Douglas PARTNERS | GROUNDED EXPERTISE

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Project 204098.06
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R.002.Rev0
NG

Attention: Ben Prior
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Report on Dewatering and Desilting of Existing Dam
Proposed Commercial Development
253 - 267 Aldington Road, Kemps Creek NSW

1. Introduction

This report provides comment on the dewatering and desilting of the existing dam for the proposed commercial development at 253 – 267 Aldington Road, Kemps Creek NSW (the site).

It is understood that geotechnical comment is required to detail the works involved in dewatering and desilting the existing dams prior to the placement of controlled fill. The Limited Detailed Site Investigation (Contamination) report (Project 204098.03.R.001.Rev1[1]) prepared by Douglas Partners Pty Ltd (Douglas) noted the requirement for a dewatering plan to be completed for the on-site dams.

The site boundary is shown in red, and the dam locations are shown in blue on the aerial photo in Figure 1.

Figure 1 – Existing dams within the site

[1] Douglas Partners Pty Ltd Report on Limited Detailed Site Investigation (Contamination), Proposed Industrial Development, 253 – 267 Aldington Road, Kemps Creek, ref. 204098.03.R.001.Rev1) (DP, 2023 – the 'DSI').

2. Scope of works

The following work components were carried out for dams present within the site (further detailed in the following sub sections):

- Water quality assessment – To determine the contamination status and quality of the stored water in the on-site dams, prior to disposal.
- Dewatering plan – Considerations for dewatering of the dams, from a geotechnical and contamination perspective.
- Provision of desilting recommendations for de-silting of the dams, from a geotechnical perspective.

3. Water quality assessment

Samples of the stored water within the on-site dams were collected as part of the DSI. Samples were collected by an environmental engineer using a grab sampler and was analysed for typical contaminants of concern. Samples collected from the on-site dams were sample D1 to D3 with results shown on the attached summary table (extracted from the DSI).

The results of water analysis reported human health and ecological exceedances for copper and total phosphorus.

It was concluded that the water retained in the on-site dams is unsuitable for discharge direct to a receiving water body. Therefore, a dam dewatering plan was required to be prepared prior to the discharge of water from the dams on site.

4. Dam dewatering plan

This dam dewatering plan only provides comment on the contamination aspects of the dewatering. It is understood that a dam de-watering strategy is being prepared for the site by Eco Logical Australia Pty Ltd which will address the environmental component (i.e. fauna and flora aspects) of the dewatering.

The following dewatering procedure is recommended:

- Stored water should either be discharged onto the ground surface a minimum distance of 50 m from existing waterways or areas proposed to be trafficked by construction vehicles. Flow dissipation devices may be required to prevent localised erosion or scouring at the outlet of the extraction pipe.
- Alternatively, water may be used during construction for moisture conditioning of fill or for dust suppression.
- An alternative to discharging the stored water onto the land surface is to pump the water to an existing dam on site which may be temporarily retained (i.e. if works are to be completed in a staged manner).
- Silt which has accumulated over the base of the dam footprint should not be extracted. Removal of silt accumulations will need to be completed separately as part of de-silting works (refer Section 5).

- Where significant wet weather is expected or experienced (i.e. more than 10 mm per 24hours) then discharge should cease.

Where discharge via irrigation or dust suppression is not possible, further assessment of both the dam waters and the receiving creek system could be completed to determine "background conditions" and whether discharge directly to the creek system is applicable. This assessment will require to be completed by an Environmental Consultant. Where discharge of the stored water within the dams directly to the local creek system is considered appropriate, the following procedure is recommended:

- The turbidity of the stored water should be assessed prior to commencement of the discharge. If the measured total suspended solids are less than 50 mg/L then the water is suitable for discharge into a local creek, provided that the flow rate will not cause downstream inundation.
- If the measured total suspended solids are above 50 mg/L, either the load of suspended solids will need to be reduced (flocculated) prior to discharge, or the water will need to be dispersed onto the ground surface.
- Site monitoring of total suspended solids of the discharged water will be required whilst discharging is in progress, to ensure that the measured values do not increase above the threshold value of 50 mg/L, and to provide further advice if required.

Where additional assessment identifies that discharge directly to the Creek system is not appropriate, the most likely form of alternative management of this water would comprise treatment, disposal or discharge into the sewer (pending approval from the relevant authorities) or via a licensed liquid waste removal contractor.

5. Dam desilting

Following dewatering, the following general desilting procedure is recommended:

- Breach the dam wall to prevent further accumulation of water within the footprint of dams.
- Strip all vegetation and other deleterious material (such as saturated silt and clay) to expose the underlying stiff or stronger clay or weathered rock.
- Remove filled dam walls if necessary (refer to comments below).
- Suitably bench the exposed surface to facilitate near-horizontal fill placement.
- Inspection and test rolling of the exposed surface in the presence of a geotechnical engineer. Where weak or heaving subgrade is identified it should be excavated and then backfilled using a suitable material.
- Place and compact approved fill material in maximum 250 mm thick layers to at least 98% Standard maximum dry density (SMDD), with placement moisture contents maintained within ±2% of Standard optimum.

Saturated *'organic'* soils from the dam base can be spread out and dried. Once dried, the material can be blended with stockpiled topsoil and spread across the finished surface of lots or in landscaping. Any saturated 'non-organic' soils can also be spread out and dried. Once the 'non-organic' soils are moisture conditioned, the materials can be reused as controlled fill subject to inspection and approval by the geotechnical consultant.

Where silts are proposed for reuse as controlled fill, they should be blended with other suitable materials at a ratio not exceeding 1:5 (silt:other). The placement of the blended material should include spreading over as large an area of the fill platform as practicable, followed by inspection of the placed blended layer by the geotechnical consultant prior to the placement of any additional fill.

The stripped surface is to be recorded by the project surveyor prior to the commencement of filling. With reference to AS 3798, Level 1 inspection and testing will be required for structural fill (i.e. lot fill) and Level 2 testing will be required for non-structural fill areas (i.e. public reserves and road reserves).

Where the existing dam walls are within future lots, the walls must be completely removed and then excavated to natural ground. Where the existing dam walls are located within future road or public reserves, excavation of the wall to at least 1 m below design subgrade level will be required with all future fill placed with Level 2 testing (AS 3798) as a minimum.

Please contact the undersigned if you have any questions on this matter.

Yours faithfully
Douglas Partners Pty Ltd

Nathan Godina / Bradley Harris
Geotechnical Engineer / Environmental Engineer

Reviewed by

For **Chris Kline**
Principal

Attachments: About this Report
DSI Summary Table G4

About this Report

November 2023

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

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About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

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Table G4 - Summary of Dam Sampling and Chemical Analysis Results (Results in µg/L - unless specified)

Sample Location	Sampling Date	Heavy Metals								PAH				TRH				BTEX				Phenol	OCPs & OPPs									Paraquat	Inorganics				Nutrients	
		As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	B(a)P TEQ	B(a)P	Total PAH	Naphthalene	C6-C10 less BTEX [F1]	>C10-C16 less Naphthalene) [F2]	>C16-C34	>C34-C40	Benzene	Toluene	Ethylbenzene	Total Xylenes		Aldrin + dieldrin	Chlordane	DDT + DDE + DDD	Endosulfan	Endrin	Heptachlor	HCB	Methoxychlor	OPP (Chlorpyrifos)			pH	Electrical Conductivity	Turbidity	Ammonia	Total Phosphorus	Total Nitrogen
Practical Quantitation Limit		1	0.1	1	1	1	0.05	1	1	5	1	1	1	10	50	100	100	1	1	1	2	0.05	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	NA	NA	NA	0.001	0.05	0.01
Unit		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	PHU	(µS/cm)	NTU	µg/L	mg/L	mg/L
Assessment Criteria																																						
ANZG (2018) - DGVs (95% protection)		13	0.2	3.3	1.4	3.4	0.06	11	8	ND	ND	ND	16	ND	ND	ND	ND	950	ND	ND	200	0.32	ND	0.03	ND	0.03	0.01	0.01	ND	ND	0.01	ND	ND	ND	ND	900	ND	ND
NEPM (2013) - Groundwater Invetigation Levels (Freshwater)		13	0.2	1	1.4	3.4	0.06	11	8	ND	ND	ND	16	ND	ND	ND	ND	950	ND	ND	200	ND	ND	0.03	ND	0.03	0.01	0.01	ND	ND	0.01	ND	ND	ND	ND	900	ND	ND
NHMRC, NRMMC 2011 - Drinking Water Guidelines (Health)		ND	2	50	2000	10	1	20	ND	ND	0.01	ND	ND	ND	ND	ND	ND	1	800	300	600	ND	0.3	2	ND	20	ND	0.3	ND	300	10	ND	ND	ND	ND	900	ND	ND
NHMRC (2008) - Recreational Water Guidelines		7	2	50	2000	10	1	20	3	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3	10	20	30	ND	0.3	ND	300	10	0.03	6.5-8.5	ND	ND	500	ND	ND
ANZECC & ARMCANZ 2000 - Irrigation Values Long/Short Term		100/2000	10/50	100/1000	200/5000	200/5000	2/2	200/2000	2000/5000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NC	ND	6.5-8	125-2200	ND	900	0.05/0.8-1.2	5/25-125
CRC CARE HSLs - Groundwater[2] HSL D Direct Contact		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1 x 10^7	2.6 x 10^7	2.6 x 10^7	2.6 x 10^7	3.8 x 10^7	4.3 x 10^4	9.9 x 10^7	2.7 x 10^7	8.1 x 10^7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
D1	17.11.21	1	<0.1	<1	2	<1	<0.05	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	8.3	1100	20	9	0.05	0.7
D2	17.11.21	<1	<0.1	<1	2	<1	<0.05	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	7.7	1200	5.7	6	0.05	0.6
D3	17.11.21	2	<0.1	<1	3	<1	<0.05	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	8.9	1300	4	30	0.4	2
D4	17.11.21	1	<0.1	1	180	4	<0.05	5	130	<5	<1	<1	<1	130	520	2900	240	<1	81	<1	<2	0.05	-	-	-	-	-	-	-	-	-	-	7	640	36	26,000	4.6	47
D4 - Silica Gel Cleanup	07.12.21	-	-	-	-	-	-	-	-	-	-	-	-	-	140	110	<100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
All results in µg/L
ND - Not Defined
NL - Not Limiting
NA - Not applicable given that Australian guiedelines have been adopted
[1] - combination of m-Xylene, o-Xylene, p-Xylene values
[2]- CRC CARE Health screening levels for petroleum hydrocarbons in soil and groundwater - HSL D commercial /industrial land use scenario - Direct Contact
Corrected using Hardness Dependent Algorithm - Table 3.4.3 - Using Average Hardness of 820 mg/L
*Very low salinity values - Table 9.2.5
**To minimise bioclogging of irrigation equipment only