REF for Proposed Local Water Centre

Glossodia, New South Wales

Executive Summary Report

Prepared by:

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Report Number: PR130493
Version / Date: April 2016

Prepared for the proponent:

FLOW SYSTEMS OPERATIONS PTY LTD (A WHOLLY-OWNED SUBSIDIARY OF FLOW SYSTEMS PTY LTD)

Level 2, 1 Alfred Street
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Executive Summary

The Proposal

Flow Systems Operations Pty Ltd (a wholly owned subsidiary of Flow Systems Pty Ltd herein referred to as Flow Systems Operations) is proposing to construct and operate a water recycling facility at Glossodia to facilitate the proposed residential subdivision of the Jacaranda Ponds development area within the Hawkesbury City local government area. The proposed activity will be known as the Glossodia Local Water Centre (Glossodia LWC).

The proposed activity will utilise sewage from the future residential area to produce high quality water. The sewage will be treated at the Glossodia LWC through a multi-stage process of screening, anaerobic and aerobic processing, chemical treatment, membrane filtration, ultraviolet disinfection and chlorination. The refined water will be plumbed into houses for non-potable uses such as toilet flushing, washing machines, irrigation and car washing, thus reducing potable water demand. The facility, to be located on part Lot 52 DP 1104504 which is land in the south-eastern corner of the Jacaranda Ponds development area, as illustrated in **Figure 1**, is intended to operate 24 hours, 7 days per week, housed in a low-scale, single level building within an open space setting. A concept plan for the Glossodia LWC is provided in **Figure 2.**

The proposed activity will provide an alternative to the traditional sewage treatment plant usually required to service new residential developments. Off-site impacts of the proposed activity are limited and it will make a significant contribution to sustainability through the provision of recycled water back to the new residential area.

Statutory and Planning Framework

The Review of Environmental Factors (REF) for the Glossodia LWC has been prepared to provide the Independent Pricing and Regulatory Tribunal (IPART) and the NSW Minister for Lands and Water, with information to the fullest extent possible of all matters affecting, or likely to affect, the environment by the construction and operation of the Glossodia LWC. The proposed activity does not require development consent under Part 4 of the Environmental Planning and Assessment Act 1979 (EP& A Act) pursuant to *State Environmental Planning Policy (Infrastructure) 2007* and the current zoning of the site which is SP2 Infrastructure. Therefore the proposed activity is the subject of environmental assessment under Part 5 of the EP&A Act. This document is an executive summary of the REF prepared for the environmental assessment.

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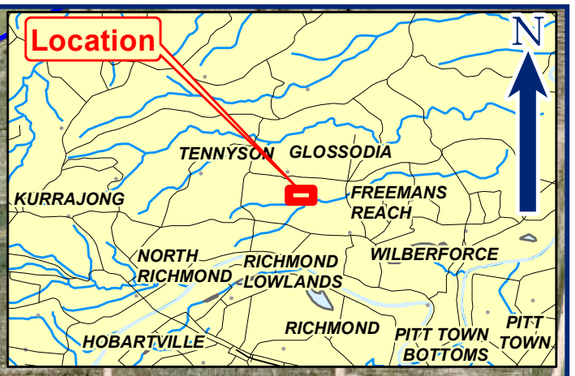
Legend

- Glossodia LWC Site
- Jacaranda Ponds Development Area
- Proposed Road
- Proposed Lot Layout
- Drainage
- 10m Contours



20 10 0 20 40 60 80 100 m

SCALE: 1:2,000 AT A3 SIZE

TITLE : **FIGURE 1: LOCATION PLAN**

LOCATION : **GLOSSODIA LOCAL WATER CENTRE**

DATUM:GDA 1994

PROJECTION: GDA 1994 MGA Zone 56

DATE : **21/04/2016**

PURPOSE: **REF**

VERSION (PLAN BY): A A3 (Natalie.Wood)

PATH: J:\JOBS\130k\130493 Jacaranda Ponds LWC\10 - Drafting\Arcgis Map Documents\Planning\130493-1 Figure 1 A A3 20160421.mxd

CLIENT: **FLOW SYSTEMS**

JOB REF: **PR130493-1**

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RPS

TITLE : **CONCEPT PLAN FOR GLOSSODIA LWC SITE**

LOCATION : **JACARANDA PONDS GLOSSODIA**

DATUM:GDA 1994

PROJECTION: GDA 1994 MGA Zone 56

DATE : **29/04/2016**

PURPOSE: **REF**

VERSION (PLAN BY): B A3 (Natalie.Wood)

PATH: J:\JOBS\130k\130493 Jacaranda Ponds LWC\10 - Drafting\Arcgis Map Documents\Planning\130493-1 Concept Plan A A3 20160429.mxd

CLIENT: **FLOW SYSTEMS**

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Environmental Impacts

The REF provides a detailed description of the potential environmental impacts associated with the proposed activity, during both construction and operation, and these include impacts associated with:

- Potential for increase in noise;
- Air Quality and odour;
- Removal of vegetation and habitat for fauna;
- Potential for the identification of Aboriginal and non-Aboriginal heritage;
- Increase in hardstand areas and associated runoff;
- Potential for Bushfires;
- Increase in traffic movements;
- Potential for changes to visual character; and
- Potential for the generation of waste during the construction phase.

Noise Impacts

Operational noise associated with the equipment within the Glossodia LWC has been assessed against noise criteria set out in the NSW Environmental Protection Authority (EPA) NSW Industrial Noise Policy (INP). Noise monitoring to determine ambient noise was carried out as part of the specialist Noise Assessment contained within the REF and enabled the establishment of Project Specific Noise Criteria for daytime and night time operations. The noise monitoring and modelling used the $L_{Aeq,15min}$ criteria which is a common measure of environmental noise and road traffic noise. Criterion established were L_{Aeq} 38 dBA for day time and L_{Aeq} 38 dBA for night time. Under conditions involving the use of a back-up generator (testing purposes only) the INP allows for a positive adjustment of 5 dB to the criterion stated above.

Predicted noise levels from the proposed blowers and compressors room, and recycled water pumps indicate compliance with all criteria on all occasions at the closest identified noise sensitive receptors. The results of the modelling of the typical operation of the Glossodia LWC are presented in graphical form as a contour map in **Figure 3**. The results of the modelling of the Glossodia LWC involving the use of a back-up generator (testing purposes) are presented in graphical form as a contour map in **Figure 4.** Predicted noise levels for both situations comply with the adjusted acceptable daytime noise level on all occasions.

Odour and Air Quality

An Odour Impact Assessment having due consideration for the NSW Environmental Protection Authority guidelines was carried out as part of the REF. The odour impacts for the fully operational plant were assessed and modelling output is illustrated in **Figure 5.** Results from the dispersion modelling indicated that predicted odour concentrations from the proposed facility would comply with the most stringent assessment criterion of 2 OU (99th percentile) at all sensitive receivers outside the LWC boundary. Furthermore the predicted odour concentrations are at or below 1 OU, the theoretical level at which odour becomes detectable but not necessarily distinguishable, at all receivers.

Figure 3 Noise Modelling – Normal Operations of the Glossodia LWC

Figure 4 Noise Modelling – Generator testing within Glossodia LWC

Figure 5 Odour Modelling – Predicted 99th percentile odour concentration (OU) when the Glossodia LWC is fully operational

Mitigation Measures

The REF provides a large number of mitigation measures that will avoid or reduce the potential impacts of the proposed activity. These mitigation measures have been designed to minimise and or mitigate, as far as practical, the potential impacts. All mitigation measures described in this REF will be incorporated into the site's CEMP and / or the Operational Environmental Management Plan (OEMP) / Licence Plans. The CEMP will be prepared prior to construction of the Glossodia LWC and the OEMP prior to the operation of the LWC and both are to be reviewed and approved by IPART prior to the commencement of relevant on-site works. A summary of the mitigation measures can be viewed in **Table 1** and **Table 2** below.

Table 1 Impact and Mitigation Measures to be Incorporated into the CEMP

Impact	Mitigation Measures
General	All contractors and machine operators will be inducted on the environmental sensitivities of the work site(s) and relevant safeguards.
	Sediment and nutrient controls will be implemented to reduce the impacts of stormwater, erosion and sedimentation on water quality. Specific erosion and sediment controls are to be contained within the site CEMP.
	All erosion and sediment control measures will be established before excavation and vegetation clearance begins. Control measures are to remain in place until all surfaces have been fully restored and stabilised.
	Sandbags will be placed at the entry points to any culverts and stormwater channels to prevent sediment entering the stormwater system.
	Any spoil storage areas or temporary stockpiles will have appropriate erosion control devices installed to control runoff and prevent sedimentation.
	Sediment control devices (e.g. silt fences, straw bales wrapped in geotextile etc will be installed parallel with the contours of the site and immediately down slope of any areas where the natural ground surface has been disturbed. A temporary sediment basin to capture sediment laden within stormwater runoff will be installed.
	Any spoil storage areas or stockpiles will have appropriate erosion control devices installed to control runoff and prevent sedimentation.
	Sediment and erosion control devices will be inspected regularly, maintained to ensure effectiveness over the entire duration of the project, and cleaned out before 30% capacity is reached.
	Disturbed areas will be stabilised by revegetation within 10 days after completion of construction.
	The natural landform of the site will be restored as closely as possible to the pre-works condition.
Odour and Air Quality	All vehicles and machinery will be fitted with approved exhaust systems to maintain exhaust emissions within accepted standards.
	Machinery and vehicles will not be left running or idling when not in use for long periods.
	Odour or air pollutant emission complaints will be dealt with promptly and the source will be eliminated wherever practicable
	All loads of excavated material, soil, fill and other erodible matter that are transported to or from the work site will be kept covered at all times during transportation and will remain covered until they are unloaded either for use at the work site, reuse or disposal at a OEH licensed waste disposal facility.
	All work sites, general work areas and stockpiles will be closely monitored for dust generation and watered down (with clean water) or covered (via seeding or tarpaulins) in the event of dry and/or windy conditions.
	Rehabilitation of disturbed surfaces would be undertaken within 10 days of completion of construction on site.
Noise	All equipment used will comply with AS2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites.
	Work and deliveries will only occur during the following times: Monday to Friday 7am to 6pm, Saturday 7am to 6pm. No construction work or deliveries will occur on Sundays or public holidays.
	Regular and effective maintenance of all equipment, including vehicles moving on and off the site, will be conducted.

Impact	Mitigation Measures
	Plant and equipment which is used intermittently will either be shut down in the intervening periods between works or throttled down to a minimum.
	Any portable equipment with the potential to create high levels of noise (e.g. compressors, generators) will only be selected for use if it incorporates effective noise control. This equipment should be located, where practical, so that natural ground barriers are between it and the nearest potentially affected receivers.
	To minimise the impact of construction noise from the proposed activity upon residential receivers the following will occur: ▪ Selection of the quietest feasible construction equipment; ▪ Localised treatment such as barriers, shrouds and the like around fixed plants such as pumps, generators and concrete pumps; and ▪ Provision of respite periods.
	A Construction Noise and Vibration Management Plan for the site should be prepared and include: ▪ Plant Noise Audit – Noise emission levels of all critical items of mobile plant and equipment should be checked for compliance with noise limits appropriate to those items prior to the equipment going into regular service. To this end, testing should be established with the contractor; ▪ Environmental Inductions – It is important that an induction is provided to all site personnel with an emphasis on understanding and managing noise impacts; ▪ Equipment Selection – All fixed plant at the work sites should be appropriately selected, and where necessary, fitted with silencers, acoustical enclosures and other noise attenuation measures in order to ensure that the total noise emission from each work site complies with EPA guidelines; and ▪ Site Noise Planning – Where practical, the layout and positioning of noise-producing plant and activities on each work site should be optimised to minimise noise emission levels.
	An effective community relations programme shall be put in place to keep the community that has been identified as being potentially affected appraised of progress of the works, and to forewarn potentially affected groups. Close liaison should be maintained between the communities overlooking work sites and the parties associated with the construction works to provide effective feedback in regard to perceived emissions. In this manner, equipment selections and work activities can be coordinated where necessary to minimise disturbance to neighbouring communities, and to ensure prompt response to complaints, should they occur.
Contamination	Intrusive sampling targeting identified areas of environmental concern applicable to the site, be undertaken as part of the CEMP for the site to provide an adequate assessment of potential soil contamination and confirm the findings of this preliminary investigation.
Flora and fauna	Where possible development of the LWC should be restricted to areas of low biodiversity constraint, such as the area of exotic grassland;
	The full extent of any vegetation clearance will be clearly documented and mapped in the site's CEMP. The CEMP will prepared by the Glossodia LWC construction contractor prior to the commencement of construction.
	The clearing extents are to be clearly demarcated with temporary fencing before commencement of works.
	Materials/equipment lay-down areas will be shown in the CEMP and located in cleared or degraded areas to prevent any damage to the surrounding plants or habitat.
	Materials, plant and equipment will not be stored within the drip-lines of any trees at the site.
	To prevent damage to vegetation outside the boundaries of access tracks, vehicles and machinery will be restricted to designated access tracks.
	Where access tracks run alongside areas of natural bushland, protective fencing or paraweb fencing is to be installed along the boundaries of the track to prevent vehicles from inadvertently entering/damaging bushland.
	Degradation or disturbance to areas of water-side (riparian) vegetation will be avoided to the greatest

Impact	Mitigation Measures
	possible extent. Any such areas will be clearly identified in the CEMP.
	Where excavated soil is to be used in site restoration, it will be excavated and stockpiled in sequential layers corresponding to the existing soil profile. Topsoil and leaf litter is to be removed first and windrowed in separate stockpiles of less than 1m in height on the upslope side of excavations. Soil layers will be replaced sequentially so that the soil profile is restored as closely as possible to its pre-work status.
	All temporary erosion and sediment control devices such as silt-stop fencing will be removed from the site at the completion of the works or when the site is stabilised.
Heritage (Aboriginal and non-Aboriginal)	All relevant Flow Systems Operations staff and contractors should be made aware of their statutory obligations for heritage under the *National Parks and Wildlife Act 1974* and the *Heritage Act 1977*, which may be implemented as a heritage induction.
	This Due Diligence Assessment Report (**Appendix 7** of the REF) must be kept by Flow Systems Operations so that it can be presented, if needed, as a defence from prosecution under Section 86(2) of the *National Parks and Wildlife Act 1974*.
	If unrecorded Aboriginal object/s are identified on the site during works, then all works in the immediate area must cease and the area should be cordoned off. OEH must be notified by ringing the Enviroline 131 555, so that the site can be adequately assessed and managed.
	In the unlikely event that skeletal remains are identified, work must cease immediately in the vicinity of the remains and the area must be cordoned off. The proponent must contact the local NSW Police who will make an initial assessment as to whether the remains are part of a crime scene or possible Aboriginal remains. If the remains are thought to be Aboriginal, OEH must be contacted by ringing the Enviroline 131 555. An OEH officer will determine if the remains are Aboriginal or not; and a management plan must be developed in consultation with the relevant Aboriginal stakeholders before works recommence.
	If, during the course of development works, suspected historic cultural heritage material is uncovered, work should cease in that area immediately. The OEH (Enviroline 131 555) should be notified, and works are only to recommence when an approved management strategy has been developed.
Stormwater and water quality	Mulch bunds up slope of the proposed disturbance areas.
	Coir logs are placed within the proposed drainage channel.
	Sediment fences down slope of all disturbed areas and material stockpile areas.
	Disturbed areas will be stabilised by revegetation within 10 days after completion of construction.
	Site disturbance will be minimised by containing machinery access to site areas required for approved construction works.
	Erosion potential would be limited by managing runoff fetches and velocities, with measures such as contour drains, silt fences and level spreaders
	Sediment filters such as silt fences, coir logs, or turf strips will be located downstream of disturbed areas.
	The storage and handling of fuels and chemicals shall comply with Australian Standard AS1940.
	No chemicals, fuels, and/or waste will be stored or collected for disposal within or adjacent to drainage lines or unsealed surfaces.
	A 'spill kit' will be kept on site at all times for potential chemical or fuel spills.
	Refuelling, fuel decanting and vehicle maintenance work will take place in a designated sealed and bunded area.
	An Incident Management Plan (IMP) will be prepared as part of the CEMP and will include a contingency plan and emergency procedures for dealing with the potential spillage of fuel or other environmental incidents that may occur on the work site. The IMP should also contain procedures dealing with the unexpected onset of rainfall during the work period.
	Drainage systems will be checked at regular intervals and maintained to ensure they are operating at full capacity (eg clearance of debris from drainage lines).
Bushfire	Bushfire buffers in the form of a Managed Fuel Zone are recommended to the north, south and west of the site between the hazard/s and proposed development.

Impact	Mitigation Measures
	All new buildings and structures shall consider the applicable construction requirements for Bushfire Attack Level – 29 (BAL-29) under AS3959 – 2009.
	All wall and roof penetrations shall be adequately sealed to prevent gaps greater than 3mm. The material used to seal the penetration shall be non-combustible.
	Openings in walls and roof shall be fitted with ember guards made from a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant , non-combustible material.
	Internal road networks should be designed and constructed in accordance with Section 4.1.3 – Property Access of PBP 2006, including the provision of defendable space between the LWC infrastructure and the bushfire hazard.
	Any proposed development is to be linked to the existing reticulated water supply and that suitable hydrants be clearly marked in accordance with AS2419.1, 2005. Alternative water supplies may be considered where the proponent accepts that an adequate supply of water for fire fighting operations can be provided.
	An Emergency Management Plan is to be prepared to identify the nearest bushfire hazards and preferred refuges and evacuation routes.
Traffic and access	Any impact upon Spinks Road associated with the works will be remediated to their original condition.
	The Contractor will maintain a complaints register. Any complaints received will be responded to as soon as possible.
	A traffic control plan prepared by a suitably qualified person will be submitted to Flow Systems Operations for approval prior to commencement of work on the site.
Visual character	On completion of the works, all vehicles, construction equipment, materials, and refuse relating to the works will be removed from the work site(s) and any adjacent affected areas.
	Work sites will be restored as close to their original condition as possible following the completion of the proposed works.
Waste generation	All waste generated during the course of the works will be reused or removed from the work areas as soon as practicable and disposed of in accordance with the waste disposal safeguards.
	All vessels used for contaminated or hazardous waste should be sealed, labelled according to their contents, and stored within bunded areas until their removal from the work site.
	Any fuel, lubricant or hydraulic fluid spillages will be collected using absorbent material and the contaminated material disposed of at an EPA licensed waste depot.
	The work site will be left clean and free of weeds, debris and other rubbish at the end of works.
	All hazardous wastes on site will be removed and disposed in accordance with the state and national regulations and guidelines and best practice for the removal of these materials.
	The Contractor's recycling and reuse proposal will be detailed in the CEMP.
	Excess spoil material that cannot be reused on site will be utilised in the ongoing earthworks as part of the adjacent subdivision works.
	Green waste from vegetation clearing will be either chipped for reuse; retained for rehabilitation; or mulched and spread immediately after the trench has been covered to prevent encroachment by weed species and minimise erosion. NB: where mulched vegetation is to be used measures to prevent organic material entering the local waterway shall be installed.
	Off-cuts of piping and other construction material will be recycled where possible.
Amenity and public information	The Contractor will maintain a complaints register. Any complaints received will be responded to as soon as possible.
	Accurate public information signs will be displayed while work is in progress and maintained in presentable manner.

Table 2 Impact and Mitigation Measures to be incorporated into the OEMP

Impact	Mitigation Measures
General	An Infrastructure Operating Plan, Odour Management Plan (prepared in accordance with the *Draft NSW Best Practice Odour Guidelines)* and a Water Quality Plan prepared in accordance with the *Australian Guideline for Water Recycling (2006*) and addressing the *Framework for Management of Recycled Water Quality and Use* are to be prepared prior to operation of the Glossodia LWC.
Land Capability	A Recycled Water Irrigation Management Plan, prepared in accordance with the *Australian Guideline for Water Recycling (2006*) is to be developed once further details of the irrigation of recycled water is established. The Recycled Water Management Plan is to detail the vegetation cover required, the maintenance of vegetated areas to be irrigated and details of irrigation preparation works for forested areas. The Recycled Water Management Plan will also detail soil improvement methods for the irrigated areas including the parameters for the use of gypsum.
Odour	An Odour Management Plan should be prepared in accordance with the *Draft NSW Best Practice Odour Guidelines*) and include operational complaints procedures.
Waste generation	During the operation of the LWC the disposal of sludge wastings, sludge cake and grit and screen debris will be carried out in accordance with the EPA *Environmental Guidelines: Use and Disposal of Biosolids Products (2000).*
	The management of waste, including its transport will comply with the POEO Act and POEO (Waste) Regulation.
	Waste materials will be separated, classified and managed in accordance with the *Waste Classification Guidelines Part 1: Classifying Waste* (DECCW 2009)
	All staff and contractors will be made aware of waste management procedures.
Risks and Hazards	Chemicals and potentially hazardous substances will be used and stored according to regulatory requirements including the *Work Health and Safety Act 2011* and *AS 3780 The storage and handling of corrosive substances.* Chemical, fuel and oil containers will be managed according to manufacturers' directions to avoid potential impacts to the environment or human health.
	Flow Systems Operations will ensure that in the unlikely event of a pollution incident all remedial actions are in accordance with the POEO Act. In accordance with Section 148 of the POEO Act pollution incidents causing or threatening material harm will be notified immediately with the EPA.
	No chemicals, fuels, and/or waste will be stored or collected for disposal within or adjacent to drainage lines or unsealed surfaces.
	A 'spill kit' will be kept on site at all times for potential chemical or fuel spills.
	Signage and buffer zones will be employed at recycled water reuse areas as appropriate to the relevant end use.

Conclusion

Construction of the Glossodia LWC will allow the provision of reticulated sewer services, including recycled water to the Jacaranda Ponds development area. Following the assessment of potential environmental impacts through the work of various specialists the REF demonstrates that the proposed activity will result in no impact beyond relevant guidelines and legislation.

Various minor environmental impacts have been identified in this REF and these are generally temporary in nature. Specifically, it is unlikely that the proposed activity will have a significant impact on threatened species, populations and ecological communities listed pursuant to the *Threatened Species Conservation Act, 1995* or impact on matters of National Environmental Significance pursuant to the *Environmental Protection and Biodiversity Conservation Act, 1999*. There are no long term adverse effects created by the construction or operation of the proposed activity. The mitigation measures contained within the REF, which will be implemented, will avoid or reduce the potential impacts of the proposed activity.

The proposed activity will provide a service essential for the development of the Jacaranda Ponds development area which greatly benefits the community by ensuring supply of affordable housing for the North –Western area of Sydney and will provide recycled water to the new development.