1 OVERVIEW

Elf Farm Supplies requests the Minister to modify the project approval to allow for the following alterations:

- ❑ construct and utilise tunnels for the pre-wet phase of substrate production, instead of constructing and utilising for this purpose the approved large shed,
- ❑ construct the approved second emissions treatment plant to a new design incorporating ammonia scrubbers and biofilters, instead of constructing a second bioscrubber and second chimney;
- ❑ install ductwork to convey extracted air from the current Phase 1 and pre-wet operating areas of the site and deliver it to the new emissions treatment plant;
- ❑ enclose the raw materials courtyard to contain chicken manure dust and enable controlled air extraction from this area;
- ❑ extend the existing and future Phase 2/3 buildings from 22 to 25 tunnels (approximately 10 metres each) to allow a longer residence time for the substrate in Phase 2/3 processing;
- ❑ Other minor or consequential changes to approved structures and operations, including:
 - install exhaust ductwork from both the existing and future Phase 2/3 buildings;
 - re-route proposed covered conveyors to transport substrate to/from the future Phase 2/3 building
 - complete the filled portion of the site in a manner to accommodate the biofilter beds;
 - construct a new electrical switchroom with transformer, generator room and cooling plant along the eastern wall of the new Phase 2/3 building.

Details of these alterations and related changes to operations are provided in the following sections.

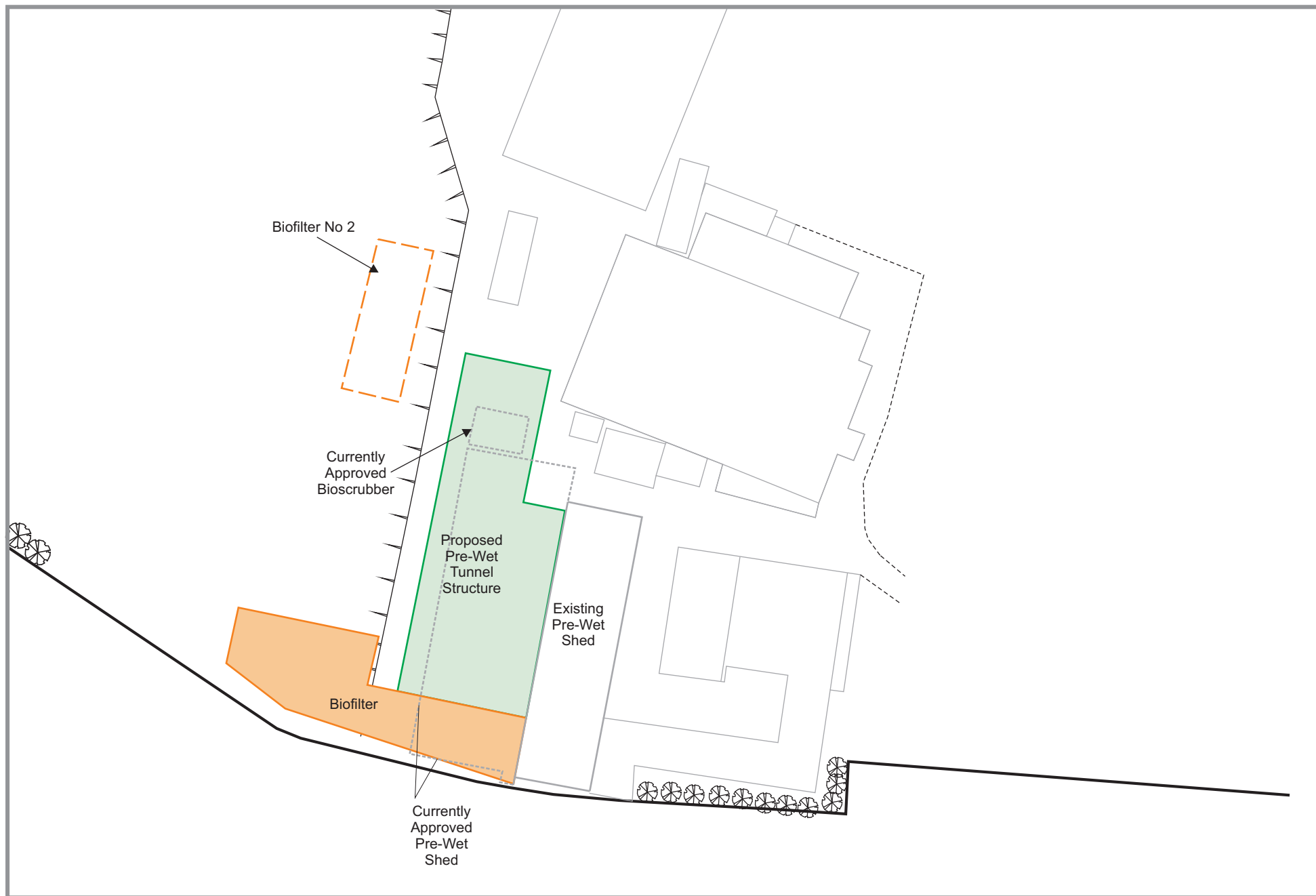


FIGURE 3 Proposed Pre-Wet Structure and Biofilter

2.2 BUILDING ALTERATIONS

2.2.1 *Approved Pre-wet Shed and Bioscrubber*

The 2012 project approval included construction of a second larger shed for pre-wet processing. The new building was designed to share a common wall with the existing pre-wet shed. It was to be larger than the existing shed being 133 metres long by 45 metres wide and had a wall height of eight metres with a pitched roof extending to approximately 12.6 metres above ground. The lower two metre section of the external walls was to be of concrete with a combination of metal sheeting and clear panel above.

The approved second emissions treatment plant was to be a separate stand-alone bioscrubber measuring 22 by 15 metres in plan and nine metres high. The building had concrete walls and a flat concrete roof. A chimney was to be erected on the roof of the bioscrubber with a diameter of 1.8 metres at the base extending to a height of 40 metres above ground.

The total plan area of these approved structures was approximately 6,300 square metres. It is now proposed that neither of these structures will be erected. *Figure 3* shows the outline of the currently approved pre-wet shed and bioscrubber upon which is overlayed the footprint of the pre-wet tunnel structure and biofilter now proposed.

2.2.2 *Proposed Tunnel Structure*

In the location where the second pre-wet shed and bioscrubber would have been constructed, it is now proposed to erect a concrete structure to permit pre-wet processing to take place in tunnels. The proposed pre-wet tunnel structure will have similar characteristics to an existing tunnel structure on the site, part of which has been in use for approximately two decades. The existing tunnel structure is used for a later stage in substrate preparation referred to as “Phase 1” processing.

The design provides for 10 pre-wet tunnels, each 50 metres long and eight metres wide. Tunnels will be arranged in a bank of six at the southern end and four at the northern end and will be constructed in stages. The tunnels will open into a centrally located working hall. At each end of the structure a plant room will enclose machinery including fans, pumps, ammonia scrubbers and tanks. A four metre wide service corridor along the eastern side of the tunnel structure adjoining the existing pre-wet building will house a conveyor and miscellaneous rooms for storage and operations. *Figure 4* shows the internal layout of the new pre-wet structure.



FIGURE 4 Internal Layout of Proposed Pre-Wet Structure

The tunnels will be constructed of reinforced concrete with a concrete roof. The working hall external walls will be of concrete in the lower section and a combination of metal sheeting and clear panel above. The working hall roof will be metal clad. The plant rooms at the ends of the structure will have external walls of concrete and concrete blockwork with a metal roof.

The tunnel structure will have a total floor area of approximately 6,500 square metres, comparable with the area of the superseded buildings. The height of the tunnels will be approximately eight metres to a flat roof, with a section of pitched roof over the work room extending to about 13 metres. A rooftop conveyor will create a linear height extension across the centre of each bank of tunnels. *Figure 5* shows west and south elevations of the proposed new pre-wet structure.

2.2.3 Proposed Biofilters

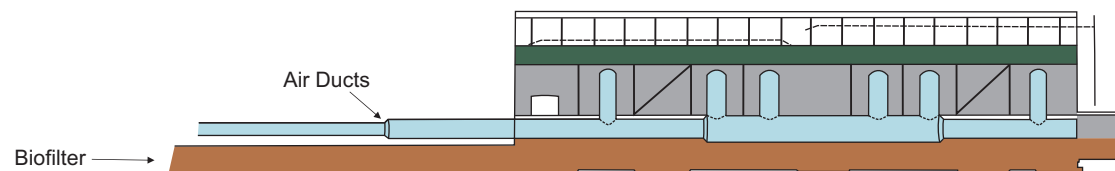
The southern biofilter will occupy an area of approximately 2,800 square metres. It will have the form of a large open swimming pool type structure with concrete sides extending approximately two metres above ground level. The structure will be divided internally into two cells. Ductwork, partly above and partly below ground, will convey exhaust air from the ammonia scrubbers and distribute it across the base of the biofilter structure. The biofilter will be filled with organic material including shredded tree stumps, trunks and bark. Grasses may colonise the surface of this structure.

Rainfall draining through to the base of the biofilter will be directed to the water recycling pit, from where the water will be reused in the substrate production process. A bypass will divert heavy flows directly to the adjoining farm dam.

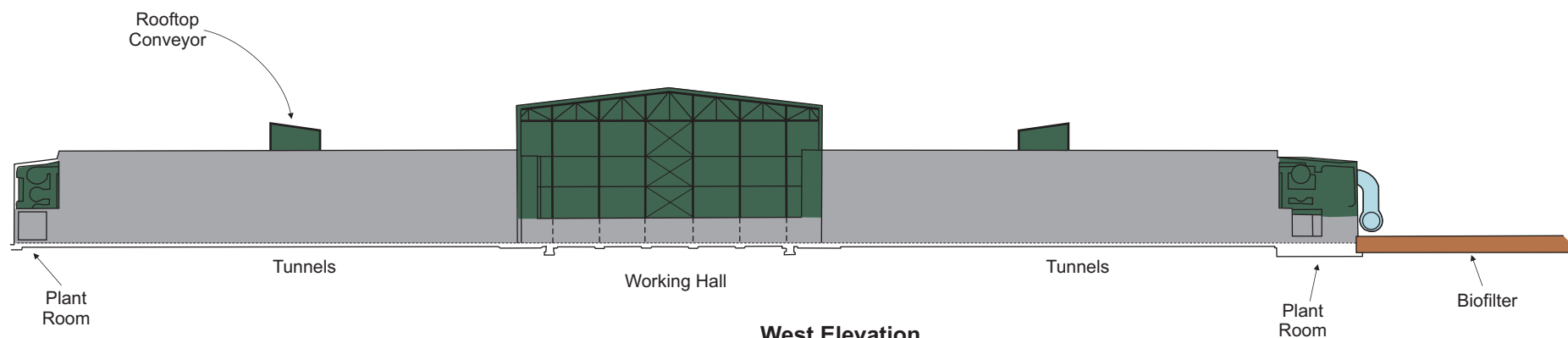
The biofilter and emissions plant have been sized with sufficient capacity to receive extracted air from all parts of the operation. Approval is sought for a second smaller biofilter to the north of the pre-wet building. The second biofilter will be constructed later if required to increase air treatment capacity and/or to provide redundancy for maintenance purposes.

2.2.4 Phase 2/3 Building Extension

The Phase 2/3 building was an existing structure at the time of the 2010 project approval. The building was not altered as a result of that approval, except for a small generator room added to its eastern end. The building is approximately 114 metres long by 73 metres wide. It is now proposed to extend the building from its western end by approximately 10 metres, less than nine per cent of its existing length. This extension will enable an additional three Phase 2/3 tunnels to provide a total of 25



South Elevation



West Elevation

FIGURE 5 Elevations

tunnels where there are now 22. The future Phase 2/3 building will be similarly enlarged on its southern end. *Figure 7* shows the proposed building extensions.

The additional tunnels will allow a longer “residence time” of substrate in the tunnels. It is planned to leave each batch of substrate in Phase 2 processing (pasteurising) for six days instead of the current five days and support three more days for Phase 3 processing (spawn running). Testing has shown that the additional processing time results in a higher yield and improved quality of mushrooms at the growing farms.

2.2.5 Other Alterations

As a consequence of introducing tunnel processing for pre-wet material, the existing pre-wet shed will become redundant for this purpose. It is planned to decommission the existing outdoor bale wetting and stable bedding area and undertake these operations in the existing pre-wet shed. The approved second external bale wetting area and associated water recycling pit on the eastern side of the site will therefore not be required. A straw bale breaking line will also be included in the pre-wet shed.

The raw materials storage area and courtyard will be further enclosed to contain chicken manure dust and be fitted with air extraction. Deliveries and manure processing will occur within the enclosed space. There will be an internal connection from this area to the existing pre-wet shed to end the use of loaders externally transporting chicken manure between buildings for blending.

Extraction ductwork is to be installed from all current and future operating areas to deliver all extracted air to the proposed new emissions plant and biofilter. *Figure 7* shows the general location of proposed ductwork.

Purpose built heat exchangers will regulate the exhaust air temperature in the ammonia scrubbers and recycle the heat energy back into the two working halls to supply makeup air and improve operator working conditions.

The site drainage system will not require further modification as the new pre-wet structure will be a replacement for the previously approved shed and bioscrubber with a similar roof area.

The existing approved development includes installation of several new conveyors. The proposed alterations will require rearrangement of approved conveyors and some new conveyors. New conveyors proposed with the new pre-wet structure will primarily be internal to the building except for the rising connections to the tunnel rooftop.

All external conveyors will be enclosed to prevent fugitive emissions.

2.3 CONSTRUCTION

Construction staging was presented in the 2010 environmental assessment. The sequence of works is largely unchanged, but the nature of building construction within Stage 2 would be modified by the current application.

At the present time Stage 1 works are complete except:

- ❑ site filling operations require a minor extension to complete level platforms for the biofilters;
- ❑ construction of the straw bale storage shed No 1 has been deferred.

Two sub-stages are planned within Stage 2:

- (a) the new emissions management plant will be constructed and placed in service as soon as possible. The southern pre-wet plant room, services corridor, biofilter and associated ductwork and mechanical fitout will be installed as a priority. Associated works including the new electrical switchroom with transformer, generator room and cooling plant along the eastern wall of the future Phase 2/3 building will also be installed.
- (b) when the new emissions plant is in service, the southern bank of six pre-wet tunnels will be completed and placed in service. This will release the existing pre-wet shed to enable consequential works and improvements to be completed. Construction of part of the new phase 2/3 building would occur in this period.

The timing for construction of the two bale storage sheds will be reviewed during Stage 2.

Stage 3 previously included the Phase 1 tunnel extension and remainder of the new Phase 2/3 building. To this will be added the northern bank of four pre-wet tunnels, second biofilter (if required) and extension to the existing Phase 2/3 building.

Figure 6 is a revised staging plan for the site development.

2.4 TECHNOLOGY

Pre-wet tunnels will use similar technology to the existing Phase 1 tunnels, including:

- ❑ an 'air under' system to introduce air to the mix through the tunnel floor;
- ❑ conveyor loading of tunnels to ensure even distribution of composting material;

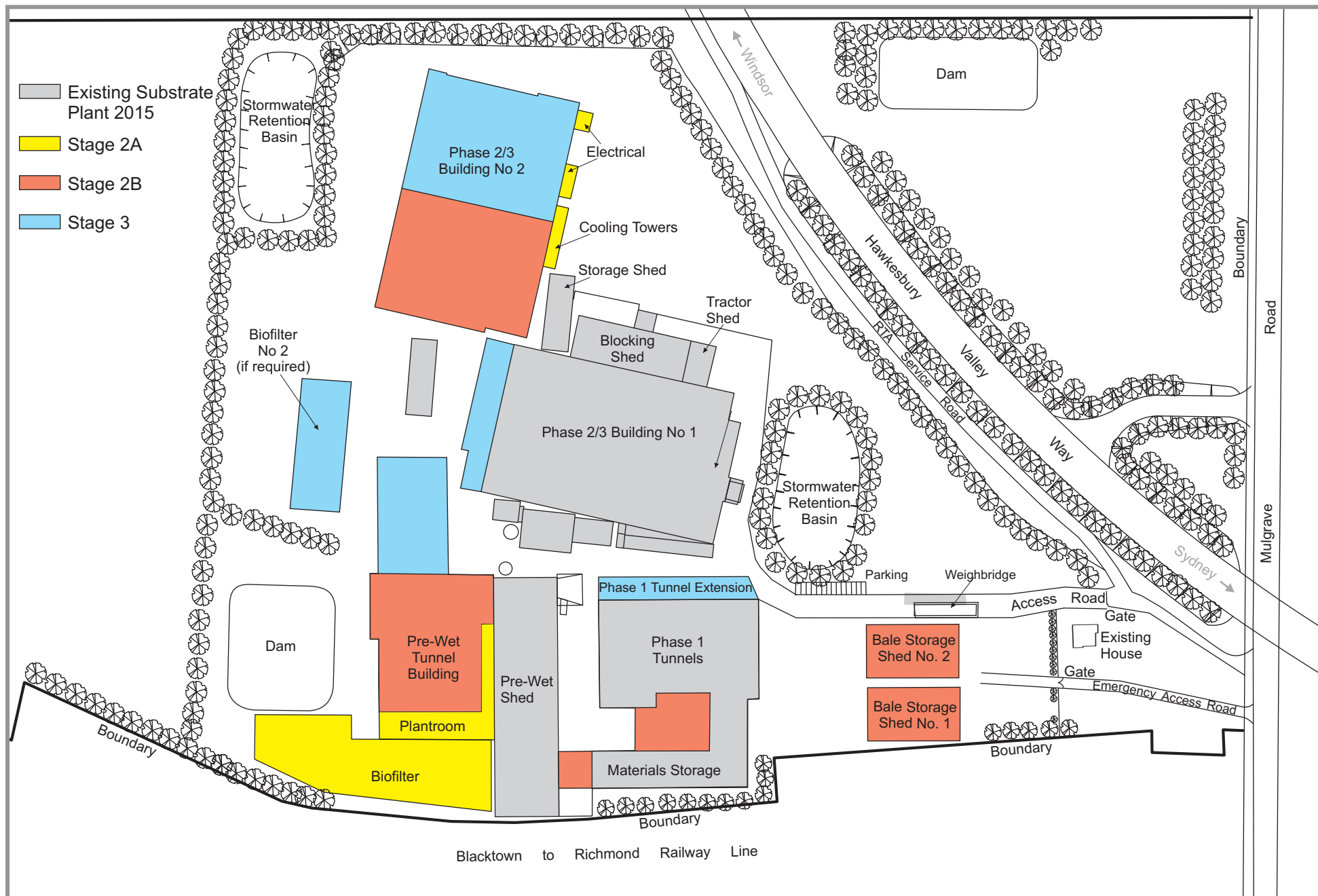


FIGURE 6 Revised Staging Plan

- ❑ 'walking floor' hoppers in the working hall to assist material movement;
- ❑ variable speed fans regulating air flow to and from the tunnels; and
- ❑ an automated management system controlling the pre-wet process.

Ammonia scrubbers and associated heat exchangers will treat and cool the exhaust air. Circulating liquid is continuously sprayed into the exhaust air stream passing through to the biofilter. The liquid is acid dosed as required to maintain the correct pH. Ammonium sulphate solution is created as part of the neutralising reaction which is to be recovered either for re-use in the composting process or sale as a fertilizer.

A biofilter is essentially a concrete structure similar in form to an above-ground swimming pool. An extensive duct network transfers exhaust air from the plant to the base of the biofilter and enables an even distribution throughout the biofilter.

2.5 OPERATIONS

The pre-wet operation will be carried out entirely indoors, with loaders operating in the working hall to collect material from the tunnels and deposit it in walking floor hoppers for addition of water and transfer via conveyor either back to tunnels or to the next stage of processing.

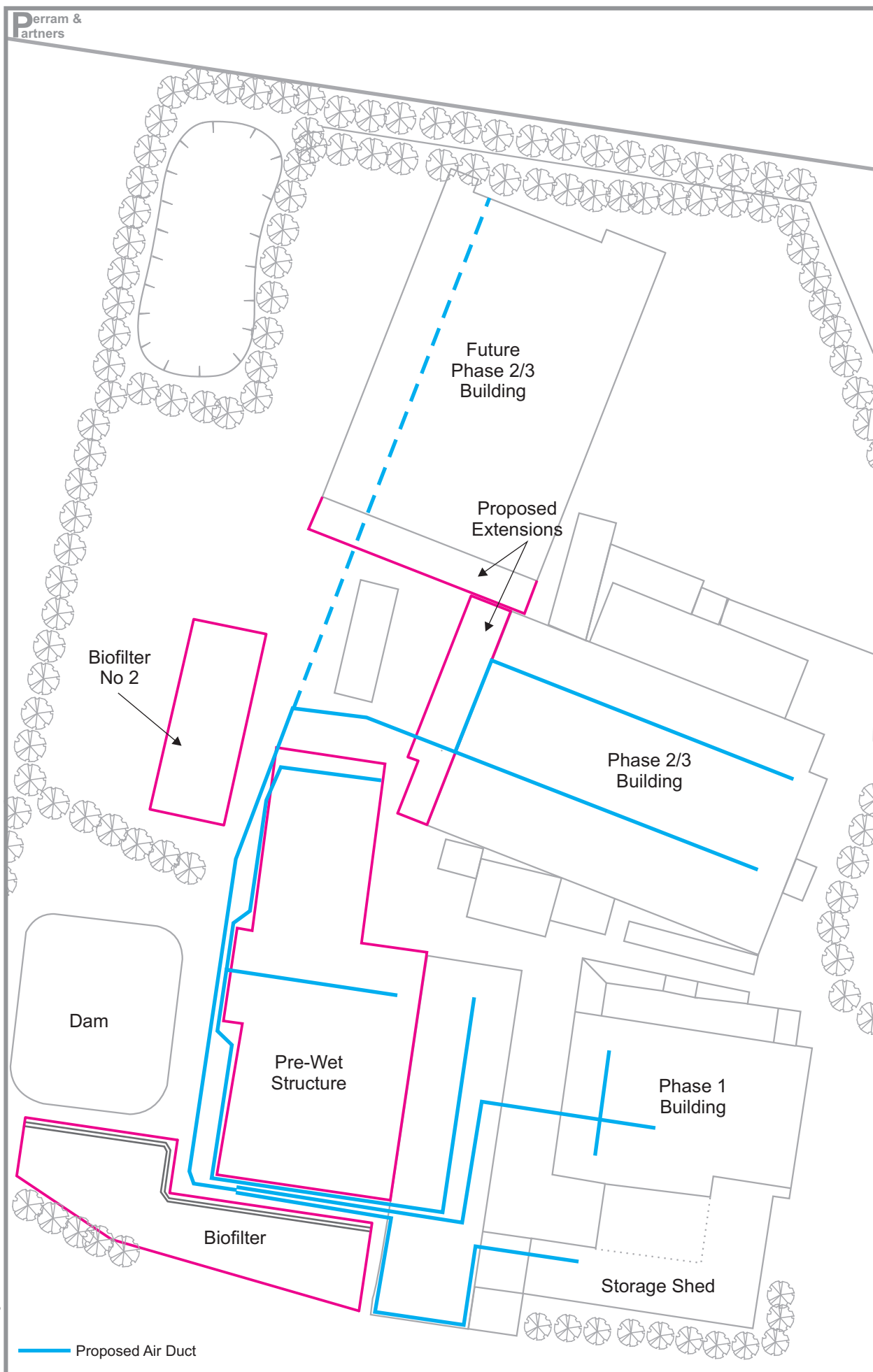
There is currently an enclosed vehicular corridor linking the pre-wet building to the Phase 1 building. The proposed modifications will eventually eliminate the need for loaders to pass through the corridor with pre-wet material as part of the normal transfer operation. This transfer will be accomplished by conveyor, enclosed to prevent fugitive emissions. A transfer conveyor for this purpose forms part of the currently approved development as depicted on *Figure 2*.

Up to 20 kilolitres of sulphuric acid will be stored in tanks beside the ammonia scrubbers. It is anticipated this storage will require replenishment approximately every three months.

To assist the biofilters to function correctly the fill material must be kept moist. In dry periods water sprays will be used to maintain minimum moisture levels in the biofilters.

Computer-managed controls will automatically regulate conditions the emissions control equipment in the plant processing areas and monitor ammonia scrubber operation to provide alarm notifications.

After the emissions control system is fully commissioned and its performance tuned, it is expected that the existing bioscrubber can be decommissioned and retained as a standby system.



136R2 Fig 7 20-02-2015

Figure 7 Proposed Air Ducts

3

ENVIRONMENTAL ASSESSMENT

3.1 VISUAL IMPACT

The proposed alterations to the plant will result in a minor change in building form. The pre-wet tunnel structure will have a similar footprint with a similar bulk to the currently approved pre-wet shed and bioscrubber. The most significant change from a visual perspective is that the second chimney will not be required. The 10 metre extended section of the Phase 2/3 buildings will be of minor visual significance.

Being just above ground level, the biofilters will have limited visibility from beyond the site. At the completion of works on the western edge of the plant, landscaping will be enhanced and extended to restrict views from the west and from the railway. Similar landscaping previously undertaken on the northern side of the site has matured to effectively screen the development from that direction.

3.2 WATER MANAGEMENT

3.2.1 *Process Water*

All process water including wash-down water is fully consumed in substrate production. In dry weather the water recycling pit receives the runoff from the external bale wetting operation. This water is screened and resprayed onto the straw bales. In wet weather, rainfall runoff from operational surfaces drains to the same pit which is sized to receive and hold the first flush of runoff from its catchment. Further runoff is directed to the dam immediately west of the pre-wet shed. Stormwater collected in the pit is used preferentially in the production process. Dam water is also used in the process or irrigated on the property.

The proposed alterations will not change this arrangement. When bale wetting moves indoors it will continue to circulate water through the existing water recycling pit. It is expected the peak runoff to the pit will be reduced for the following reasons:

- ❑ placing a roof over the courtyard of the raw materials storage will reduce the pit's catchment (roof water flows to the stormwater system, see below);
- ❑ the approved second outdoor bale wetting area on the eastern side of the plant will not be required; and

- ❑ the additional input from rainfall on biofilters will be reduced by absorption and delayed by the time taken for rainwater to pass through the media. Significant flows from the biofilters will be diverted directly to the dam.

Machinery will continue to be cleaned as at present in the catchment of the water recycling pit.

3.2.2 Stormwater

The stormwater system for the substrate plant and its approved expansion was designed by Barker Ryan Stewart (Perram & Partners 2010). In accordance with the approved design:

- ❑ roof water from various structures (current and future) is directed either to South Creek or farm dams. In the latter case it is stored for use on the rural property, or in substrate production, as required;
- ❑ surface water from non-operational areas of the site such as hardstand is collected in retention basins and also diverted to farm dams via reed beds;
- ❑ rainfall runoff from dirty operational areas flows to the water recycle pit from which it is extracted for use in the production process as described above.

The proposed building alterations will create some additional roofed area beyond that already approved, primarily from the proposed extension of the Phase 2/3 buildings. Roof water from these buildings will continue to flow to South Creek, as approved.

3.2.3 Wastewater

The process of neutralising ammonia will create ammonium sulphate, dissolved in the circulating water of the ammonia scrubbers. To control the concentration of ammonium sulphate, circulating water will periodically be drawn from the ammonia scrubbers and stored for further pH correction prior to adding to the process. In the future Elf Farm Supplies will investigate selling some of this material to the agricultural industry as a fertilizer.

Hence there will be no wastewater generated from the ammonia scrubbers. The only wastewater generated on the site will continue to be from staff amenities, which is discharged to sewer.

3.3 HAZARDOUS MATERIAL

Up to 20 kilolitres of sulphuric acid will be stored for use in the ammonia scrubbers. The acid will be in tanks in the plant rooms and arranged in accordance with relevant Australian Standards for storage of this material.

3.4 TRANSPORT

The proposed modification will not significantly affect the number of vehicles accessing the site. The construction phase for the pre-wet facility will extend because concrete tunnels are more complex structure than the currently approved pre-wet shed. Operational traffic will be largely unchanged.

3.5 NOISE

Noise emissions will be constrained to remain within existing project specific noise goals established in the noise assessment forming part of the original environmental assessment for the Part 3A project (Atkins Acoustics 2010 in Perram & Partners 2010). Detailed design of the alterations will be undertaken with input from an acoustic specialist to ensure that adequate attenuation is installed for the selected plant. This work will be undertaken as the plant's detailed designs are prepared and finalised.

Appendix B contains an acoustic review of the modified operations, prepared by the acoustic consultant.

3.6 ODOUR

The primary purpose of proposed alterations to the odour management system is to improve the odour performance of the entire operation. Works have been programmed to enable the improvements to the odour management system to be completed as an initial sub-stage. This will enable the system to be placed into service while other construction activities are completed.

An odour impact assessment report has been prepared and is included as *Appendix C*. The report concludes that the proposed modifications when complete will result in a highly significant reduction to existing odour emissions and impact profile. The air output from the biofilter will be of a treated quality. It will not have the character of the current untreated process air.

The odour management system has been designed with sufficient capacity to accept odour from the plant when operating at its full approved capacity and with the existing bioscrubber mothballed. The initial loading on the system will be significantly less than this designed maximum. Provision has been made to increase the available treatment facilities by including extra ammonia scrubbers and biofilter area and provide redundancy if required in the future.

3.7 FLOODING

The substrate plant development is being undertaken on land that is already cleared and has been filled to provide a working platform above the once in 100 year flood level. The small amount of additional filling to prepare the biofilter beds will cap filling already in place and will not affect flood performance as assessed in the project environmental assessment (Perram & Partners 2010).

3.8 FLORA AND FAUNA

The Mulgrave property has previously been surveyed as part of the environmental assessment for the Part 3A project (Perram & Partners 2010). The survey revealed that the land has been re-contoured and filled in the past with surface vegetation primarily exotic grasses and herbs for grazing with some weed species. There is no useful animal habitat in the substrate plant site and no threatened species were recorded.

3.9 HERITAGE

The environmental assessment for the Part 3A project (Perram & Partners 2010) included an archaeological and cultural heritage assessment revealing no known or discovered artefacts of indigenous heritage on the site. The report observed that the entire development site has been previously disturbed. There are no items of non-indigenous heritage listed for the site, although there are some heritage items on surrounding land.

REFERENCES

Atkins Acoustics (2010)

Operation and Construction Noise Impact Assessment, Mushroom Substrate Plant, Mulgrave

Perram & Partners (2010)

Mushroom Industry Expansion in Western Sydney, Environmental Assessment

Todoroski Air Sciences (2012)

Odour Management Plan, Elf Farm Supplies Substrate Facility

APPENDICES

Appendix A

DEPT OF PLANNING & ENVIRONMENT CORRESPONDENCE

Terry Perram

From: "Kerry Hamann" <Kerry.Hamann@planning.nsw.gov.au>
To: <tperram@bigpond.net.au>
Sent: Monday, 20 October 2014 2:49 PM
Attach: EPA SEARs for ~ installation of biofilter.pdf
Subject: Assessment requirements - ELf Mushroom Farm and Substrate Plant 08_0225 MOD 1

Dear Mr Perram

I refer to your letter dated 23 September 2014, and request to modify the project approval for the Elf Mushroom Farm and Substrate Plant (08_0225) on behalf of Elf Farm Supplies.

The proposed modification will be assessed under Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act). As discussed, the environmental assessment (EA) supporting the application will be **publically exhibited for a period of two weeks**. An invoice for the payment of application fees will be issued to the Proponent soon. Please note that the Department is unable to issue invoices to consultants acting for companies. As such, could you please provide me with the following details for Elf Farm Supplies:

- Company name
- Contact name
- Contact address and phone number
- Company ABN

The Department has consulted with both the Environment Protection Authority (EPA) and Penrith City Council regarding their specific assessment requirements to be included in the EA. The EPA has provide assessment requirements (see attached) that are based on the information you have provided to date. Council declined to provide specific assessment requirements.

In addition to the EPA's requirements, the Department requests that the EA includes:

- detailed description of the existing or ongoing operations and photographs of the existing operations;
- site plans including the modifications to the existing or approved building works;
- the need for the modification application having particular regard to current odour issues;
- alternatives considered;
- likely changes to any approved staging of the development - including construction and operational stage/s;
- likely interactions between the modified Project and existing, approved and proposed operations in the vicinity of the site;
- clear identification of any changes to the approved project in terms of environmental impact i.e. noise , wastewater, stormwater.
- proposed amendments to existing conditions of approval and environmental management and monitoring measures.

It is likely that the EPA will want the opportunity to review the draft EA documentation prior to public exhibition.

Note that **Emma Barnet** will be undertaking the assessment of the proposal for the Department. Please contact Emma at least two weeks before the submission of the EA. This will enable Emma to arrange the exhibition of the proposal (for a period of two weeks) and determine the:

- consultation requirements; and
- number of copies (hard-copy or CD-ROM) of the EA that will be required for exhibition purposes.

The Department is required to make all the relevant information associated with the modification application publicly available on its website. Consequently, please ensure that all the documents you subsequently submit to the Department are in a suitable format for the web.

Please contact myself or Emma Barnet on 9228 6412 (Monday to Wednesday) if you have any questions.

Kind regards,

Kerry Hamann
Development Assessment Systems and Approvals
Department of Planning & Environment | GPO Box 39 | SYDNEY NSW 2001
T 02 9228 6516

Available: Monday, Tuesday & Wednesday.

For urgent enquiries on Thursday or Friday please contact Chris Ritchie on 9228 6413.



This message is intended for the addressee named and may contain confidential/privileged information. If you are not the intended recipient, please delete it and notify the sender. Views expressed in this message are those of the individual sender, and are not necessarily the views of the Department.

You should scan any attached files for viruses.



Our reference: DOC14/223897-02

Chris Ritchie
NSW Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2001
Attention: Kerry Hamann

STANDARD POST
17 October 2014

Dear Mr Ritchie,

RE: 08_0255 MOD 1 - ELF Farm Supplies - Proposed Modifications to Mulgrave Substrate Plant

I refer to your request for the Environment Protection Authority's (EPA) requirements for the environmental assessment (EA) in regard to the above proposal received by EPA on 3 October 2014.

The EPA has considered the details of the proponent's proposal as provided by the Department of Planning & Environment and has identified the information it requires to assess the project (see **Attachment A**). The proponent should ensure that the EA is sufficiently comprehensive to enable the EPA to determine the extent of the impact(s) of the proposal.

The key issues requiring assessment for this project are summarised below:

1. Air quality (including dust, odour, other air emissions assessment modelling and management);
2. Noise impact (including noise assessment modelling and mitigation);
3. Waste acceptance, storage, processing, reuse, management and disposal;
4. Description of outputs from process, ie (type, volume etc); and
5. Surface water and waste water management, (including surface water controls and impacts on waterways and water supply).

EPA has required the applicant undertake works to address odour emissions from the facility and understands this modification application has been lodged for this purpose. The proponent should ensure that odour and noise emissions from the total site operations are considered in this assessment and that the totality of these emissions is mitigated by the proposed works.

In carrying out the assessment, the proponent should refer to the relevant guidelines and any relevant industry codes of practice and best practice management guidelines.

Please note that this response does not cover biodiversity or Aboriginal cultural heritage issues, which are the responsibility of the Office of Environment and Heritage.

The proponent should be made aware that any commitments made in the EA may be formalised as approval conditions and may also be placed as formal licence conditions.

If you have any queries regarding this matter please contact Mr Damien Rose on (02) 9995 5586.

Yours sincerely

A handwritten signature in black ink, appearing to be 'T. Wilson', written in a cursive style.

Trevor Wilson
Unit Head Waste Compliance
Environment Protection Authority

Att A. EPA SEAR REQUIREMENTS - 08_0255 MOD 1

ATTACHMENT A
SEAR REQUIREMENTS - 08_0255 MOD 1
Elf Farm Supplies - Proposed Modifications to Mulgrave Substrate Plant

How to use these requirements

The EPA requirements have been structured in accordance with the DIPNR EIS Guidelines, as follows. It is suggested that the EA follow the same structure:

- A. Executive summary
- B. The proposal
- C. The location
- D. Identification and prioritisation of issues
- E. The environmental issues
- F. List of approvals and licences
- G. Compilation of mitigation measures
- H. Justification for the proposal

A. Executive summary

The executive summary should include a brief discussion of the extent to which the proposal achieves identified environmental outcomes.

B. The proposal

1. Objectives of the proposal

The objectives of the proposal should be clearly stated and refer to:

- a) the size and type of the operation, the nature of the processes and the products, by-products and wastes produced
- b) a life cycle approach to the production, use or disposal of products
- c) the anticipated level of performance in meeting required environmental standards and cleaner production principles
- d) the staging and timing of the proposal and any plans for future expansion
- e) the proposal's relationship to any other industry or facility.

2. Description of the proposal

General:

Outline the production process including:

- a) the environmental "mass balance" for the process – quantify in-flow and out-flow of materials, any points of discharge to the environment and their respective destinations (sewer, stormwater, atmosphere, recycling, landfill etc)
- b) any life-cycle strategies for the products.

Outline cleaner production actions, including:

- a) measures to minimise waste (typically through addressing source reduction)
- b) proposals for use or recycling of by-products
- c) proposed disposal methods for solid and liquid waste
- d) air management systems including all potential sources of air emissions, proposals to re-use or treat emissions, emission levels relative to relevant standards in regulations, discharge points
- e) water management system including all potential sources of water pollution, proposals for re-use, treatment etc, emission levels of any wastewater discharged, discharge points, summary of options explored to avoid a discharge, reduce its frequency or reduce its impacts, and rationale for selection of option to discharge.

f) soil contamination treatment and prevention systems.

Outline construction works including:

- a) actions to address any existing soil contamination
- b) any earthworks or site clearing; re-use and disposal of cleared material (including use of spoil on-site)
- c) construction timetable and staging; hours of construction; proposed construction methods
- d) environment protection measures, including noise mitigation measures, dust control measure and erosion and sediment control measures.

Air:

Identify all sources of air emissions from the development.

Note: emissions can be classed as either:

- point (eg emissions from stack or vent) or
- fugitive (from wind erosion, leakages or spillages, associated with loading or unloading, conveyors, storage facilities, plant and yard operation, vehicle movements (dust from road, exhausts, loss from load), land clearing and construction works).

Provide details of the project that are essential for predicting and assessing air impacts including:

- a) the quantities and physio-chemical parameters (eg concentration, moisture content, bulk density, particle sizes etc) of materials to be used, transported, produced or stored
- b) an outline of procedures for handling, transport, production and storage
- c) the management of solid, liquid and gaseous waste streams with potential for significant air impacts.

Noise and vibration:

Identify all noise sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials. Specify the times of operation for all phases of the development and for all noise producing activities.

For projects with a significant potential traffic noise impact provide details of road alignment (include gradients, road surface, topography, bridges, culverts etc), and land use along the proposed road and measurement locations – diagrams should be to a scale sufficient to delineate individual residential blocks.

Water:

Provide details of the project that are essential for predicting and assessing impacts to waters:

- a) including the quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient waters (as defined on www.environment.nsw.gov.au/ieo, using technical criteria derived from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC 2000)
- b) the management of discharges with potential for water impacts
- c) drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal.

Outline site layout, demonstrating efforts to avoid proximity to water resources (especially for activities with significant potential impacts eg effluent ponds) and showing potential areas of modification of contours, drainage etc.

Outline how total water cycle considerations are to be addressed showing total water balances for the development (with the objective of minimising demands and impacts on water resources). Include water

requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

Waste and chemicals:

Provide details of the quantity and type of both liquid waste and non-liquid waste generated, handled, processed or disposed of at the premises. Waste must be classified according to the Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes (NSW EPA, 1999).

Provide details of liquid waste and non-liquid waste management at the facility, including:

- a) the transportation, assessment and handling of waste arriving at or generated at the site
- b) any stockpiling of wastes or recovered materials at the site
- c) any waste processing related to the facility, including reuse, recycling, reprocessing (including composting) or treatment both on- and off-site
- d) the method for disposing of all wastes or recovered materials at the facility
- e) the emissions arising from the handling, storage, processing and reprocessing of waste at the facility
- f) the proposed controls for managing the environmental impacts of these activities.

Provide details of spoil disposal with particular attention to:

- a) the quantity of spoil material likely to be generated
- b) proposed strategies for the handling, stockpiling, reuse/recycling and disposal of spoil
- c) the need to maximise reuse of spoil material in the construction industry
- d) identification of the history of spoil material and whether there is any likelihood of contaminated material, and if so, measures for the management of any contaminated material
- e) designation of transportation routes for transport of spoil.

Provide details of procedures for the assessment, handling, storage, transport and disposal of all hazardous and dangerous materials used, stored, processed or disposed of at the site, in addition to the requirements for liquid and non-liquid wastes.

Provide details of the type and quantity of any chemical substances to be used or stored and describe arrangements for their safe use and storage.

Reference should be made to the guidelines: Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes (NSW EPA, 1999).

ESD:

Demonstrate that the planning process and any subsequent development incorporates objectives and mechanisms for achieving ESD, including:

- a) an assessment of a range of options available for use of the resource, including the benefits of each option to future generations
- b) proper valuation and pricing of environmental resources
- c) identification of who will bear the environmental costs of the proposal.

3. Rehabilitation

Outline considerations of site maintenance, and proposed plans for the final condition of the site (ensuring its suitability for future uses).

4. Consideration of alternatives and justification for the proposal

Consider the environmental consequences of adopting alternatives, including alternative:

- a) sites and site layouts
- b) access modes and routes
- c) materials handling and production processes
- d) waste and water management
- e) impact mitigation measures
- f) energy sources

Selection of the preferred option should be justified in terms of:

- a) ability to satisfy the objectives of the proposal
- b) relative environmental and other costs of each alternative
- c) acceptability of environmental impacts and contribution to identified environmental objectives
- d) acceptability of any environmental risks or uncertainties
- e) reliability of proposed environmental impact mitigation measures
- f) efficient use (including maximising re-use) of land, raw materials, energy and other resources.

C The location

1. General

Provide an overview of the affected environment to place the proposal in its local and regional environmental context including:

- a) meteorological data (eg rainfall, temperature and evaporation, wind speed and direction)
- b) topography (landform element, slope type, gradient and length)
- c) surrounding land uses (potential synergies and conflicts)
- d) geomorphology (rates of landform change and current erosion and deposition processes)
- e) soil types and properties (including erodibility; engineering and structural properties; dispersibility; permeability; presence of acid sulfate soils and potential acid sulfate soils)
- f) ecological information (water system habitat, vegetation, fauna)
- g) availability of services and the accessibility of the site for passenger and freight transport.

2. Air

Describe the topography and surrounding land uses. Provide details of the exact locations of dwellings, schools and hospitals. Where appropriate provide a perspective view of the study area such as the terrain file used in dispersion models.

Describe surrounding buildings that may effect plume dispersion.

Provide and analyse site representative data on following meteorological parameters:

- a) temperature and humidity
- b) rainfall, evaporation and cloud cover
- c) wind speed and direction
- d) atmospheric stability class
- e) mixing height (the height that emissions will be ultimately mixed in the atmosphere)
- f) katabatic air drainage
- g) air re-circulation.

3. Noise and vibration

Identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties, schools, churches, and hospitals. Typically the location of any noise sensitive locations in relation to the site should be included on a map of the locality.

Identify the land use zoning of the site and the immediate vicinity and the potentially affected areas.

4. Water

Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity/significance from a public health, ecological and/or economic perspective. The Water Quality and River Flow Objectives on the website: www.environment.nsw.gov.au/ieo should be used to identify the agreed environmental values and human uses for any affected waterways. This will help with the description of the local and regional area.

5. Soil Contamination Issues

Provide details of site history – if earthworks are proposed, this needs to be considered with regard to possible soil contamination, for example if the site was previously a landfill site or if irrigation of effluent has occurred.

D Identification and prioritisation of issues / scoping of impact assessment

Provide an overview of the methodology used to identify and prioritise issues. The methodology should take into account:

- a) relevant NSW government guidelines
- b) industry guidelines
- c) EISs for similar projects
- d) relevant research and reference material
- e) relevant preliminary studies or reports for the proposal
- f) consultation with stakeholders.

Provide a summary of the outcomes of the process including:

- a) all issues identified including local, regional and global impacts (eg increased/ decreased greenhouse emissions)
- b) key issues which will require a full analysis (including comprehensive baseline assessment)
- c) issues not needing full analysis though they may be addressed in the mitigation strategy
- d) justification for the level of analysis proposed (the capacity of the proposal to give rise to high concentrations of pollution compared with the ambient environment or environmental outcomes is an important factor in setting the level of assessment).

E The environmental issues

1. General

The potential impacts identified in the scoping study need to be assessed to determine their significance, particularly in terms of achieving environmental outcomes, and minimising environmental pollution.

Identify gaps in information and data relevant to significant impacts of the proposal and any actions proposed to fill those information gaps so as to enable development of appropriate management and mitigation measures. This is in accordance with ESD requirements.

Note: The level of detail should match the level of importance of the issue in decision making which is dependent on the environmental risk.

Describe baseline conditions

Provide a description of existing environmental conditions for any potential impacts.

Assess impacts

For any potential impacts relevant for the assessment of the proposal provide a detailed analysis of the impacts of the proposal on the environment including the cumulative impact of the proposal on the receiving environment especially where there are sensitive receivers.

Describe the methodology used and assumptions made in undertaking this analysis (including any modelling or monitoring undertaken) and indicate the level of confidence in the predicted outcomes and the resilience of the environment to cope with the predicted impacts. The analysis should also make linkages between different areas of assessment where necessary to enable a full assessment of environmental impacts eg assessment of impacts on air quality will often need to draw on the analysis of traffic, health, social, soil and/or ecological systems impacts; etc.

The assessment needs to consider impacts at all phases of the project cycle including: exploration (if relevant or significant), construction, routine operation, start-up operations, upset operations and decommissioning if relevant. The level of assessment should be commensurate with the risk to the environment.

Describe management and mitigation measures

Describe any mitigation measures and management options proposed to prevent, control, abate or mitigate identified environmental impacts associated with the proposal and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

Proponents are expected to implement a 'reasonable level of performance' to minimise environmental impacts. The proponent must indicate how the proposal meets reasonable levels of performance. For example, reference technology based criteria if available, or identify good practice for this type of activity or development. A 'reasonable level of performance' involves adopting and implementing technology and management practices to achieve certain pollutant emissions levels in economically viable operations. Technology-based criteria evolve gradually over time as technologies and practices change.

Use environmental impacts as key criteria in selecting between alternative sites, designs and technologies, and to avoid options having the highest environmental impacts.

Outline any proposed approach (such as an Environmental Management Plan) that will demonstrate how commitments made in the EIS will be implemented. Areas that should be described include:

- a) operational procedures to manage environmental impacts
- b) monitoring procedures
- c) training programs
- d) community consultation
- e) complaint mechanisms including site contacts
- f) strategies to use monitoring information to improve performance
- g) strategies to achieve acceptable environmental impacts and to respond in event of exceedences.

2. Air

Describe baseline conditions

Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data. This description should include an assessment of dust particulate matter.

Assess impacts

Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.

Estimate the resulting ground level concentrations of all pollutants. Where necessary (eg potentially significant impacts and complex terrain effects), use an appropriate dispersion model to estimate ambient pollutant concentrations. Discuss choice of model and parameters with the EPA.

Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.

Describe the contribution that the development will make to regional and global pollution, particularly in sensitive locations.

For potentially odorous emissions provide the emission rates in terms of odour units (determined by techniques compatible with EPA procedures). Use sampling and analysis techniques for individual or complex odours and for point or diffuse sources, as appropriate.

Note: With dust and odour, it may be possible to use data from existing similar activities to generate emission rates.

Reference should be made to:

- Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW (EPA, 2001);
- Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (EPA, 2001); Assessment and Management of Odour from Stationary Sources in NSW (EPA, 2001);
- Technical Notes: Draft Policy: Assessment and Management of Odour from Stationary Sources in NSW (EPA, 2001);
- Load Calculation Protocol for use by holders of NSW Environment Protection
- Licences when calculating Assessable Pollutant Loads (EPA, 1999).

Describe management and mitigation measures

Outline specifications of pollution control equipment (including manufacturer's performance guarantees where available) and management protocols for both point and fugitive emissions. Where possible, this should include cleaner production processes.

3. Noise and vibration

Describe baseline conditions

Determine the existing background (LA90) and ambient (LAeq) noise levels in accordance with the NSW Industrial Noise Policy.

Determine the existing road traffic noise levels in accordance with the NSW Environmental Criteria for Road Traffic Noise, where road traffic noise impacts may occur.

The noise impact assessment report should provide details of all monitoring of existing ambient noise levels including:

- a) details of equipment used for the measurements
- b) a brief description of where the equipment was positioned
- c) a statement justifying the choice of monitoring site, including the procedure used to choose the site, having regards to the definition of 'noise sensitive locations(s)' and 'most affected locations(s)' described in Section 3.1.2 of the NSW Industrial Noise Policy
- d) details of the exact location of the monitoring site and a description of land uses in surrounding areas
- e) a description of the dominant and background noise sources at the site
- f) day, evening and night assessment background levels for each day of the monitoring period
- g) the final Rating Background Level (RBL) value
- h) graphs of the measured noise levels for each day should be provided
- i) a record of periods of affected data (due to adverse weather and extraneous noise), methods used to exclude invalid data and a statement indicating the need for any re-monitoring under Step 1 in Section B1.3 of the NSW Industrial Noise Policy
- j) determination of LAeq noise levels from existing industry.

Assess impacts

Determine the project specific noise levels for the site. For each identified potentially affected receiver, this should include:

- a) determination of the intrusive criterion for each identified potentially affected receiver
- b) selection and justification of the appropriate amenity category for each identified potentially affected receiver
- c) determination of the amenity criterion for each receiver
- d) determination of the appropriate sleep disturbance limit.

Maximum noise levels during night-time period (10pm-7am) should be assessed to analyse possible affects on sleep. Where LA1(1min) noise levels from the site are less than 15 dB above the background LA90 noise level, sleep disturbance impacts are unlikely. Where this is not the case, further analysis is required. Additional guidance is provided in Appendix B of the NSW Environmental Criteria for Road Traffic Noise.

Determine expected noise level and noise character (eg tonality, impulsiveness, vibration, etc) likely to be generated from noise sources during:

- a) site establishment
- b) construction
- c) operational phases
- d) transport including traffic noise generated by the proposal
- e) other services.

Note: The noise impact assessment report should include noise source data for each source in 1/1 or 1/3 octave band frequencies including methods for references used to determine noise source levels. Noise source levels and characteristics can be sourced from direct measurement of similar activities or from literature (if full references are provided).

Determine the noise levels likely to be received at the most sensitive locations (these may vary for different activities at each phase of the development). Potential impacts should be determined for any identified significant adverse meteorological conditions. Predicted noise levels under calm conditions may also aid in quantifying the extent of impact where this is not the most adverse condition.

The noise impact assessment report should include:

- a) a plan showing the assumed location of each noise source for each prediction scenario
- b) a list of the number and type of noise sources used in each prediction scenario to simulate all potential significant operating conditions on the site
- c) any assumptions made in the predictions in terms of source heights, directivity effects, shielding from topography, buildings or barriers, etc
- d) methods used to predict noise impacts including identification of any noise models used. Where modelling approaches other than the use of the ENM or SoundPlan computer models are adopted, the approach should be appropriately justified and validated
- e) an assessment of appropriate weather conditions for the noise predictions including reference to any weather data used to justify the assumed conditions
- f) the predicted noise impacts from each noise source as well as the combined noise level for each prediction scenario under any identified significant adverse weather conditions as well as calm conditions where appropriate
- g) for developments where a significant level of noise impact is likely to occur, noise contours for the key prediction scenarios should be derived
- h) an assessment of the need to include modification factors as detailed in Section 4 of the NSW Industrial Noise Policy.

Discuss the findings from the predictive modelling and, where relevant noise criteria have not been met, recommend additional mitigation measures.

The noise impact assessment report should include details of any mitigation proposed including the attenuation that will be achieved and the revised noise impact predictions following mitigation.

Where relevant noise/vibration criteria cannot be met after application of all feasible and cost effective mitigation measures the residual level of noise impact needs to be quantified by identifying:

- a) locations where the noise level exceeds the criteria and extent of exceedence
- b) numbers of people (or areas) affected
- c) times when criteria will be exceeded
- d) likely impact on activities (speech, sleep, relaxation, listening, etc)
- e) change on ambient conditions
- f) the result of any community consultation or negotiated agreement.

For the assessment of existing and future traffic noise, details of data for the road should be included such as assumed traffic volume; percentage heavy vehicles by time of day; and details of the calculation process. These details should be consistent with any traffic study carried out in the EIS.

Where blasting is intended an assessment in accordance with the Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (ANZECC, 1990) should be undertaken. The following details of the blast design should be included in the noise assessment:

- a) bench height, burden spacing, spacing burden ratio
- b) blast hole diameter, inclination and spacing
- c) type of explosive, maximum instantaneous charge, initiation, blast block size, blast frequency.

Describe management and mitigation measures

Determine the most appropriate noise mitigation measures and expected noise reduction including both noise controls and management of impacts for both construction and operational noise. This will include selecting quiet equipment and construction methods, noise barriers or acoustic screens, location of stockpiles, temporary offices, compounds and vehicle routes, scheduling of activities, etc.

For traffic noise impacts, provide a description of the ameliorative measures considered (if required), reasons for inclusion or exclusion, and procedures for calculation of noise levels including ameliorative measures. Also include, where necessary, a discussion of any potential problems associated with the proposed ameliorative measures, such as overshadowing effects from barriers. Appropriate ameliorative measures may include:

- a) use of alternative transportation modes, alternative routes, or other methods of avoiding the new road usage
- b) control of traffic (eg: limiting times of access or speed limitations)
- c) resurfacing of the road using a quiet surface
- d) use of (additional) noise barriers or bunds
- e) treatment of the façade to reduce internal noise levels buildings where the night-time criteria is a major concern
- f) more stringent limits for noise emission from vehicles (i.e. using specially designed 'quite' trucks and/or trucks to use air bag suspension)
- g) driver education
- h) appropriate truck routes
- i) limit usage of exhaust breaks
- j) use of premium mufflers on trucks
- k) reducing speed limits for trucks
- l) ongoing community liaison and monitoring of complaints
- m) phasing in the increased road use.

4. Water

Describe baseline conditions

Describe existing surface and groundwater quality – an assessment needs to be undertaken for any water resource likely to be affected by the proposal and for all conditions (e.g. a wet weather sampling program is needed if runoff events may cause impacts).

Note: Methods of sampling and analysis need to conform with an accepted standard (e.g. Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DECCW 2004) or be approved and analyses undertaken by accredited laboratories).

Provide site drainage details and surface runoff yield.

State the ambient Water Quality and River Flow Objectives for the receiving waters. These refer to the community's agreed environmental values and human uses endorsed by the Government as goals for the ambient waters. These environmental values are published on the website:

www.environment.nsw.gov.au/ieo. The EIS should state the environmental values listed for the catchment and waterway type relevant to your proposal. NB: A consolidated and approved list of environmental values are not available for groundwater resources. Where groundwater may be affected the EIS should identify appropriate groundwater environmental values and justify the choice.

State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC 2000 Guidelines for Fresh and Marine Water Quality (<http://www.environment.gov.au/resource/australian-and-new-zealand-guidelines-fresh-and-marine-water-quality-volume-1-guidelines>) (Note that, as at 2004, the NSW Water Quality Objectives booklets and website contain technical criteria derived from the 1992 version of the ANZECC Guidelines. The Water Quality Objectives remain as Government Policy, reflecting the community's environmental values and long-term goals, but the technical criteria are replaced by the more recent ANZECC 2000 Guidelines).

NB: While specific guidelines for groundwater are not available, the ANZECC 2000 Guidelines endorse the application of the trigger values and decision trees as a tool to assess risk to environmental values in groundwater.

State any locally specific objectives, criteria or targets, which have been endorsed by the government e.g. the Healthy Rivers Commission Inquiries or the NSW Salinity Strategy (DLWC, 2000)

(<http://www.environment.nsw.gov.au/salinity/government/nswstrategy.htm>).

Where site specific studies are proposed to revise the trigger values supporting the ambient Water Quality and River Flow Objectives, and the results are to be used for regulatory purposes (e.g. to assess whether a licensed discharge impacts on water quality objectives), then prior agreement from the EPA on the approach and study design must be obtained.

Describe the state of the receiving waters and relate this to the relevant Water Quality and River Flow Objectives (i.e. are Water Quality and River Flow Objectives being achieved?). Proponents are generally only expected to source available data and information. However, proponents of large or high risk developments may be required to collect some ambient water quality / river flow / groundwater data to enable a suitable level of impact assessment. Issues to include in the description of the receiving waters could include:

- a) lake or estuary flushing characteristics
- b) specific human uses (e.g. exact location of drinking water offtake)
- c) sensitive ecosystems or species conservation values
- d) a description of the condition of the local catchment e.g. erosion levels, soils, vegetation cover etc
- e) an outline of baseline groundwater information, including, but not restricted to, depth to watertable, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment
- f) historic river flow data where available for the catchment.

Assess impacts

No proposal should breach clause 120 of the Protection of the Environment Operations Act 1997 (i.e. pollution of waters is prohibited unless undertaken in accordance with relevant regulations).

Identify and estimate the quantity of all pollutants that may be introduced into the water cycle by source and discharge point including residual discharges after mitigation measures are implemented.

Include a rationale, along with relevant calculations, supporting the prediction of the discharges.

Describe the effects and significance of any pollutant loads on the receiving environment. This should include impacts of residual discharges through modelling, monitoring or both, depending on the scale of the proposal. Determine changes to hydrology (including drainage patterns, surface runoff yield, flow regimes, wetland hydrologic regimes and groundwater).

Describe water quality impacts resulting from changes to hydrologic flow regimes (such as nutrient enrichment or turbidity resulting from changes in frequency and magnitude of stream flow).

Identify any potential impacts on quality or quantity of groundwater describing their source.

Identify potential impacts associated with geomorphological activities with potential to increase surface water and sediment runoff or to reduce surface runoff and sediment transport. Also consider possible impacts such as bed lowering, bank lowering, instream siltation, floodplain erosion and floodplain siltation.

Identify impacts associated with the disturbance of acid sulfate soils and potential acid sulfate soils.

Containment of spills and leaks shall be in accordance with the technical guidelines section 'Bunding and Spill Management' of the Authorised Officers Manual (EPA, 1995)

(<http://www.epa.nsw.gov.au/mao/bundingspill.htm>) and the most recent versions of the Australian Standards referred to in the Guidelines. Containment should be designed for no-discharge.

The significance of the impacts listed above should be predicted. When doing this it is important to predict the ambient water quality and river flow outcomes associated with the proposal and to demonstrate whether these are acceptable in terms of achieving protection of the Water Quality and River Flow Objectives. In particular the following questions should be answered:

- a) will the proposal protect Water Quality and River Flow Objectives where they are currently achieved in the ambient waters; and
- b) will the proposal contribute towards the achievement of Water Quality and River Flow Objectives over time, where they are not currently achieved in the ambient waters.

Consult with the EPA as soon as possible if a mixing zone is proposed (a mixing zone could exist where effluent is discharged into a receiving water body, where the quality of the water being discharged does not immediately meet water quality objectives. The mixing zone could result in dilution, assimilation and decay of the effluent to allow water quality objectives to be met further downstream, at the edge of the mixing zone). The EPA will advise the proponent under what conditions a mixing zone will and will not be acceptable, as well as the information and modelling requirements for assessment.

Note: The assessment of water quality impacts needs to be undertaken in a total catchment management context to provide a wide perspective on development impacts, in particular cumulative impacts.

Where a licensed discharge is proposed, provide the rationale as to why it cannot be avoided through application of a reasonable level of performance, using available technology, management practice and industry guidelines.

Where a licensed discharge is proposed, provide the rationale as to why it represents the best environmental outcome and what measures can be taken to reduce its environmental impact.

Reference should be made to Managing Urban Stormwater: Soils and Construction (Landcom, 2004), Guidelines for Fresh and Marine Water Quality ANZECC 2000), Environmental Guidelines: Use of effluent by Irrigation (DECCW, 2004)

Describe management and mitigation measures

Outline stormwater management to control pollutants at the source and contain them within the site. Also describe measures for maintaining and monitoring any stormwater controls.

Outline erosion and sediment control measures directed at minimising disturbance of land, minimising water flow through the site and filtering, trapping or detaining sediment. Also include measures to maintain and monitor controls as well as rehabilitation strategies.

Describe waste water treatment measures that are appropriate to the type and volume of waste water and are based on a hierarchy of avoiding generation of waste water; capturing all contaminated water (including stormwater) on the site; reusing/recycling waste water; and treating any unavoidable discharge from the site to meet specified water quality requirements.

Outline pollution control measures relating to storage of materials, possibility of accidental spills (eg preparation of contingency plans), appropriate disposal methods, and generation of leachate.

Describe hydrological impact mitigation measures including:

- a) site selection (avoiding sites prone to flooding and waterlogging, actively eroding or affected by deposition)
- b) minimising runoff
- c) minimising reductions or modifications to flow regimes
- d) avoiding modifications to groundwater.

Describe groundwater impact mitigation measures including:

- a) site selection
- b) retention of native vegetation and revegetation
- c) artificial recharge
- d) providing surface storages with impervious linings
- e) monitoring program.

Describe geomorphological impact mitigation measures including:

- a) site selection
- b) erosion and sediment controls
- c) minimising instream works
- d) treating existing accelerated erosion and deposition
- e) monitoring program.

Any proposed monitoring should be undertaken in accordance with the Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DECCW 2004).

5. Soils and contamination

Describe baseline conditions

Provide any details (in addition to those provided in the location description - Section C) that are needed to describe the existing situation in terms of soil types and properties and soil contamination.

Assess impacts

Identify any likely impacts resulting from the construction or operation of the proposal, including the likelihood of:

- a) disturbing any existing contaminated soil
- b) contamination of soil by operation of the activity
- c) subsidence or instability
- d) soil erosion
- e) disturbing acid sulfate or potential acid sulfate soils.

Reference should be made to Reference should be made to Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites (OEH, 2011); Contaminated Sites – Guidelines on Significant Risk of Harm and Duty to Report (EPA, 2003).

Describe management and mitigation measures

Describe and assess the effectiveness or adequacy of any soil management and mitigation measures during construction and operation of the proposal including:

- a) erosion and sediment control measures
- b) proposals for site remediation – see Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)
- c) proposals for the management of these soils – see Assessing and Managing Acid Sulfate Soils, Environment Protection Authority, 1995 (note that this is the only methodology accepted by the EPA).

6. Waste and chemicals

Describe baseline conditions

Describe any existing waste or chemicals operations related to the proposal.

Waste Classification

Describe, clarify and classify waste types to be accepted as part of the proposal in accordance with the Waste Classification Guidelines (2009).

Assess impacts

Assess the adequacy of proposed measures to minimise natural resource consumption and minimise impacts from the handling, transporting, storage, processing and reprocessing of waste and/or chemicals.

Reference should be made to the EPA's environmental guidelines and policies for waste (<http://www.epa.nsw.gov.au/waste/envguidlns/>)

Describe management and mitigation measures

Outline measures to minimise the consumption of natural resources.

Outline measures to avoid the generation of waste and promote the re-use and recycling and reprocessing of any waste.

Outline measures to support any approved regional or industry waste plans.

7. Cumulative impacts

Identify the extent that the receiving environment is already stressed by existing development and background levels of emissions to which this proposal will contribute.

Assess the impact of the proposal against the long term air, noise and water quality objectives for the area or region.

Identify infrastructure requirements flowing from the proposal (eg water and sewerage services, transport infrastructure upgrades).

Assess likely impacts from such additional infrastructure and measures reasonably available to the proponent to contain such requirements or mitigate their impacts (eg travel demand management strategies).

F. List of approvals and licences

Identify all approvals and licences required under environment protection legislation including details of all scheduled activities, types of ancillary activities and types of discharges (to air, land, water).

G. Compilation of mitigation measures

Outline how the proposal and its environmental protection measures would be implemented and managed in an integrated manner so as to demonstrate that the proposal is capable of complying with statutory obligations under EPA licences or approvals (eg outline of an environmental management plan).

The mitigation strategy should include the environmental management and cleaner production principles which would be followed when planning, designing, establishing and operating the proposal. It should include two sections, one setting out the program for managing the proposal and the other outlining the monitoring program with a feedback loop to the management program.

H. Justification for the Proposal

Reasons should be included which justify undertaking the proposal in the manner proposed, having regard to the potential environmental impacts.