

Appendix I

Preliminary Site Investigation, GHD 2024



Preliminary Site Investigation

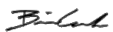
Orica Tocumwal Magazine Compound Upgrade

Orica Australia Pty Ltd

13 September 2024

→ The Power of Commitment



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Executive summary

Orica Australia Pty Ltd (Orica) is proposing to redevelop the Tocumwal Explosives Reserve magazines (“the project”) to bring the storage of explosives at the Tocumwal site (Lot 2, DP 225459, 431 Newell Highway, Tocumwal, NSW, 2714) in line with *AS2187 Australian Standards Explosives - Storage, Transport and Use*. To achieve this, Orica proposes to build four new 250 tonne (t)HE magazines and a new detonator magazine in new locations on the existing site. Earthen blast mounds are proposed in front of three of the proposed 250t HE magazines to prevent sympathetic detonation. Construction activities for the project will include site clearing, establishing hardstands and concrete slabs, magazine construction and construction of sealed access roads to each of the magazines.

As part of the Environmental Impact Statement (EIS) for the project, GHD has been engaged to undertake a preliminary site investigation (PSI) for potential soil and groundwater contamination.

The scope of work for the PSI comprised:

- A site history review including a review of current and historical aerial photographs, a review of EPA notices under the *Contaminated Land Management Act 1997* and other publicly available information.
- A review of previous investigations pertaining to the site including the project area, and any other information held by Orica.
- A review of geology, hydrology, hydrogeology and topography information for the site including the project area.
- Completion of a site inspection of the site and project area to identify areas of potential contamination, documenting and mapping important features, and confirming features identified in the desktop review.
- Preparation of this report with reference to the *Guideline for Consultants Reporting on Contaminated Sites* (NSW EPA, 2020).

Key information from the desktop review from searches of publicly available databases and information provided by Orica included the following:

- The site has been used for storage and distribution of explosives since at least 1943, with the existing magazines constructed in 1956.
- The immediate surrounding area is mainly used for agricultural production.
- No NSW EPA contaminated land records/notices were reported for the site.
- No previous contaminated soil or groundwater reports were provided for the site.
- Historical mining (thorium and uranium) and exploration (petroleum) titles were identified for the site; however, no obvious evidence of mining or petroleum exploration was observed on-site from the aerial photo review.
- Based on information provided by Orica and site inspections conducted by GHD, the following potential sources of contamination were noted:

Within the project area:

- Explosives currently stored onsite.
- Leaks and spills associated with use of the diesel above ground storage tank (AST).
- Leaks and spills during vehicle use and maintenance activities.
- Potential contamination associated with materials sourced from the former sand mine area used in the earthen blast mounds outside of Magazine 6.
- Contamination associated with the potential use of pesticides and fertilizers onsite.

On-site but outside of the project area:

- Containment cell which was used as a remediation site for contaminated soils resulting from an offsite detonator disposal area.
- Areas of historical burning of explosives located within the fenced area of the containment cell.
- Operation of the former sand mine/quarry in the northern portion of the site.
- Disposal of uncontrolled wastes in the former sand mine area (timber, scrap metal, etc).

- Potential asbestos contamination from demolition of former site buildings.
- Fill and imported materials from unknown sources used in the containment cell and sand mine.

The assessment identified that there is a low potential for contamination to be present within the project area.

- The potential impacts of contamination to human health and the environment during construction and future operation of the project is considered to be low with the only potentially complete source-pathway-receptor linkages during construction of the project relate to soil potentially impacted from spills from storage, spillage or leakage of fuels / oils in the vicinity of the diesel AST.
- During operation of the proposal, it is understood that all fuels and explosive materials will be stored undercover in buildings to prevent any unintended runoff of hazardous materials occurring. Given that this will occur under the implementation of Construction Environmental Management Plans (CEMPs) and Soil and Water Management Plans (SWMPs), the operation of the project is not anticipated to result in soil or groundwater contamination.

To mitigate potential exposure to soil or groundwater contamination it is recommended that:

- The soil in the vicinity of the diesel AST be further assessed if it is to be disturbed.
- The CEMP for the project includes an 'unexpected finds protocol', to manage any potential impacts associated with the disturbance of potentially contaminated soils (if encountered) during works of the project. The CEMP is to include actions to cease work on discovery, test suspected contaminated material, and safely store, treat, and dispose of the material as relevant.

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1. Introduction

Orica Australia Pty Ltd (Orica) is proposing to redevelop the Tocumwal Explosives Reserve magazines (“the project”) to bring the storage of explosives at the Tocumwal site (Lot 2, DP 225459, 431 Newell Highway, Tocumwal, NSW, 2714) in line with *AS2187 Australian Standards Explosives - Storage, Transport and Use*. To achieve this, Orica proposes to build four new 250 tonne (t)HE magazines and a new detonator magazine in new locations on the existing site. Earthen blast mounds are proposed in front of three of the proposed 250t HE magazines to prevent sympathetic detonation. Construction activities for the project will include site clearing, establishing hardstands and concrete slabs, magazine construction and construction of sealed access roads to each of the magazines.

As part of the Environmental Impact Statement (EIS) for the project, GHD has been engaged to undertake a preliminary site investigation (PSI) for potential soil and groundwater contamination.

The Secretary of the Department of Planning and Environment’s environmental assessment requirements (SEARs) for the project state that the EIS must include a site contamination assessment in accordance with the *Managing Land Contamination Planning Guidelines: SEPP 55 – Remediation of Land* (DUAP, 1998), including:

- Characterisation of the nature and extent of any contamination on the site and surrounding area.
- A Remedial Action Plan, if required.

1.1 Objectives

The objectives of this PSI were to:

- Undertake a contamination assessment to address the requirements of the SEARs for the project
- Assess the potential risk to human health and/or the environment from potential soil or groundwater contamination that may exist as a result of past and/or present site uses of the project area.
- Assess the potential impacts on soil and groundwater (via contamination) of the project.
- Provide recommendations as to the requirement for further investigation, remediation and/or management of potential soil or groundwater contamination (if identified) in the project area.

This PSI was undertaken to inform the EIS and is to be read in conjunction with that report.

1.2 Scope of work

The scope of work completed during this PSI included:

- A site history review including a review of current and historical aerial photographs, a review of EPA notices under the *Contaminated Land Management Act 1997* and other publicly available information.
- A review of previous investigations pertaining to the site including the project area, and any other information held by Orica.
- A review of geology, hydrology, hydrogeology and topography information for the site including the project area.
- Inspection of the site and project area to identify areas of potential contamination, documenting and mapping important features, and confirming features identified in the desktop review.
- Preparation of this report with reference to the *Guideline for Consultants Reporting on Contaminated Sites* (NSW EPA, 2020).

The assessment was limited to a review of desktop information and site inspection and did not include sampling of soils, groundwater, sediments or surface water. Planning certificates and historical titles were not included in this review.

2. Site information

2.1 Site identification

A summary of identification details for the site are provided in Table 2.1. The site location is shown on Figure 1 in Appendix A. The 'project area' is within the site and includes the area around each proposed magazine and access road where development is proposed.

Table 2.1 Site identification summary

Information	Details
Street address/location	431 Newell Highway, Tocumwal, NSW, 2714
Lot and deposited plan (DP) number	Lot 2, DP 225459
Site area	750 hectares (ha)
Local Government Area (LGA)	Berrigan Shire
Land Use Zoning	RU1 Primary Production under Berrigan Local Environment Plan (LEP) 2013
Current site use	The site is currently used as a storage and distribution facility for explosives for the mining and quarrying sector. A portion of the site is also currently used as grazing land for sheep and cattle under a leasing agreement.
Proposed Land Use	The site will continue to operate under its current land use but the existing magazines will be redeveloped to be compliant with <i>AS2187 Australian Standards Explosives – Storage, Transport and Use</i> .
Surrounding land use	North – Newell Highway (adjacent), agricultural lands South – Lalaly Channel (adjacent), agricultural lands East – Tocumwal No. 6 Canal Drain (southeast boundary), Newell Highway (eastern boundary, agricultural land West – rural / residential and agricultural land

2.2 Site observations

A GHD environmental scientist completed a site inspection on 20 April 2023. The main features observed at the Site during the walkover are summarised in Table 2.2 with reference to Figure 1 as presented Appendix A and photograph log provided in Appendix B.

Table 2.2 Site inspection summary

Item	Site conditions
Site access and conditions	The site has two entrances from Newell Highway (A39) located at the southeastern and northern corners of the site complex. Located at the southeastern corner of the site are the office buildings which were constructed in 2020 (Photograph 1). The current ten magazines onsite are accessible via internal gravel access roads (Photograph 2). The site is fenced, flat land with open cleared areas and patches of woodland. A portion of the site is being used for sheep and cattle grazing (Photograph 3).

Item	Site conditions
Site buildings and infrastructure	Based on the site inspection conducted and information from the Scoping Report (GHD, 2023), the site currently contains: – Office and amenities that accommodates five personnel. The new site office was constructed in 2020 (Photograph 4). – Ten licensed explosives magazines, consisting of nine magazines that hold Division 1.1D products and one magazine that holds Division 1.1B, 1.4B and 1.4S products. The existing magazines are corrugated steel sheet clad buildings and surrounded with security fencing (Photograph 5). – Earthen blast mounds that are located outside the Magazine 6 security fence (Photograph 6). – Sheds and shipping containers for storage and blasting accessories and repacking detonators. – A maintenance and general storage shed. – A self-bunded 2000 L diesel aboveground storage tank (AST) located between Magazine 2 and 3 (Photograph 7 and 8). – A sand-mine disposal area with general inert waste. This area can also hold water. – A fenced containment cell area. – Three primary farm dams (Dams 1 to 3) and two informal dams/depressions (Dams 4 to 5) on-site which receive rainfall runoff. – A forklift parking area near Magazine 5. The current site lay-out is presented in Figure 1 of Appendix A.
Ground surface and site drainage	The site is generally flat and unsealed with drainage from east to the west across the site. Localised water logging in one of the site drainage lines was observed (Photograph 12). Surface water flows on the site are controlled by small changes in relief and the irrigation channel (Lalaly Drainage Channel) that traverses the southern portion of the site. The irrigation channel is connected to the nearby farm dams and directs small surface flows to these dams.
Potential sources of contamination	Potential sources of contamination at the site include: <u>Within the project area:</u> – Explosives currently stored onsite. – Leaks and spills associated with use of the diesel AST. – Leaks and spills during vehicle use and maintenance activities. – Potential contamination associated with materials sourced from the former sand mine area used in the earthen blast mounds outside of Magazine 6. <u>On-site but outside the project area:</u> – Containment cell which was used as a disposal site for contaminated soils resulting from remediation of an offsite detonator disposal area (Photographs 9 to 11). Based on the PSI report (JBS&G 2016) (Section 3.4.1), approximately 195 m³ of contaminated soil was disposed in the cell between 2001 to 2008. – Historical burning grounds of explosives from a former offsite manufacturing facility located within the fenced area of the containment cell. – Former sand mine in the northern portion of the site which was historically used for local road construction. – Fill and imported materials from unknown sources used in the containment cell and sand mine. – Dumping of uncontrolled wastes in the former sand mine area (timber, scrap metal, etc). – Potential asbestos in the soils in the vicinity of the site offices that may have resulted from demolition of the old office buildings that were confirmed to contain asbestos. – Potential use of pesticides and fertilizers onsite.

2.3 Environmental setting

Table 2.3 provides an overview of the environmental setting of the site based on existing information.

Table 2.3 Site environmental setting

Setting	Site conditions
Topography	The topography of the land at the Tocumwal Explosives Reserve is flat, with elevation varying between 107 to 109 metres Australian Height datum (mAHD) with small changes in relief. (Six Maps, NSW Government, https://maps.six.nsw.gov.au/ , accessed 29 November 2023).
Hydrology	Several surface water features are located near the site. Primarily these are manmade channels and canals that form the drainage network of surrounding agricultural land. This network includes: – The Lalaly Channel which is a large irrigation channel and runs along the southern boundary of the project area. – Tocumwal No. 6 Canal Drain located on the southeast boundary of the project area. – The Murray River which is approximately 3.5 km south from the project area. – Five small farm dams within the lot boundary (see Figure 1, Appendix A). Dams 2 and 4 are positioned closest to the proposed magazines. The majority of the site is unsealed with a proportion of the surface water expected to infiltrate into the ground surface while any on-site surface flows are controlled by small changes in relief and irrigation channels that traverse the site. The irrigation channels direct surface flows to the nearby on-site farm dams.
Geology and soils	Reference to the NSW Surface Geology Maps (MinView, NSW Statewide Seamless Geology) indicates that the subsurface geology at the project site by Cenozoic alluvial floodplain deposits (Cz_af) which are composed of silt, very fine to medium-grained lithic to quartz rich sand, clay. Reference to the NSW Australian Soils Classification (MinView, NSW Statewide Seamless Geology) shows that soils in the vicinity of the project site include Red and Brown Sub-plastic Chromosols (CH). Reference to the Acid Sulphate Risk Maps (arcgis.com) shows that the site is not mapped as containing acid sulphate soils (ASS). An examination of the online NSW Naturally Occurring Asbestos (NOA) map (Naturally Occurring Asbestos in NSW (arcgis.com)) shows that the project is not within an area listed as having potential for naturally occurring asbestos.

Setting	Site conditions																																																																																																
Hydrogeology and groundwater bore search	An examination of the online WaterNSW online database identified 15 registered groundwater bores within 1 km of the project boundary (https://realtimedata.waternsw.com.au/) which are summarised below. One well (GW273107) was reported as a monitoring bore installed by the Office of Water and is used to monitor water levels in the deeper aquifer (approximately 100 meters below ground level (mbgl)) (JBS&G, 2016). Review of the Australian Groundwater Explorer (BoM, 2018) showed that out of the identified 15 bores, only nine were listed as functional and the rest were listed as status “unknown”. For the functional wells, water bore uses were recorded as domestic, stock, monitoring and farming. Bore depths ranged from 20 mbgl to 131 mbgl. Where detailed, groundwater depths varied between 11 mbgl and 35 mbgl. For the on-site wells, GW504902 is currently reported as functioning, while GW505624 had an unknown status. Based on the PSI report (JBS&G, 2016), GW505624 was installed as a replacement bore for GW504902. Based on GHD’s understanding of the environmental setting of the site, regional groundwater is expected to flow to the south towards the Murray River. Based on the bore usage information reviewed as part of the groundwater bore search, it is possible that groundwater within the area could be used for either drinking water, stock or irrigation purposes. Bore details (where available) are summarised below and with details presented in Appendix C.																																																																																																
	<table><tr><th>Bore ID</th><th>Location</th><th>Standing Water level (mbgl)</th><th>Final depth (mbgl)</th><th>Intended Purpose</th><th>Status</th></tr><tr><td>GW504902</td><td>Onsite – Site Office</td><td>12</td><td>40</td><td>Domestic</td><td>Functioning</td></tr><tr><td>GW505624</td><td>Onsite – Site Office</td><td>14</td><td>41</td><td>Stock, domestic</td><td>Unknown</td></tr><tr><td>GW505753</td><td>Offsite -South</td><td>18</td><td>66</td><td>Irrigation</td><td>Unknown</td></tr><tr><td>GW034602</td><td>Offsite -South</td><td></td><td>20.7</td><td>Domestic</td><td>Unknown</td></tr><tr><td>GW504065</td><td>Offsite -South</td><td>27</td><td>61</td><td>Stock, domestic</td><td>Functioning</td></tr><tr><td>GW502436</td><td>Offsite -South</td><td>20</td><td>42</td><td>Stock, domestic</td><td>Unknown</td></tr><tr><td>GW504216</td><td>Offsite - West</td><td>12</td><td>38</td><td>Stock</td><td>Functioning</td></tr><tr><td>GW505965</td><td>Offsite - West</td><td>-</td><td>114</td><td>Irrigation</td><td>Unknown</td></tr><tr><td>GW061544</td><td>Offsite - West</td><td>-</td><td>28</td><td>Stock, domestic</td><td>Unknown</td></tr><tr><td>GW505522</td><td>Offsite - West</td><td>15</td><td>42</td><td>Stock, domestic</td><td>Functioning</td></tr><tr><td>GW504683</td><td>Offsite - West</td><td>11</td><td>36</td><td>Stock, domestic</td><td>Functioning</td></tr><tr><td>GW273107</td><td>Offsite - North</td><td>35.1</td><td>131</td><td>Monitoring bore</td><td>Functional</td></tr><tr><td>GW504972</td><td>Offsite - North</td><td>-</td><td>30</td><td>Stock, domestic, farming</td><td>Functioning</td></tr><tr><td>GW504638</td><td>Offsite -East</td><td>-</td><td>20</td><td>Domestic</td><td>Functioning</td></tr><tr><td>GW012744</td><td>Offsite-East</td><td>-</td><td>33.5</td><td>Stock, domestic</td><td>Functioning</td></tr></table>	Bore ID	Location	Standing Water level (mbgl)	Final depth (mbgl)	Intended Purpose	Status	GW504902	Onsite – Site Office	12	40	Domestic	Functioning	GW505624	Onsite – Site Office	14	41	Stock, domestic	Unknown	GW505753	Offsite -South	18	66	Irrigation	Unknown	GW034602	Offsite -South		20.7	Domestic	Unknown	GW504065	Offsite -South	27	61	Stock, domestic	Functioning	GW502436	Offsite -South	20	42	Stock, domestic	Unknown	GW504216	Offsite - West	12	38	Stock	Functioning	GW505965	Offsite - West	-	114	Irrigation	Unknown	GW061544	Offsite - West	-	28	Stock, domestic	Unknown	GW505522	Offsite - West	15	42	Stock, domestic	Functioning	GW504683	Offsite - West	11	36	Stock, domestic	Functioning	GW273107	Offsite - North	35.1	131	Monitoring bore	Functional	GW504972	Offsite - North	-	30	Stock, domestic, farming	Functioning	GW504638	Offsite -East	-	20	Domestic	Functioning	GW012744	Offsite-East	-	33.5	Stock, domestic	Functioning
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3. Desktop information

3.1 Historical aerial photographs

A selection of historical aerial photographs were examined in order to assess past activities and land uses at the site. Photographs were examined from the years 1967, 1975, 1990 and 1995 as obtained from the NSW Historical Imagery, 2010 as obtained from NearMaps and 2022 as obtained from Google Earth and are presented in Appendix D. A summary of the review is provided below:

Table 3.1 *Review of historical aerial photographs*

Photograph	Site observations
1967 Black and white	The site office and Magazines 1 to 10 are already visible. Two of the three main farm dams which includes Dam 1 (east of Magazine 10) and Dam 2 (between Magazines 5 and 6) are also observed. Two other smaller farm dams which include Dam 4 (north of Magazine 8) and Dam 5 (in the western portion of the site) are also visible. A cleared area of land is evident in the northeast portion of the site which corresponds to the location of the former sand mine. Internal access tracks connecting the magazines are evident including an access track located at the southwest portion of the site. A structure similar to the existing magazines is located southwest of Magazine 3 and may be one of former brick magazines. Scattered vegetation within the site can be observed. The Newell Highway is located directly east of the site and Tocumwal No. 6 Canal Drain is located on the southeast boundary. Chinaman's Lane is located adjacent to the west and Lalaly Channel located adjacent to the site to the south. The rural/residential properties to the west and north east of the site are also visible.
1975 Black and white	There are no significant changes in the existing infrastructure with the site and its surroundings from the previous aerial photograph with the exception of the demolition/removal of the structure which appeared to be similar to the existing magazines that was located southwest of Magazine 3. Some rectangular patches of ground are observed across the access track in the southern portion of the site which may be the locations of the previous brick magazines that were present onsite prior to the construction of the now existing Magazines 1 to 10. The rural residential property to the south of the site is also visible.
1990 Black and white	There are no significant changes with the existing onsite infrastructure, however, the internal access roads in the southwest portion of the site are now less prominent. Other changes include observation of a vegetated patch of land north of the site office and farm buildings located towards the southwest of the site.
1995 Colour	Dam 3, the third main dam on site, is now evident, located in the northern portion of the site. The accessory store and the associated access roads located west of the site office are now visible. Some developments north of the office are also evident.
2010 Colour	The site access tracks appear more visible in this photograph. Rectangular patches of ground are also evident across the access roads. These patches were noted in the 1975 aerial. The fenced area of the containment cell located north of Magazine 8 is now visible which correlates with the date of construction (2001-2008). The diesel AST located east of Magazine 3 is apparent.
2023 Colour	There are no significant changes with the existing onsite infrastructure with the exception that the external mounds north and south of Magazine 6 are visible as is the forklift parking east of Magazine 5. Some of the access tracks are less obvious.

Based on the review of historical aerial photographs, the site has been used for storage and distribution of explosives since at least 1967 with the existing ten magazines and site office onsite already constructed at that time. The former sand mine was also apparent in 1967. By 1975, the access roads in the southwest portion of the site (which appeared to also previously contain magazines) appeared to have been disused. Since 1975 there appeared to be no significant changes to the site and surrounding area with the exception of the construction of the accessory store by 1995 and the construction of the containment cell and the addition of the diesel AST by 2010. The forklift parking area east of Magazine 5 and the external mounds north and south of Magazine 6 were apparent by 2023.

3.2 NSW Environment Protection Authority listings

A search of the datasets maintained by NSW EPA including notices under the *Contaminated Land Management Act 1997* (CLM Act) and *Protection of the Environment Operations Act 1997* (POEO Act) Environment Protection License Register was carried out within a 1 km radius from the site boundaries. No sites or notices were identified for the site or within the 1 km search radius as summarised in Table 3.2, hence impact from NSW EPA listed sites is unlikely.

Table 3.2 NSW EPA dataset search

	Details of EPA notices
List of NSW contaminated sites notified to EPA	Nil notices.
Contaminated land record of notices	None.
POEO licence register	None.
Other delicensed, surrendered, or revoked licensed activities	Nil notices.

3.3 Other information

Other information resulting from searches of publicly available databases is summarised in Table 3.3. In summary, given the distance and direction of the landfill (800m downgradient) it is unlikely to have caused soil or groundwater contamination at the site. Historical mining or mining exploration may have caused soil or groundwater contamination if inadequate environmental controls were used.

Table 3.3 Public database search

	Details of EPA notices				
Former Gas Works	Nil records.				
Waste Management Facilities	A search to the Waste Management Facilities Database (Department of Agriculture, Water and Environment (DAWE)) showed that there are currently two existing waste management facilities within the 3 km radius from the site as summarised below:				
	Organisation	Address	Type	Status	Distance from study area
	Tocumwal Landfill	Newell Highway, Tocumwal, NSW, 2714	Landfill - putrescible	Operational	800 m SE
	Tocumwal Landfill Transfer Station	Newell Highway, Tocumwal, NSW, 2714	Transfer station	Operational	800 m SE
Liquid Fuel Facilities	Nil records.				
Investigation or Management for Per- and Poly-Fluoroalkyl Substances	Nil records.				

	Details of EPA notices		
Current Mining or Exploration Titles or Applications	A search to the NSW Exploration and Mining Title Maps (MinView, NSW Statewide Seamless Geology) showed that there are currently no existing mining and exploration titles within the 1 km radius from the project site. Historical mining and exploration titles that have been issued in the area (including the project area) are summarised below.		
	Organisation	Resource	Year Ended
	Mines Administration Pty Limited	Group 11 (Thorium, uranium)	1973
	Applegate Exploration, LLC, Pannonian International Ltd	Petroleum	2004

3.4 Review of previous reports

A number of previous investigations have been conducted on-site and within the surrounding area. The following reports were reviewed as part of this PSI:

- JBS&G 2016, Orica Pty Ltd Tocumwal Phase 1, 431 Newell Highway, Tocumwal, NSW, 2174, 22 August 2016, 52015/104831 Rev 0.
- Orica 2022, Tocumwal Explosive Magazine Environmental Management Plan Version 2, Issued 7th February 2022.

A summary of the previous investigation reports reviewed is provided in the following sections. It should be noted that only information pertinent to possible contamination present on-site was included.

3.4.1 Tocumwal Phase 1 (JBS&G, 2016)

In 2016, JBS&G was engaged by Orica to complete a Phase 1 Environmental Site Assessment (ESA). The scope of works included a review of historical activities at the site and limited sampling including soils, asbestos fragments and bore (tap) water.

According to the report, prior to 1943, the site was composed of 16 privately owned properties. By 1943, the Commonwealth resumed a large portion of the land in Tocumwal including the site. The site was then used by the Australian Army to store ordnance in a number of small brick magazines. In 1956, the Imperial Chemical Industries (ICI) of Australia occupied the site and demolished the brick magazines and constructed larger magazines made from corrugated iron. These magazines are currently present onsite. A residential type building was also constructed and was used as the site office. The site was then purchased by the ICI and New Zealand Limited (now Orica) in 1966. At the time of writing (2016), the site was used for storage and distribution of explosives and had a lease agreement for cattle and sheep grazing.

Between 2000 to 2008, Orica undertook remediation activities on an offsite location, whereby detonators were disposed of on private property. The detonators were buried and burned which resulted in a combination of both fired and un-fired detonators. The remediation activity resulted in excavation of approximately 195 m³ of contaminated soil which was transported to and disposed of in a containment cell constructed within the subject site (see Figure 1, Appendix A).

JBS&G, 2016 reported that the containment cell was clay lined and a 0.5 m layer of 'clean soil' was placed on top of the material once the cell was filled. Ten tonnes of lime was added to the soil that was placed in the cell to aid in the degradation of contaminants associated with the detonators such as lead azide and pentaerythritol tetranitrate (PETN). It was also reported that the area around the containment cell was historically used as a burning ground to dispose of explosives from a former offsite manufacturing facility. The location of the containment cell was fenced and vegetated with trees and grasses.

The Phase 1 assessment also reported that a former sand mine was located in the northwest portion of the site which was used for disposal of inert wastes such as timber and metallic wastes including corrugated iron, fencing wire and steel fence posts, at the time of writing (2016). The sand/gravel pit was formerly leased to the local roads authority as a compound during the construction of the Newell Highway. The report did not specify the time of lease although it can be assumed to be prior to 1965 based on the review of the historical aerial photographs conducted during this PSI (Section 3.1).

Based on the results of the desktop review, JBS&G, 2016 identified several Areas of Environmental Concern (AEC) which included the following:

- Burial of soil containing fired and unfired detonators.
- Historical burning of explosives.
- Former presence of asbestos in site structures (since demolished).
- Storage of diesel in AST.
- Disposal of inert wastes in the former sand mine.
- Historical and current storage of explosives.

A limited sampling program was conducted targeting the identified moderate to high risk AEC which included the containment cell area, carport structure and onsite groundwater bore. The limited sampling program included:

- Collection of 13 surface soil samples in the area of the containment cell and historical burning grounds and analysis for explosives, ammonia, nitrate and heavy metals.
- Collection of two surface soil samples analysed for asbestos in the location of the former carport where asbestos cladding was previously located.
- Collection of one water sample from the drinking water tap of the site office drinking bore and analysed for explosives, ammonia, nitrate and heavy metals.

Results of the limited sampling are summarised below:

- No soil samples exceeded the adopted assessment criteria relevant to the protection of human health.
- One soil sample recorded a zinc concentration of 120 mg/kg which exceeded the ecological investigation level (EIL) for zinc of 100 mg/kg. However, this was not considered significant due to the reported concentration below the criteria for the other samples analysed.
- No asbestos was detected in any of the samples collected.
- The concentrations of heavy metals, ammonia and nitrate in the water sample were less than the criteria specified in the Australian Drinking Water Guidelines (ADWG 2011).
- No explosive compounds were detected above the laboratory limit of reporting (LOR) in the tap water, however it was noted that a number of the LORs were higher than the USEPA Region IX criteria for tap water, making it impossible to definitively conclude that explosives were not present in the water. It was considered that the potential for elevated levels of explosives was very low.

Overall the limited sampling program did not identify any significant contamination associated with the identified moderate and high risks AECs at the site, however, the completion of a detailed Phase 2 Environmental Site Assessment was recommended should land use be altered (including changes to the current agricultural use).

3.4.2 Tocumwal Environmental Management Plan (Orica, 2022)

The Land Impact Register of the Environmental Management Plan (EMP) had documented that hydrocarbon impacted soil in the diesel unloading area with an approximate area of 10m² was excavated to a maximum depth of 0.1m. According to the register, the investigation results did not show any impact below 0.1m. The contaminated soil was excavated and disposed of as hazardous waste with Waste Tracking Certification (WTC) and regulator approval (Document WTC 128634). It is noted however, that the results were not available for review.

4. Preliminary conceptual site model

A preliminary conceptual site model (CSM) was developed for the project area to evaluate the risk posed by the potential contamination sources to the identified receptors and whether further investigation, remediation or management are required to manage that risk.

4.1 Potential contaminant sources

Based on the results of the desktop assessment and site inspection, the following potential contamination sources on the site were identified:

Within the project area:

- Storage of explosives onsite.
- Leaks and spills during use of the diesel AST.
- Leaks and spills during vehicle use and maintenance activities.
- Potential contamination associated with materials sourced from the former sand mine area used in the earthen blast mounds outside of Magazine 6.
- Potential use of herbicides and pesticides onsite.

Onsite but outside the project area:

- Containment cell which was used as a remediation site for contaminated soils resulting from an offsite detonator disposal area.
- Historical burning of explosives within the fenced area of the containment cell.
- Uncontrolled disposal of wastes in the former sand mine.
- Potential asbestos in the soils within the vicinity of the demolished site offices.
- Fill and imported materials from unknown sources used in the containment cell and sand mine.

The potential for contamination to be present within the project area is discussed in Table 4.1. In summary, the only potential source of soil or groundwater contamination is from fuels stored on-site including the diesel AST.

Table 4.1 *Potential for contamination*

Source	Rationale/detail	Potential contaminants	Potential for contamination within the project area
<u>Within the project area</u>			
Former and existing magazines	Contamination associated to storage of ordnance	Explosives, heavy metals, ammonia, nitrate	Low The current explosives are stored within the magazines and are currently managed as per the site EMP.
Storage, spillage or leakage of fuels / oils	Use of diesel AST and vehicles onsite	TRH, BTEXN, PAHs, heavy metals	Moderate Some staining on the concrete pad was observed during the inspection in the vicinity of the diesel AST. In addition, historical records noted a spill in the diesel area in 2010, which indicates that such incident could potentially occur onsite. It is noted that the contaminated soil was reported to had been removed and disposed offsite.
Potential contamination associated with materials sourced from the former sand mine	Use of materials from the former sand mine in the earthen blast mounds	Asbestos, heavy metals, TRH, BTEX, PAHs, OCPs, OPPs, PCBs	Low No visible contamination was noted in the earthen blast mounds located in the project area.

Source	Rationale/detail	Potential contaminants	Potential for contamination within the project area
Potential use of herbicides, pesticides	Use of pesticides or herbicides on the site or adjacent properties	Arsenic, OCPs and OPPs	Low The site is currently used for sheep and cattle grazing.
<i>Onsite but outside the project area</i>			
Containment cell	Contamination associated with the buried soils containing detonators from an offsite remediation activity	Explosives, heavy metals, ammonia, nitrate	Low The containment cell is not located within the project area, The closest Magazine is located 400 m south of the cell. The containment cell was also reported to have been clay lined, thus, there is low potential for leaching. Access to the containment cell area is also restricted with fencing. In addition, previous sampling and analysis of the surface soils (2016) did not detect any contaminant concentrations above adopted criteria.
Historical incineration of detonators	Contamination in soil associated with the incineration of explosives	Explosives, heavy metals, ammonia, nitrate	Low The burn areas are not located within the project area with the closest Magazine located 400 m south. Access to the burn areas (containment cell area) is restricted with fencing.
Uncontrolled waste disposal in former sand mine/quarry	Contamination of soils, groundwater or surface water from disposal of wastes	Heavy metals, ammonia, nitrogen compounds, TRH, BTEXN, PAHs, PFAS, OCPs, OPPs, PCBs	Low The sand mine is not located within the project area, with the nearest magazine located 1.8 km southeast.
Asbestos from building materials in areas of demolished buildings	Potential contamination of the soils within the vicinity of the old site offices	Asbestos	Low The former site office buildings were demolished in 2020 and are outside the project area. A previous investigation in 2016 near the carport also did not identify any asbestos in the surface soils.
Potential use of imported fill materials	Use of imported fill materials from unknown sources during operation of the sand mine and construction of the containment cell	Asbestos, heavy metals, TRH, BTEX, PAHs, OCPs, OPPs, PCBs	Low The areas such as the containment cell and sand mine where imported fill could have been potentially used is outside the project site. In addition, previous sampling and analysis of the surface soils (2016) did not detect any contaminant concentrations above adopted criteria.

– Heavy metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn)

– BTEXN – benzene, toluene, ethylbenzene, toluene and naphthalene

– OCPs and OPPs - organochlorine and organophosphate pesticides

TRH – total recoverable hydrocarbons

PCBs – polychlorinated biphenyls

PFAS - per- and polyfluoroalkyl substances

4.2 Potential contaminant exposure pathways

Construction activities for the project will include site clearing, establishing hardstands and concrete slabs, magazine construction and construction of sealed access roads to each of the magazines.

The primary pathways by which current and future receptors could be exposed to the potential sources of contamination are considered to be:

- Direct contact (including ingestion) with potentially contaminated soil, surface water or groundwater.
- Inhalation of potential contaminants in soil, if disturbed (particularly asbestos if present).
- Lateral migration of potential contaminants via surface water run-off to impact surface water.
- Vertical and horizontal migration of potential contaminants within the groundwater.

4.3 Potential receptors

When evaluating potential adverse health/environmental effects from exposure to a contaminated site, all potentially exposed populations should be considered. For the site, the key populations or receptors of interest are considered to include:

– **Human health receptors**

- Current and future workers, visitors and contractors at Orica including those accessing the site and project area under Orica work permits.
- Current agricultural leaseholders.
- Intrusive maintenance or construction workers during the construction phase of the project.
- Current and future occupants and visitors of surrounding properties.
- Potential off-site users of groundwater (consumption or stock watering).

– **Environmental receptors**

- Flora and fauna within the Orica site and surrounding land and waterways.
- Drainage lines and dams throughout the site and surrounding area.
- Groundwater beneath and downgradient of the site.

4.4 Preliminary conceptual site model

Table 3.1 summarises the potential for complete source-pathway-receptor linkages for the project area based on the results of the desktop review and site inspection. In summary, the only potentially complete source-pathway-receptor linkages relate to soil potentially impacted from spills from storage, spillage or leakage of fuels / oils.

During operation of the proposal, it is understood that all fuels and explosive materials will be stored undercover in buildings to prevent any unintended runoff of hazardous materials occurring. Additionally, it is noted that the risk of handling these materials is typical of works of this nature and well understood control measures, such as bunding, safely storing hazardous materials, and visual inspections of the works area and waterways, are commonly employed during implementation of Construction Environmental Management Plans (CEMPs) and Soil and Water Management Plans (SWMPs) which are stipulated as required mitigation measures provided in the EIS. On this basis, with the specified required mitigation and plans and on the basis that these materials will be stored undercover, the operation of the project is not anticipated to result in soil or groundwater contamination.

Table 4.2 Conceptual site model for the project area

Potential Source within the project area, as discussed in Section 4.1	Pathway	Receptor	Potential for completeness
Contaminated soils from storage, spillage or leakage of fuels / oils	Volatilisation to indoor and outdoor air and subsequent inhalation	On-site workers and visitors	Unlikely given location of potential spills.
		Current agricultural leaseholders	
		Intrusive maintenance or construction workers during the construction phase of the project	Possible if intrusive works are undertaken in the vicinity of the AST or former spills.
	Direct contact, including ingestion	On-site workers and visitors	Possible in the vicinity of the AST or former spills.
		Intrusive maintenance workers	
		Ecological receptors e.g., invertebrates and vegetation	
	Surface water runoff	Drainage lines and dams throughout the site and surrounding area	Possible in the vicinity of the AST or former spills.
	Vertical leaching through soil profile	Groundwater beneath the site	Unlikely, given the depth to groundwater (>10m).

5. Conclusion

With respect to the objectives described in Section 1.2 of this report and subject to the limitations described in Section 7:

- The only potentially complete source-pathway-receptor linkages during construction of the project relate to soil potentially impacted from spills from storage, spillage or leakage of fuels / oils in the vicinity of the diesel AST.
- During operation of the proposal, it is understood that all fuels and explosive materials will be stored undercover in buildings to prevent any unintended runoff of hazardous materials occurring. Given that this will occur under the implementation of CEMPs and SWMPs, the operation of the project is not anticipated to result in soil or groundwater contamination.

To mitigate potential exposure to soil or groundwater contamination it is recommended that:

- The soil in the vicinity of the diesel AST be further assessed if it is to be disturbed.
- The CEMP for the project includes an 'unexpected finds protocol', to manage any potential impacts associated with the disturbance of potentially contaminated soils (if encountered) during works of the project. The CEMP is to include actions to cease work on discovery, test suspected contaminated material, and safely store, treat, and dispose of the material as relevant.

6. References

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NSW Six Maps (<http://maps.six.nsw.gov.au/>) (Accessed 29 November 2023).

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NSW Naturally Occurring Asbestos (NOA) map (Naturally Occurring Asbestos in NSW (arcgis.com) (Accessed 29 November 2023).

NSW Acid Sulphate Risk Maps (arcgis.com) (Accessed 29 November 2023).

Orica 2022, *Tocumwal Explosive Magazine Environmental Management Plan Version 2*, Issued 7th February 2022
[WaterNSW All Groundwater Database. www.realtimedata.waternsw.com.au.](https://www.realtimedata.waternsw.com.au/) (Accessed 29 November 2023).

7. Limitations

This preliminary site investigation ("Report") has been prepared by GHD Pty Ltd ("GHD") for use by Orica for the purpose as stated in Section 1.1 of the report.

GHD otherwise disclaims responsibility to any person other than Orica arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Report are excluded unless they are expressly stated to apply in this Report.

The services undertaken by GHD in connection with preparing this Report:

- Were limited to those specifically detailed in Section 1.2 of this Report.
- Were undertaken in accordance with current profession practice and by reference to relevant environmental regulatory authority and industry standards, guidelines and assessment criteria in existence as at the date of this Report.

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD when undertaking the services mentioned above and preparing the Report ("Assumptions"), as specified throughout this Report. GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with any of the Assumptions being incorrect except where GHD has been negligent in the adoption of those Assumptions.

GHD has prepared this Report on the basis of information provided by Orica and others (including Government authorities), which GHD has not independently verified or checked ("Unverified Information") beyond the agreed scope of work. GHD expressly disclaims responsibility in connection with the Unverified Information, including (but not limited to) errors in, or omissions from, the Report, which were caused or contributed to by errors in, or omissions from, the Unverified Information.

Subject to the paragraphs in this section of the Report, the opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the time of preparation of this Report and are relevant until such times as the site conditions or relevant legislations changes, at which time, GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with those opinions, conclusions and any recommendations.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD expressly disclaims responsibility:

- Arising from, or in connection with, any change to the site conditions
- To update this Report if the site conditions change

Except as otherwise expressly stated in this Report GHD makes no warranty or representation as to the presence or otherwise of asbestos and/or asbestos containing materials ("ACM") on the site. If fill material has been imported on to the site at any time, or if any buildings constructed prior to 1970 have been demolished on the site or material from such buildings disposed of on the site, the site may contain asbestos or ACM.

Except as otherwise expressly stated in this Report, GHD makes no warranty, statement or representation of any kind concerning the suitability of the site for any purpose or the permissibility of any use, development or re-development of the site.

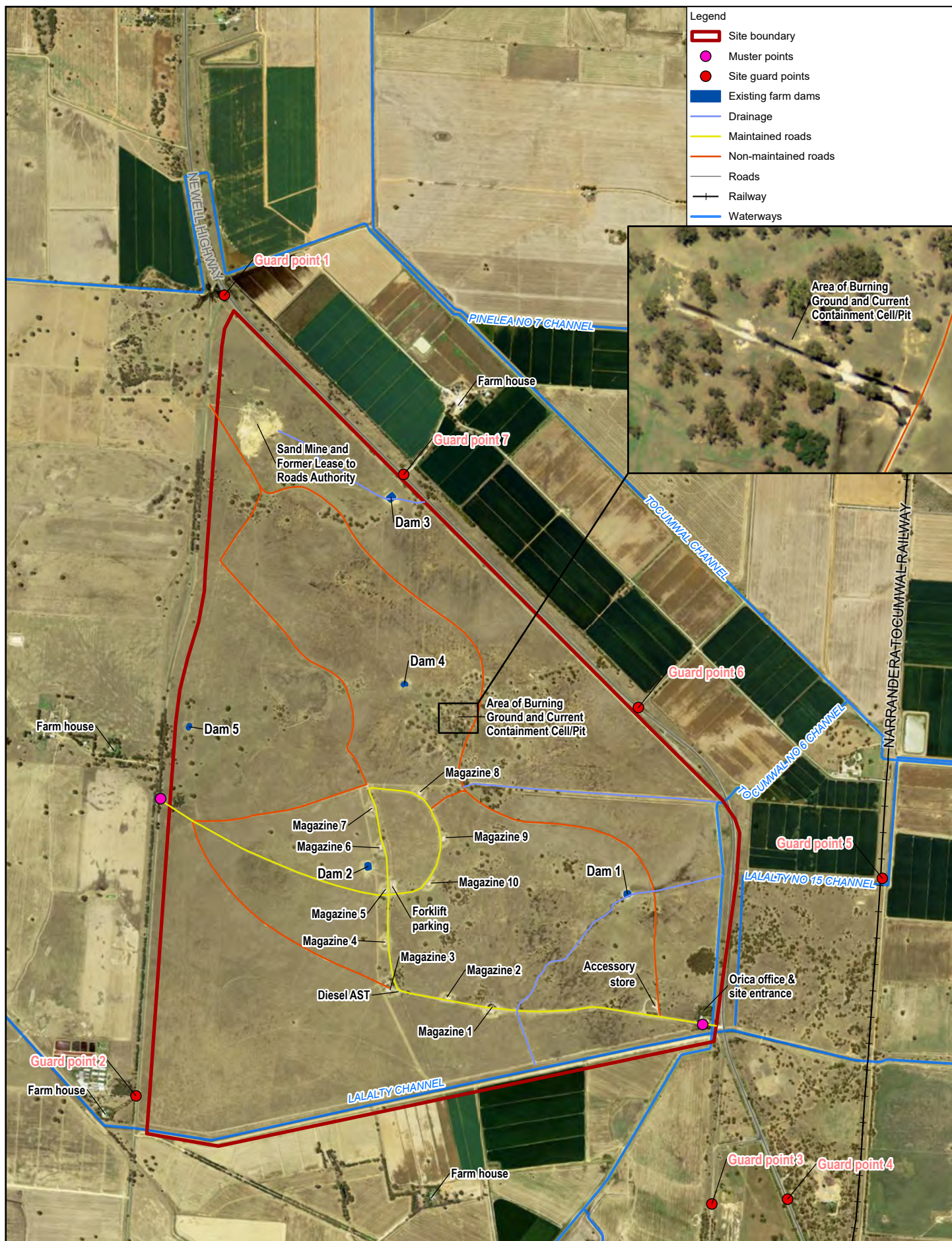
These Disclaimers should be read in conjunction with the entire Report and no excerpts are taken to be representative of the findings of this Report.

To the extent of any inconsistency between this Disclaimer and the terms of any service agreement between Orica and GHD pursuant to which this Report was prepared, the terms of the service agreement will prevail.

Appendix

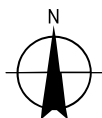
Appendix A

Figures



Paper Size ISO A4
0 500 1,000
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



Orica Australia Pty Ltd
Orica Tocomwal Magazine Compound Upgrade

Project No. 12597123
Revision No. A
Date 13/12/2023

Existing site layout

FIGURE 1

Appendix B

Photographic Log



Photograph 1 - Southeast corner site access from Newell Highway.



Photograph 2 - Internal gravel access looped track within the site.



Photograph 3 - Portions of the site are used for grazing.



Photograph 4 - Site office and other amenities (constructed in 2020).



Photograph 5 - Existing magazines surrounded by security fencing.



Photograph 6 - Earthen blast mounds located in the vicinity of Magazine 6.



Photograph 7 - Onsite self-bunded 2000 L diesel above ground storage tank (AST).



Photograph 8 - Onsite diesel AST with some staining on the concrete pad.



Photograph 9 - Location of containment cell with buried wastes which was also used as a burning ground.



Photograph 10 – The fenced containment cell, vegetated with trees and grasses.



Photograph 11 - Bare patches of land within the containment cell location.



Photograph 12 - Localised surface water ponding was noted in some areas.



Photograph 13 - Newell Highway.



Photograph 14 - Lalaly Drainage Channel to the south of the site.

Appendix C

Water NSW Groundwater Search Results

WaterNSW

Work Summary

GW504902

Licence:	Licence Status:
	Authorised Purpose(s):
	Intended Purpose(s): DOMESTIC
Work Type: Bore	
Work Status: Supply Obtained	
Construct.Method:	
Owner Type: Private	
Commenced Date:	Final Depth: 40.00 m
Completion Date: 01/01/1958	Drilled Depth: 40.00 m
Contractor Name:	
Driller: Unkown Unknown	
Assistant Driller:	
Property:	Standing Water Level 12.000
	(m):
GWMA:	Salinity Description: Good
GW Zone:	Yield (L/s):

Site Details

Site Chosen By:			
		County	Parish
		Form A: DENISON	TOCUMWAL
		Licensed:	Cadastral
			2/225459
Region: 50 - Murray		CMA Map: 8026-S	
River Basin: 409 - MURRAY RIVERINA		Grid Zone:	Scale:
Area/District:			
Elevation: 0.00 m (A.H.D.)		Northing: 6040021.000	Latitude: 35°46'30.7"S
Elevation Source: Unknown		Easting: 369401.000	Longitude: 145°33'18.3"E
GS Map: -		MGA Zone: 55	Coordinate Source: Map Interpre

Remarks

01/01/1958: Form A Remarks:
Entered by Clare Hillier

*** End of GW504902 ***

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW505624

Licence:
Licence Status:
Authorised Purpose(s):
Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore
Work Status: Replacement
Construct.Method: Rotary Mud
Owner Type: Private

Commenced Date:
Completion Date: 07/06/2013
Final Depth: 41.00 m
Drilled Depth: 41.00 m

Contractor Name: STRATHMERTON DRILLING PTY LTD
Driller: Heath Brian Madgwick
Assistant Driller: Brian (Jack) Madgwick

Property:
GWMA:
GW Zone:
Standing Water Level: 14.000 (m)
Salinity Description:
Yield (L/s): 4.000

Site Details

Site Chosen By:

County: DENISON
Form A: DENISON
Licensed:
Parish: TOCUMWAL
Cadastre: 2//225459

Region: 50 - Murray
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6040026.000
Easting: 369343.000
Latitude: 35°46'30.6"S
Longitude: 145°33'16.0"E

GS Map: -
MGA Zone: 55
Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	41.00	200			Rotary Mud
1		Annulus	Waterworn/Rounded	30.00	41.00				
1	1	Casing	P.V.C.	0.00	37.00	135			Suspended in Clamps, Glued, S: 40.00-41.00m
1	1	Opening	Screen	37.00	40.00	135		0	Stainless Steel, Other, A: 1.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
37.00	40.00	3.00	Unknown	14.00		4.00		01:30:00	500.00

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	34.00	34.00	clay	Clay	
34.00	35.50	1.50	sand	Sand	
35.50	37.00	1.50	clay	Clay	

37.00	40.00	3.00	sand	Sand	
40.00	41.00	1.00	silt	Silt	

Remarks

07/06/2013: Form A Remarks:

Helen Lester: Coordinates are taken from charted licence location.

*** End of GW505624 ***

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WaterNSW

Work Summary

GW505753

Licence: 50CA513685

Licence Status: CURRENT

Authorised Purpose(s): IRRIGATION

Intended Purpose(s): IRRIGATION

Work Type: Bore

Work Status: New Bore

Construct.Method:

Owner Type: Private

Commenced Date:

Completion Date: 04/05/2018

Final Depth: 66.00 m

Drilled Depth: 72.00 m

Contractor Name: Arcon Drilling

Driller: Rhys Henry Johnson

Assistant Driller: Will Johnson

Property: Cairns RMB 2383 Chinamans
Road TOCUMWAL 2714

GWMA: -

GW Zone: -

Standing Water Level 18.000
(m):

Salinity Description:

Yield (L/s): 50.000

Site Details

Site Chosen By: Driller, Client

County
Form A: DENISON
Licensed: DENISON

Parish
TOCUMWAL
TOCUMWAL

Cadastre
196//752296
Whole Lot
196//752296

Region: - (Not set)

CMA Map:

River Basin: - Unknown
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6039268.000
Easting: 367585.000

Latitude: 35°46'54.3"S
Longitude: 145°32'05.6"E

GS Map: -

MGA Zone: 55

Coordinate Source: Map Interpre

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	66.00	305			Rotary Mud
1		Hole	Hole	66.00	72.00	125			Rotary Mud
1		Annulus	Waterworn/Rounded	50.00	66.00				Graded, Q.0.650m3, PL-Poured/Shovelled
1		Backfill	Drilled Cuttings	66.00	72.00				
1	0	Casing	Abandoned Casing	0.00	66.00				
1	1	Opening	Slots - Vertical	0.00	0.00			0	
1	1	Casing	Steel Stainless 304	0.00	55.00	219	202		Held in Clamp, Welded - Butt
1	1	Opening	Perforations, Screen - Gauze/Mesh	55.00	66.00	219	207	0	Screen - Wedge Wire, Welded - Butt, A: 1.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
54.00	66.00	12.00	Unknown	18.00	21.00	50.00		00:04:00	155.00

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	11.00	11.00	sandy clay, brown grey	Sandy Clay	
11.00	12.00	1.00	clayey sand, grey	Clayey Sand	
12.00	23.00	11.00	sand, grey brown, mg	Sand	
23.00	30.00	7.00	clay, grey	Clay	
30.00	36.00	6.00	clayey sand, grey	Clayey Sand	
36.00	44.00	8.00	sand, brown grey, mg	Sand	
44.00	54.00	10.00	clay, brown	Clay	
54.00	66.00	12.00	sand, brown grey, cg	Sand	
66.00	72.00	6.00	clay, brown grey	Clay	
72.00	72.00	0.00	granite, white black, cg, hard	Granite	

Remarks

04/05/2018: Entered by Helen Lester - 30/7/2018

*** End of GW505753 ***

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW034602

Licence: 50WA510299

Licence Status: CURRENT

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): DOMESTIC

Work Type: Bore

Work Status:

Construct.Method: Rotary

Owner Type: Private

Commenced Date:
Completion Date: 01/02/1972

Final Depth: 20.70 m
Drilled Depth: 20.70 m

Contractor Name: (None)

Driller:

Assistant Driller:

Property: CAIRNLEA Silo Rd TOCUMWAL
2714 NSW
GWMA: 016 - LOWER MURRAY (D/S
COROWA)
GW Zone: 001 - MURRAY - CALVIL
REMARK

Standing Water Level
(m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

County
Form A: DENISON
Licensed: DENISON
Parish
TOCUMWAL
TOCUMWAL
Cadastre
196
Whole Lot
196/752296

Region: 50 - Murray
River Basin: 409 - MURRAY RIVERINA
Area/District:

CMA Map: 8026-S
Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6039146.000
Easting: 368114.000

Latitude: 35°46'58.5"S
Longitude: 145°32'26.6"E

GS Map: -

MGA Zone: 55

Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Opening	Perforations	-100.00	2.40	127		1	
1	1	Casing		-0.30	20.70	127			Driven into Hole

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
18.20	20.60	2.40	Unconsolidated	9.10		0.63			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	6.10	6.10	Clay	Clay	
6.10	12.19	6.09	Clay Sandy	Clay	
12.19	12.80	0.61	Sand	Sand	

12.80	18.29	5.49	Clay	Clay	
18.29	20.73	2.44	Sand Water Supply	Sand	

*** End of GW034602 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW504065

Licence:

Licence Status:

Authorised Purpose(s):

Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore

Work Status: Supply Obtained

Construct.Method: Rotary Mud

Owner Type: Private

Commenced Date:

Completion Date: 02/09/2009

Final Depth: 61.00 m

Drilled Depth: 61.00 m

Contractor Name: LLOYD ANGOVE DRILLING

Driller: Lloyd John Angove

Assistant Driller: Vaughn Rafferty

Property:

Standing Water Level: 27.000

(m):

GWMA:

Salinity Description:

GW Zone:

Yield (L/s): 5.000

Site Details

Site Chosen By:

County
Form A: DENISON
Licensed:

Parish
TOCUMWAL

Cadastre
11/1133460

Region: 50 - Murray

CMA Map: 8026-S

River Basin: 409 - MURRAY RIVERINA
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6038870.000
Easting: 366687.000

Latitude: 35°47'06.8"S
Longitude: 145°31'29.6"E

GS Map: -

MGA Zone: 55

Coordinate Source: GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	61.00	180			Rotary Mud
1	1	Casing	Pvc Class 12	0.00	59.00	140	116		Sealed on Bottom, Riveted and Glued
1	1	Opening	Screen - Round Wire	59.00	61.00	140		0	Stainless Steel 304, Riveted, A: 1.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
56.00	61.00	5.00	Unknown	27.00		5.00		03:00:00	

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	5.00	5.00	Clay, grey	Clay	
5.00	7.00	2.00	Clay, red	Clay	
7.00	14.00	7.00	Clay, grey	Clay	
14.00	16.00	2.00	Sandy clay, red	Sandy Clay	

16.00	38.00	22.00	Clay, grey	Clay	
38.00	39.00	1.00	Sandy clay, red	Sandy Clay	
39.00	56.00	17.00	Clay, red grey	Clay	
56.00	61.00	5.00	Sand, coarse, red	Sand	

Remarks

02/09/2009: Form A Remarks:

Entered by Clare Hillier

*** End of GW504065 ***

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW502436

Licence: Licence Status:
 Authorised Purpose(s):
 Intended Purpose(s): STOCK, DOMESTIC
 Work Type: Bore
 Work Status:
 Construct.Method:
 Owner Type:
 Commenced Date: Final Depth: 42.00 m
 Completion Date: 28/01/2004 Drilled Depth: 42.00 m
 Contractor Name: LLOYD ANGOVE DRILLING
 Driller: Lloyd John Angove
 Assistant Driller:
 Property: Standing Water Level 20.000
 (m):
 GWMA: Salinity Description:
 GW Zone: Yield (L/s): 2.000

Site Details

Site Chosen By:

County Parish Cadastre
 Form A: DENISON TOCUMWAL 22 715053
 Licensed:
 Region: 50 - Murray
 River Basin: - Unknown
 Area/District:
 CMA Map:
 Grid Zone: Scale:
 Elevation: 0.00 m (A.H.D.)
 Elevation Source: Unknown
 Northing: 6038618.000
 Easting: 366455.000
 Latitude: 35°47'14.9"S
 Longitude: 145°31'20.2"E
 GS Map: - MGA Zone: 55 Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	42.00	150			Rotary Mud
1		Annulus	(Unknown)	35.00	42.00				
1	1	Casing	Pvc Class 9	0.00	39.00	110	92		Sealed on Bottom, Glued
1	1	Opening	Slots - Diagonal, Screen	39.00	42.00	110		0	PVC Class 9, SL: 50.0mm
1	1	Opening	Slots - Diagonal, Screen	39.00	42.00	110		0	PVC Class 9, Glued, A: 1.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
35.00	42.00	7.00	Unknown	20.00	29.00	2.00		05:00:00	140.00

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.00	1.00	brown clay	Clay	

1.00	2.00	1.00	grey brown clay	Invalid Code	
2.00	8.00	6.00	grey clay	Clay	
8.00	10.00	2.00	yellow sandy clay	Invalid Code	
10.00	16.00	6.00	grey clay	Clay	
16.00	22.00	6.00	yellow grey clay	Invalid Code	
22.00	28.00	6.00	yellow brown sandy clay	Invalid Code	
28.00	33.00	5.00	brown sandy clay	Invalid Code	
33.00	35.00	2.00	grey brown clay	Invalid Code	
35.00	37.00	2.00	yellow brown fine sand	Invalid Code	
37.00	42.00	5.00	white coarse sand	Invalid Code	

*** End of GW502436 ***

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WaterNSW

Work Summary

GW504216

Licence:

Licence Status:

Authorised Purpose(s):
Intended Purpose(s): STOCK

Work Type: Bore
Work Status: Supply Obtained
Construct.Method: Rotary Mud
Owner Type: Private

Commenced Date:
Completion Date: 25/09/2007

Final Depth: 38.00 m
Drilled Depth: 38.00 m

Contractor Name: LLOYD ANGOVE DRILLING
Driller: Lloyd John Angove
Assistant Driller: Rhys JOHNSON

Property:

Standing Water Level 12.000
(m):

GWMA:
GW Zone:

Salinity Description:
Yield (L/s): 2.000

Site Details

Site Chosen By:

County
Form A: DENISON
Licensed:
Parish
TOCUMWAL
Cadastre
21/715053

Region: 50 - Murray
River Basin: 409 - MURRAY RIVERINA
Area/District:

CMA Map: 8026-S
Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6039866.000
Easting: 366257.000

Latitude: 35°46'34.3"S
Longitude: 145°31'13.1"E

GS Map: -

MGA Zone: 55

Coordinate Source: GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	38.00	150			Rotary Mud
1	1	Casing	Pvc Class 12	0.00	33.00	115	91		Sealed on Bottom, Glued
1	1	Opening	Slots - Diagonal	33.00	38.00	115		0	Casing - Machine Slotted, PVC Class 12, Glued, SL: 50.0mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
33.00	38.00	5.00	Unknown	12.00		2.00		02:00:00	

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	6.00	6.00	Clay, brown grey	Clay	
6.00	10.00	4.00	Sand, grey	Sand	
10.00	19.00	9.00	Clay, grey brown	Clay	
19.00	23.00	4.00	Clay, grey	Clay	

23.00	24.00	1.00	Sand, brown	Sand	
24.00	28.00	4.00	Sandy clay, brown grey	Sandy Clay	
28.00	29.00	1.00	Sand, grey	Sand	
29.00	33.00	4.00	Clay, grey brown	Clay	
33.00	37.00	4.00	Sand, grey	Sand	
37.00	38.00	1.00	Clay, grey	Clay	

Remarks

25/09/2007: Form A Remarks:
Entered by Clare Hillier

*** End of GW504216 ***

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WaterNSW

Work Summary

GW061544

Licence:

Licence Status:

Authorised Purpose(s):

Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore

Work Status:

Construct.Method: Rotary

Owner Type: Private

Commenced Date:

Completion Date: 01/01/1980

Final Depth: 28.00 m

Drilled Depth:

Contractor Name: (None)

Driller:

Assistant Driller:

Property:

Standing Water Level

(m):

GWMA:

Salinity Description:

GW Zone:

Yield (L/s):

Site Details

Site Chosen By:

County
Form A: DENISON
Licensed:

Parish
TOCUMWAL

Cadastre
119

Region: 50 - Murray

CMA Map:

River Basin: 409 - MURRAY RIVERINA
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6040286.000
Easting: 366013.000

Latitude: 35°46'20.5"S
Longitude: 145°31'03.6"E

GS Map: -

MGA Zone: 55

Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	P.V.C.	0.00	0.00	102			

*** End of GW061544 ***

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WaterNSW

Work Summary

GW505522

Licence:

Licence Status:

Authorised Purpose(s):

Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore

Work Status: Supply Obtained

Construct.Method: Rotary Mud

Owner Type: Private

Commenced Date:

Completion Date: 02/11/2011

Final Depth: 42.00 m

Drilled Depth: 42.00 m

Contractor Name: LLOYD ANGOVE DRILLING

Driller: Lloyd John Angove

Assistant Driller: Barry ANGOVE

Property:

Standing Water Level 15.000
(m):

GWMA:

Salinity Description:

GW Zone:

Yield (L/s): 1.000

Site Details

Site Chosen By:

County
Form A: DENISON
Licensed:

Parish
TOCUMWAL

Cadastra
198/752296

Region: 50 - Murray

CMA Map: 8026-S

River Basin: 409 - MURRAY RIVERINA
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6041490.000
Easting: 366555.000

Latitude: 35°45'41.7"S
Longitude: 145°31'25.9"E

GS Map: -

MGA Zone: 55

Coordinate Source: GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	42.00	180			Rotary Mud
1	1	Casing	Pvc Class 12	0.00	38.00	115	91		Sealed on Bottom, Riveted and Glued
1	1	Opening	Slots - Diagonal	38.00	42.00	115		0	Casing - Machine Slotted, PVC Class 12, Riveted and Glued, SL: 50.0mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
38.00	42.00	4.00	Unknown	15.00		1.00		03:00:00	

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.00	1.00	Clay, dark grey	Clay	
1.00	7.00	6.00	Clay, grey	Clay	
7.00	10.00	3.00	Gravel coarse, yellow grey	Gravel with Clay	
10.00	12.00	2.00	Sand, grey	Sand	

12.00	16.00	4.00	Clay, grey	Clay	
16.00	18.00	2.00	Sand, grey	Sand	
18.00	21.00	3.00	Clay, grey	Clay	
21.00	22.00	1.00	Sandy clay, grey	Sandy Clay	
22.00	38.00	16.00	Clay, grey brown	Clay	
38.00	42.00	4.00	Sand coarse, yellow brown	Sand and clay bands	

Remarks

02/11/2011: Form A Remarks:

Entered by Clare Hillier

Unable to enter gravel pack as type and grade not nominated

*** End of GW505522 ***

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW504683

Licence:	Licence Status:
	Authorised Purpose(s): Intended Purpose(s): STOCK, DOMESTIC
Work Type: Bore	
Work Status: Supply Obtained	
Construct.Method:	
Owner Type: Private	
Commenced Date:	Final Depth: 36.00 m
Completion Date: 01/01/1955	Drilled Depth: 36.00 m
Contractor Name:	
Driller:	
Assistant Driller:	
Property:	Standing Water Level 11.000 (m):
GWMA:	Salinity Description: Good
GW Zone:	Yield (L/s): 1.000

Site Details

Site Chosen By:

Form A: DENISON Licensed:	County Parish TOCUMWAL	Cadastre 198/752296
Region: 50 - Murray River Basin: 409 - MURRAY RIVERINA Area/District:	CMA Map: 8026-S Grid Zone:	Scale:
Elevation: 0.00 m (A.H.D.) Elevation Source: Unknown	Northing: 6041506.000 Easting: 366331.000	Latitude: 35°45'41.1"S Longitude: 145°31'17.0"E
GS Map: -	MGA Zone: 55	Coordinate Source: Map Interpre

Remarks

01/01/1955: Form A Remarks:
Entered by Clare Hillier
Casing type steel.. Outside diam 15 length 36. Screen from 34m to 36m

*** End of GW504683 ***

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WaterNSW

Work Summary

GW273107

Licence:

Licence Status:

Authorised Purpose(s):

Intended Purpose(s): MONITORING BORE

Work Type: Bore

Work Status: Equipped

Construct.Method: Rotary Mud

Owner Type: NSW Office of Water

Commenced Date:

Completion Date: 24/05/2009

Final Depth: 131.00 m

Drilled Depth: 131.00 m

Contractor Name: DWE GROUNDWATER DRILLING

Driller: Daniel William Orr

Assistant Driller: Dan Whitby

Property:

Standing Water Level 35.100

(m):

GWMA:

Salinity Description:

GW Zone:

Yield (L/s): 3.000

Site Details

Site Chosen By:

Form A: County
DENISON
Licensed:

Parish
WOPERANA

Cadastral
114/752304

Region: 50 - Murray

CMA Map: 8026-N

River Basin: 409 - MURRAY RIVERINA
Area/District:

Grid Zone:

Scale:

Elevation: 107.77 m (A.H.D.)
Elevation Source: (unknown)

Northing: 6044432.000
Easting: 367236.000

Latitude: 35°44'06.6"S
Longitude: 145°31'54.8"E

GS Map: -

MGA Zone: 55

Coordinate Source: Surveyed

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	131.00	200			Rotary Mud
1		Annulus	Concrete	0.00	4.00	200	90		PL: Poured/Shovelled
1		Annulus	Waterworn/Rounded	4.00	47.00	200	90		Graded, PL: Poured/Shovelled
1		Annulus	Bentonite	47.00	48.00	200	90		PL: Poured/Shovelled
1		Annulus	Waterworn/Rounded	48.00	86.00	200	90		Graded, PL: Poured/Shovelled
1		Annulus	Bentonite	86.00	87.00	200	90		PL: Poured/Shovelled
1		Annulus	Waterworn/Rounded	87.00	131.00	200	90		Graded, PL: Poured/Shovelled
1		Casing	Casing Protector	-1.00	0.00	168	158		Cemented
1	1	Casing	Pvc Class 18	-0.50	131.00	90	77		Sealed, Glued, S: 109.00-115.00m
1	1	Opening	Slots - Horizontal	106.00	109.00	90		0	Mechanically Slotted, PVC Class 18, Glued, SL: 35.0mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
106.00	109.00	3.00	Unknown	35.10		3.00		12:00:00	

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	3.00	3.00	Topsoil	Topsoil	
3.00	7.00	4.00	Sand, coarse	Sand	
7.00	11.00	4.00	Clay, light brown	Clay	
11.00	42.00	31.00	Clay, light brown with some Mottling	Clay	
42.00	46.00	4.00	Sand	Sand	
46.00	89.00	43.00	Clay	Clay	
89.00	111.00	22.00	Sand	Sand	
111.00	122.00	11.00	Clay	Clay	
122.00	130.00	8.00	Bedrock, weathered	Bedrock	
130.00	131.00	1.00	Bedrock	Bedrock	

Remarks

24/05/2009: Form A Remarks:

Nat Carling, 24-June-2009: GPS provided by the driller.

13/07/2010: Nat Carling, 13-July-2010: Updated coordinates & added RL's as provided by survey results received from State Water. Also updated cadastre details, as no information existed.

WaterNSW

Work Summary

GW504972

Licence:

Licence Status:

Authorised Purpose(s):

Intended Purpose(s): STOCK, DOMESTIC, FARMING

Work Type: Bore

Work Status: Supply Obtained

Construct.Method:

Owner Type: Private

Commenced Date:

Completion Date: 01/01/1920

Final Depth: 30.00 m

Drilled Depth: 61.00 m

Contractor Name:

Driller: Unknown Unknown

Assistant Driller:

Property:

Standing Water Level

(m):

GWMA:

Salinity Description:

GW Zone:

Yield (L/s):

Site Details

Site Chosen By:

County
Form A: DENISON
Licensed:

Parish
WOPERANA

Cadastre
1141/752304

Region: 50 - Murray

CMA Map: 8026

River Basin: 409 - MURRAY RIVERINA
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6044713.000
Easting: 366852.000

Latitude: 35°43'57.3"S
Longitude: 145°31'39.6"E

GS Map: -

MGA Zone: 55

Coordinate Source: Map Interpret

Remarks

01/01/1920: Form A Remarks:
Entered by Clare Hillier

*** End of GW504972 ***

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WaterNSW

Work Summary

GW504638

Licence:	Licence Status:
	Authorised Purpose(s): Intended Purpose(s): DOMESTIC
Work Type: Bore	
Work Status: Supply Obtained	
Construct.Method:	
Owner Type: Private	
Commenced Date:	Final Depth: 20.00 m
Completion Date: 26/05/2011	Drilled Depth: 20.00 m
Contractor Name:	
Driller:	
Assistant Driller:	
Property:	Standing Water Level (m):
GWMA:	Salinity Description:
GW Zone:	Yield (L/s):

Site Details

Site Chosen By:			
	County Form A: DENISON Licensed:	Parish TOCUMWAL	Cadastral 1241/785541
Region: 50 - Murray	CMA Map: 8026		
River Basin: 409 - MURRAY RIVERINA Area/District:	Grid Zone:	Scale:	
Elevation: 0.00 m (A.H.D.) Elevation Source: Unknown	Northing: 6042861.000 Easting: 368283.000	Latitude: 35°44'58.1"S Longitude: 145°32'35.5"E	
GS Map: -	MGA Zone: 55	Coordinate Source: Map Interpre	

Remarks

26/05/2011: Form A/Remarks:
Entered by Clare Hillier

*** End of GW504638 ***

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW012744

Licence: 50WA510277

Licence Status: CURRENT

Authorised Purpose(s): DOMESTIC, STOCK

Intended Purpose(s): GENERAL USE

Work Type: Bore

Work Status: Supply Obtained

Construct.Method: Cable Tool

Owner Type: Private

Commenced Date:

Completion Date: 01/01/1956

Final Depth: 33.50 m

Drilled Depth:

Contractor Name: (None)

Driller:

Assistant Driller:

Property: LONGFORD RMB 1670
TOCUMWAL 2714 NSW
GWMA: 016 - LOWER MURRAY (D/S
COROWA)
GW Zone: 001 - MURRAY - CALMIL
REMARK

Standing Water Level
(m):

Salinity Description:

Yield (L/s):

Site Details

Site Chosen By:

County
Form A: DENISON
Licensed: DENISON

Parish
TOCUMWAL
BERIGAN

Cadastral
173
Whole Lot
173/752296

Region: 50 - Murray

River Basin: 409 - MURRAY RIVERINA
Area/District:

CMA Map: 8026-S

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6041204.000
Easting: 369741.000

Latitude: 35°45'52.5"S
Longitude: 145°33'32.6"E

GS Map: -

MGA Zone: 55

Coordinate Source: GD, ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Threaded Steel	0.00	33.50	102			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
33.50	33.50	0.00	(Unknown)	15.20					

*** End of GW012744 ***

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Appendix D

Historical aerial photographs

1967 - Source: NSW Historical Imagery



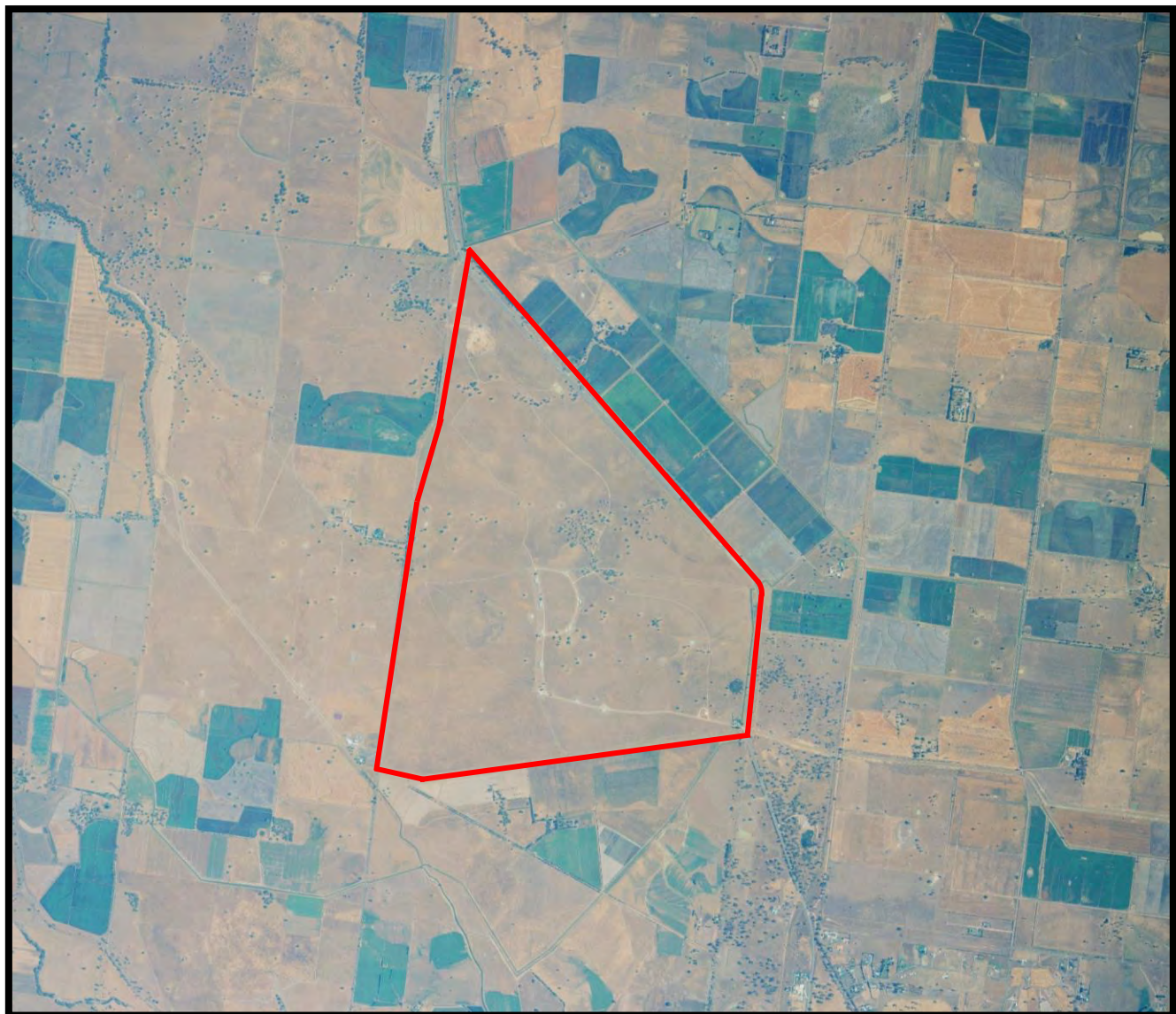
1975 - Source: NSW Historical Imagery



1990 - Source: NSW Historical Imagery



1995 - Source: NSW Historical Imagery



2010 - Source: Nearmaps



2023 - Source: Google Earth





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➔ The Power of Commitment