

Appendix K

Hazard and risk assessment

Googong Township water cycle project

Environmental Assessment

November 2010

GOOGONG WATER CYCLE PROJECT

RISK ASSESSMENT

SEPP 33 ASSESSMENT REPORT

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ABBREVIATIONS

ADG	Australian Dangerous Goods (Code)
CIC	Canberra Investment Corporation Limited
DG	Dangerous Goods
DoP	Department of Planning
EA	Environmental Assessment
EARs	Environmental Assessment Requirements
EP&A	Environmental Planning and Assessment
EPL	Environmental Protection Licence
MSDS	Material and Safety Data Sheet
PG	Packing Group
PHA	Preliminary Hazard Analysis
SEPP	State Environmental Planning Policy
WRP	Water Recycling Plant

1. EXECUTIVE SUMMARY

1.1. Overview

Canberra Investment Corporation Limited (CIC) is proposing a new residential community at Googong, south of Queanbeyan in NSW and west of the Googong Reservoir. The Googong Water Cycle Project comprises the water cycle management strategy for the Googong development.

1.2. Proposed Development

The Googong development will provide residential dwellings with retail, commercial and public facilities. The overall Googong development will comprise a total area of about 780 hectares. The development will be staged with an ultimate population of about 15,000 residents. The development will be provided with water cycle infrastructure, including water and wastewater services.

The following facilities are new facilities which have on-site chemical storage for recycled water treatment. They were assessed to determine whether the SEPP 33 thresholds were exceeded (hence requiring a PHA):

- The Googong Water Recycling Plant
- Chlorination facility at a potable storage reservoir.

1.3. Methodology

The screening process published in the NSW Department of Planning guideline *Applying SEPP 33 – Hazardous & Offensive Development Application Guideline (1997 2nd edition)* was used to establish whether the proposal is “potentially hazardous” or “potentially offensive”.

1.4. Conclusion

The screening risk assessment demonstrated that the quantities of hazardous materials proposed to be stored and handled for the Googong WRP and the potable storage reservoir are below the screening thresholds given in SEPP 33. Consequently, the project will not result in significant off-site risks and is not classified as “potentially hazardous”. Therefore a preliminary hazard analysis (PHA) is not required for the proposed project.

In the absence of controls, the development has the potential to cause pollutants to be discharged to water, air and soil. e.g. from spills of chemicals. An environmental protection licence is anticipated to be required. Therefore the development is considered “potentially offensive industry” and the assessment of potential impacts (e.g. noise, odour) and the required controls is considered in the EA.

From the screening of the transportation expected from the proposal, the PHA does not require a transport study.

1.5. Recommendations

The following recommendations are made as a result of the study:

1. If the chemicals or quantities to be stored change significantly during the design process, the review should be updated to determine if the quantities exceed the SEPP 33 threshold quantities and whether a PHA is required.
2. MSDSs for final chemicals selected should be reviewed to determine storage and handling requirements.

2. INTRODUCTION

2.1. Background

Canberra Investment Corporation Limited (CIC) is proposing a new residential community at Googong, south of Queanbeyan in NSW and west of the Googong Reservoir. The Googong Water Cycle Project comprises the water cycle management strategy for the Googong development. The development (including subdivision) of the land at Googong is the subject of a separate planning and approvals process.

The development of water cycle management infrastructure is subject to two levels of planning approval:

- Water cycle management (water, wastewater and stormwater headworks) for the entire development, application for assessment of a concept plan for the project under Part 3A of the EP&A Act.
- Water cycle management required for stage 1 of the development (NH1A), application for assessment of part of the project, under Part 3A of the EP&A Act.

Manidis Roberts has been commissioned by CIC to manage the Environmental Assessment process for the Googong Water Cycle Project concept plan and the NH1A water cycle infrastructure. Manidis Roberts commissioned Sherpa Consulting Pty Ltd (Sherpa) to undertake a SEPP 33 assessment for input to the Environmental Assessment (EA).

2.2. Study Overview

The hazard and risk assessment was carried out in accordance with the NSW Department of Planning guideline '*State Environmental Planning Policy 33 – Hazardous and Offensive Development*' (SEPP 33).

State Environmental Planning Policy 33 – Hazardous and Offensive Development (SEPP 33) applies to the proposed development. It is possible that the proposed development would constitute a potentially hazardous development under the SEPP, requiring that a Preliminary Hazard Analysis (PHA) is to be included in the EA.

This report details the results of the screening and review of the proposed development against SEPP 33 to determine whether a PHA is required for inclusion in the EA.

2.3. Objectives

The main objective of the study is to establish whether a PHA is required for the proposed development and document the basis for the decision.

2.4. SEPP 33 Applicability

To obtain project approval an Environmental Assessment (EA) for the project is being prepared by Manidis Roberts. The EA process includes review of the planning

instruments applicable to the project. *State Environmental Planning Policy 33 – Hazardous and Offensive Development* (SEPP 33) is applicable to the project.

SEPP 33 links the permissibility of an industrial development to its offsite safety and environmental risks. Developments that involve storage, handling, or processing materials which, in the absence of locational, technical or operational controls, may create an offsite risk or offence to people, property or the environment are defined by SEPP 33 as “*potentially hazardous industry*” or “*potentially offensive industry*”.

Development proposals that are classified as potentially hazardous industry must undergo a Preliminary Hazard Assessment (PHA) to determine the risk to people, property and the environment. If the residual risk exceeds the acceptability criteria, the development is “hazardous industry” and may not be permissible within NSW.

Developments that have the potential to emit contaminants to the environment and which require an Environmental Protection Licence (EPL) are “potentially offensive”.

Sherpa Consulting Pty Ltd (Sherpa) was retained by Manidis Roberts to undertake a review of the project to determine whether SEPP 33 is applicable.

3. FACILITY DESCRIPTION

3.1. Overview

The Googong development will provide residential dwellings with retail, commercial and public facilities. The overall Googong development will comprise a total area of about 780 hectares located south of Queenbeyan. The development will be staged with an ultimate population of about 15,000 residents.

The development will be provided with water cycle infrastructure, including water and wastewater services. The services provided will include:

- Potable water supply mains
- Recycled water supply mains
- Potable and recycled water pumping stations
- Googong Water Treatment Plant (existing)
- Water recycling plant
- Reservoirs
- Sewer mains
- Sewage pumping stations

The potential environmental impacts of the above facilities include the following:

- Noise from operation of treatment plants and pumping stations.
- Odour generation from treatment plants, pumping stations and wastewater mains.
- Environmental effects of spills of effluent from wastewater mains and water recycling plants to the biosphere.

These impacts will be covered by separate environmental studies undertaken as part of the EA. In addition, the Googong Water Treatment Plant is an existing facility which remains unchanged for the development.

The following facilities are new facilities which have on-site chemical storage for recycled water treatment. They were assessed to determine whether the SEPP 33 thresholds were exceeded (requiring a PHA):

- The Googong Water Recycling Plant
- Chlorination facility at a potable storage reservoir.

3.2. Water Recycling Plant

The proposed development area is in an environmentally sensitive location and the water recycling plant (WRP) will be designed to achieve a high effluent quality.

The water recycling plant will be located in the north-east corner of the development area. Details of the final design are yet to be finalised, but will likely consist of the following:

- Inlet works including flow balancing, screening and grit removal facilities
- Biological treatment (Bardenpho process)
- Membrane ultrafiltration
- Chemical dosing
- Disinfection (ultraviolet)
- Chlorination
- Recycled effluent storage and pumping
- Odour control
- Sludge stabilisation and handling
- First flush containment

The ultimate capacity for the WRP will be for an equivalent population of about 20,000. The nearest residential areas will be located about 200 m from the water recycling plant.

3.3. Potable Water Storage

Due to the length of mains, a chlorination facility with storage of about 4,000 L of sodium hypochlorite is required.

4. SEPP 33 ASSESSMENT

4.1. Potentially Hazardous Development

The screening process published in the NSW Department of Planning guideline *Applying SEPP 33 – Hazardous & Offensive Development Application Guideline (1997 2nd edition)* was used to establish whether the proposal is “potentially hazardous” or “potentially offensive”.

SEPP 33 defines potentially hazardous industry as follows:

“Potentially hazardous industry” means a development for the purposes of an industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:

- (a) to human health, life or property; or
- (b) to the biophysical environment, and:

includes a hazardous industry and a hazardous storage establishment.

To determine whether a proposed development is potentially hazardous, the risk screening process in the *Applying SEPP 33* guideline considers the type and quantity of hazardous materials to be stored on the site and the distance of the storage area to the nearest site boundary, as well as the expected number of transport movements.

“Hazardous materials” are defined within the *Applying SEPP 33* guideline as substances that fall within the classification of the Australian Dangerous Goods Code (ADG), i.e. have a Dangerous Goods (DG) classification.

4.1.1. Dangerous Goods

A list of the expected types and quantities of materials to be stored or handled at the proposed Googong Water Treatment Facility is summarised in Table 4.1.

A site layout showing the approximate location of these inventories and the site boundary is shown in Figure 4.1.

TABLE 4.1: HAZARDOUS MATERIAL STORAGE SUMMARY

Chemical name	UN No.	DG class	Packaging Group	Storage Quantity (L)	Material State	Description	Storage Arrangement	Comments	Any other hazards from MSDS check?
Water Recycling Plant									
Ferric sulphate (45%)	N/A	N/A	N/A	35,000	Red brown viscous liquid	Ferric sulphate for odour control and phosphorus removal	Bunded tank storage as per MSDS requirements	Not classified as dangerous goods by the criteria of Australian Dangerous Goods Code	Avoid heating in air.
Magnesium Hydroxide (58%)	N/A	N/A	N/A	25,000	White powder	Magnesium hydroxide for alkalinity addition	Bunded tank storage as per MSDS requirements	Not classified as dangerous goods by the criteria of Australian Dangerous Goods Code	-
Sodium hypochlorite (10-15%)	1791	8	III	7,500	Clear, greenish yellow solution	Sodium hypochlorite for disinfection and membrane cleaning	Tank storage as per AS3780:2008	-	Hazardous/Irritant to skin and eyes Unstable at temperatures above 40°C in sunlight, resulting in reduced product quality. Reaction with acids resulting in chlorine release

Chemical name	UN No.	DG class	Packaging Group	Storage Quantity (L)	Material State	Description	Storage Arrangement	Comments	Any other hazards from MSDS check?
Polymer (Final selection to be advised, liquid expected)	-	-	-	500	Liquid or powder depending on selection	Polymer for thickening and dewatering	Bunded tank or bulk storage as per MSDS requirements	On final selection, review MSDS and provide required storage and safeguards In general, polymers are not Dangerous Goods. SEPP 33 Review to be updated if final polymer selection is classified as Dangerous Good. Quantities are low and unlikely to exceed SEPP 33 threshold.	To be determined from product MSDS on final selection.
Citric Acid (50%)	N/A	N/A	N/A	1,000	Colours to pale yellow liquid	Citric acid for membrane cleaning	Bunded tank/bulk storage as per MSDS requirements	Not classified as dangerous goods by the criteria of Australian Dangerous Goods Code.	Irritant to skin, eyes and respiratory tract
Liquid Sugar (66%)	N/A	N/A	N/A	20,000	Liquid	Liquid sugar for additional carbon source for bioreactors	Bunded tank storage as per MSDS requirements	Not classified as Dangerous Goods by the criteria of Australian Dangerous Goods Code	-

Chemical name	UN No.	DG class	Packaging Group	Storage Quantity (L)	Material State	Description	Storage Arrangement	Comments	Any other hazards from MSDS check?
Acetic acid (75%)	2790	8	II	20,000	Clear, colourless liquid	Acetic acid for additional carbon source for bioreactors (alternative to liquid sugar)	Tank storage as per AS3780:2008	The choice between either liquid sugar or acetic acid has not been confirmed yet.	-
Potable Water Storage									
Sodium hypochlorite (10-15%)	1791	8	III	4,000	Clear, greenish yellow solution	For secondary disinfection	Tank storage as per AS3780:2008		Hazardous/Irritant to skin and eyes Unstable at temperatures above 40°C in sunlight, resulting in reduced product quality. Reaction with acids resulting in chlorine release



FIGURE 4.1: LAYOUT DRAWING – WASTE RECYCLING PLANT

4.2. Results

Table 4.2 summarises the SEPP 33 screening for the WRP and potable storage reservoir. The key findings of the SEPP 33 review and screening of the Googong WRP are:

- Two substances proposed to be stored within the chemical storage facility, sodium hypochlorite and acetic acid, fall within the classification of the Australian Dangerous Goods Code (ADGC).
- Both sodium hypochlorite and acetic acid are Class 8 materials (corrosives).
- The proposed quantity of sodium hypochlorite to be stored at the WRP is below the SEPP 33 threshold (Class 8, PG III) amount and thus, this component is not potentially hazardous.
- The proposed quantity of acetic acid to be stored at the WRP is below the SEPP 33 threshold (Class 8, PG II) amount and thus, this component is not potentially hazardous.
- The proposed quantity of sodium hypochlorite to be stored at the potable storage reservoir is below the SEPP 33 threshold (Class 8, PG III) amount and thus, this component is not potentially hazardous.
- In the proposed facility, liquid sugar and acetic acid are to be employed as additional carbon source for bioreactors at the WRP. The option for either liquid sugar or acetic acid has not been confirmed yet. Liquid sugar solution is not classified as a dangerous good and the quantity of acetic acid is below the SEPP 33 threshold level for Class 8, PGII. Therefore, either option will still meet the SEPP 33 criteria, i.e. the storage is not potentially hazardous.

TABLE 4.2: SEPP 33 SCREENING SUMMARY

Chemical name	DG class	Packaging Group	Quantity (L)	SEPP 33 threshold	SEPP 33 determination
Water Recycling Plant					
Ferric sulphate (45%)	N/A	N/A	35,000	N/A	-
Magnesium Hydroxide (58%)	N/A	N/A	25,000	N/A	-
Sodium hypochlorite (10-15%)	8	III	7,500	50 m ³ (50,000 L)	The quantity of product stored is below the SEPP 33 threshold (Class 8, PG III)
Polymer (Final selection to be advised, liquid expected)	TBA	TBA	500	TBA	TBA
Citric Acid (50%)	N/A	N/A	1,000	N/A	-
Liquid Sugar (66%)	N/A	N/A	20,000	N/A	-
Acetic acid (75%)	8	II	20,000	25 m ³ (25,000 L)	The quantity of product stored is below the SEPP 33 threshold (Class 8, PG II)
Potable Water Storage					
Sodium hypochlorite (10-15%)	8	III	4,000	50 m ³ (50,000 L)	The quantity of product stored is below the SEPP 33 threshold (Class 8, PG III)

4.2.1. Transport

The SEPP 33 transport screening threshold for Class 8 substances are shown in Table 4.3.

TABLE 4.3: TRANSPORT SCREENING THRESHOLD

Class	Vehicle Movements		Minimum quantity per load (tonnes)	
	Cumulative Annual (or)	Peak Weekly	Bulk	Packages
8	>500	>30	2	5

The above thresholds indicate that where the proposed numbers of hazardous materials movements are greater than 500 per year or greater than 30 per week, a

transport route selection study is required. This figure is equivalent to 15 vehicles coming in and out of the facility every week.

Since the development is still at the detailed design stage, the vehicle movements in and out of the facility and the quantity per load have not been determined yet. The storage size has been based on thirty day re-order quantities for all chemicals (or possibly fortnightly at the potable water storage) to minimise traffic volumes to the site.

There are a total of eight substances that require transport movements, of which three are classified as DGs (acetic acid at the WRP and sodium hypochlorite at the WRP and the potable storage reservoir). Based on the expected frequency of chemical deliveries, the expected vehicle movements for DG materials is a maximum of about 50 per year which is well below the transport threshold.

4.2.2. Other Hazards

Additional hazards to be considered that are not explicitly covered by the *Applying SEPP 33* guideline include:

- Reactions / incompatibilities between materials
- Hazardous processing conditions (e.g. high temperatures and pressures)

A review of typical Material and Safety Data Sheets (MSDSs) for the materials to be handled at the site was undertaken and any specific hazards noted in Table 4.1. As indicated in Table 4.1, for the materials proposed for the project, the only potential hazard not specifically addressed by the SEPP 33 screening process expected to result in significant offsite risk is reactions between sodium hypochlorite and acids. This potential scenario is managed by the following:

- Storage in separate bunded areas as per AS3780:2008 for incompatible products.
- Operating procedures and engineered safeguards (e.g. incompatible hose couplings) for delivery and unloading of chemicals to prevent unloading of product into the wrong storage tank.
- Low storage quantities on site.

These safeguards are typical of facilities of this nature and size. Given the previous experience of this type of operation, no additional engineering safeguards are likely to provide additional benefit to reduced risk further.

With these safeguards in place, the likelihood of chlorine generation leading to offsite impact is minimised and therefore a PHA is not considered necessary.

4.3. Potentially Offensive Development

SEPP 33 defines potentially offensive industry as follows:

“Potentially offensive industry” means a development for the purposes of an industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the

locality or on the existing or likely future development on other land, would emit a polluting discharge (including, for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land, and includes an offensive industry and an offensive storage establishment.

In the absence of controls, the development has the potential to cause pollutants to be discharged to water, air and soil, e.g. from spills of chemicals. An environmental protection licence is anticipated to be required. Therefore the development is considered “potentially offensive industry” and the assessment of potential impacts (e.g. noise, odour) and the required controls is considered separately in the EA.

4.4. Conclusion

The screening risk assessment demonstrated that the quantities of hazardous materials proposed to be stored and handled for the Googong WRP and the potable storage reservoir are below the screening thresholds given in SEPP 33. Consequently, the project will not result in significant offsite risks and is not classified as “potentially hazardous”. Therefore a preliminary hazard analysis (PHA) is not required for the proposed project.

From the screening of the transportation expected from the proposal, the PHA does not require a transport study.

4.5. Recommendations

The following recommendations are made as a result of the study:

1. If the chemicals or quantities to be stored change significantly during the design process, the review should be updated to determine if the quantities exceed the SEPP 33 threshold quantities and whether a PHA is required.
2. MSDSs for final chemicals selected should be reviewed to determine storage and handling requirements.