Shoalhaven District Memorial Hospital

Health Infrastructure

Ground Water Management Plan

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Rev	Date	Prepared By [Name & Signature]	Reviewed By [Name & Signature]	Approved By	Remarks
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1 Revisions and Distribution

1.1 Revisions

Draft issues of this document shall be identified as Revision A, B, C, etc. Upon initial issue (Contract Award) this shall be changed to a sequential number commencing at Revision 0. Subsequent revision numbers shall be Rev. 1, 2, etc.

1.2 Distribution List

Principal's Representative	Via Aconex
Project Manager	Via Aconex
Project Site Manager	Via Aconex
HSEQ Manager	Via Aconex
Project Environment Representative	Via Aconex

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1.3 Development Consent Conditions

Table 1 SSD 35999468 Compliance Table

Consent Condition Requirements		Reference
B17	Prior to the commencement of construction, the Applicant must submit a Construction Environmental Management Plan (CEMP) to the Certifier and must be published on the Applicant's website in accordance with condition A23. The CEMP must include, but not be limited to, the following:	This Plan
a)	Details of: i) Ground water management including measures to prevent ground water contamination	This Plan

2 Definitions

AMS – Activity Method Statement

SDMH – Shoalhaven District Memorial Hospital

Principal – Health Infrastructure

DPIE – Department of Planning, Industry and Environment

CEMP – Construction Environmental Management Plan

ENM – Excavated Natural Material

EPA – Environmental Protection Authority

FM – Foreman / Supervisor

OEH – Office of Environment and Heritage

PER – Project Environmental Representative

PM – Project Manager

RAP – Remediation Action Plan

SEP – Site Environmental Plan

SM – Site Manager / Superintendent

TRA – Task Risk Assessment

VENM – Virgin Excavated Natural Material

WRA – Workplace Risk Assessment

3 Scope of the Ground Water Management Plan

EMS reference
Ground Water Management Plan JH-MAN-ENV-001

The SDMH site is located along the banks of the Shoalhaven River in Nowra. The project site comprises a total of 29,600m^2. The Project will have an indicative building footprint of approximately 8,860m^2, whilst the remaining 20,920m^2 will comprise of ground plane access, public domain, and landscaping works. The project includes.

- A new emergency department (ED) and emergency short-stay unit to improve patient flow and reduce wait times
- New state-of-the-art intensive care unit (ICU)
- Theatres and endoscopy procedure rooms, doubling capacity
- A dedicated cardiology inpatient unit (IPU), coronary care unit and catheterisation lab
- A new vascular surgery service and expanded orthopaedic, general surgery and urology services
- Overnight surgical IPUs and a dedicated day surgery unit
- New medical IPUs for specialties including gastroenterology, respiratory, oncology, endocrinology, and general medicine
- A new acute mental health IPU
- A psychiatric emergency care centre for emergency and crisis response adjacent to the ED
- An expanded acute stroke unit collocated with a dedicated rehabilitation service to ensure early access to rehabilitation and minimise functional loss
- A new nuclear medicine department to support expanded clinical services including cancer, cardiology, and respiratory care
- A new MRI service to provide improved diagnostic capacity
- Expanded medical imaging including CT, X-ray, ultrasound, and mammography to support clinical services
- Significant increase in aged care capacity in a dedicated ward
- A sub-acute geriatric evaluation and management service
- A dedicated palliative care facility
- A new paediatric assessment unit which will provide additional capacity for day presentations and short-stay admissions
- A specialist rehabilitation unit for a range of conditions including stroke, orthopaedics, brain, and spine injuries
- Expanded outpatient departments for follow up and management of admitted and non-admitted services
- Helipad on top of the new building with direct access to ICU and ED
- Link bridge to the existing Shoalhaven Memorial Hospital

Table 2 SDMH Staging:

Stage No.	Proposed works	Duration	Forecast Start Date	Forecast Finish Date
Stage 1	Demolition / Tree Clearing / Civil Works New Roadway BOC Delivery Area	4 months	May 2023	Aug 2023
Stage 2	Bulk Excavation, Piling	3 months	Aug 2023	Oct 2023
Stage 3	Footings, Inground Services & level 00	4 months	Oct 2023	Dec 2023
Stage 4	Superstructure (level L1-L4)	6 months	Dec 2023	June 2024
Stage 5	Superstructure (level L5-L7)	5 months	April 2024	Aug 2024
Stage 6	Façade and Fitout & Services	11 months	Mar 2024	Jan 2025
Stage 7	Landscaping and External Works	8 months	Feb 2025	Sep 2025

This Groundwater Management Plan outlines the strategies and measures to effectively manage groundwater resources for the construction and operation of a new hospital in Shoalhaven. The plan aims to ensure the sustainable use of groundwater, minimise environmental impact, and comply with ISO AS/NZS14001. It includes groundwater assessment, objectives, monitoring program, mitigation measures, and an emergency response plan. Consistent with John Holland Environment Policy, the intended outcomes of this CWMP include:

- Enhancement of environmental performance on the project.
- Fulfilment of the Project's compliance obligations; and
- Achievement of the Project's environmental objectives.

This Ground Water Management Plan is applicable to all construction phase works associated with the SDMH project (John Holland and subcontractors).

3.1 Project Location

The site is located at 39 Shoalhaven Street Nowra, 160km South of Sydney. Within Nowra, the hospital is located north-west of the main business district and sits in an elevated position adjacent to and overlooking the Shoalhaven River. The precinct is bounded by Shoalhaven Street to the east, north street to the south and scenic drive to the west and is located within the Shoalhaven City Council area.

The site comprises is legally described as Lot 104 in Deposited Plan 1165533, Lot 7034 in Deposited Plan 1031852 and Lot 373 in Deposited Plan 755952.

The site is approximately 400m from the Shoalhaven Town Centre, 16km from Shoalhaven Heads and 12km to Nowra airport. The site is connected to Shoalhaven's public transport via an existing bus route which stops outside the existing hospital on both Shoalhaven Street and Scenic Drive.

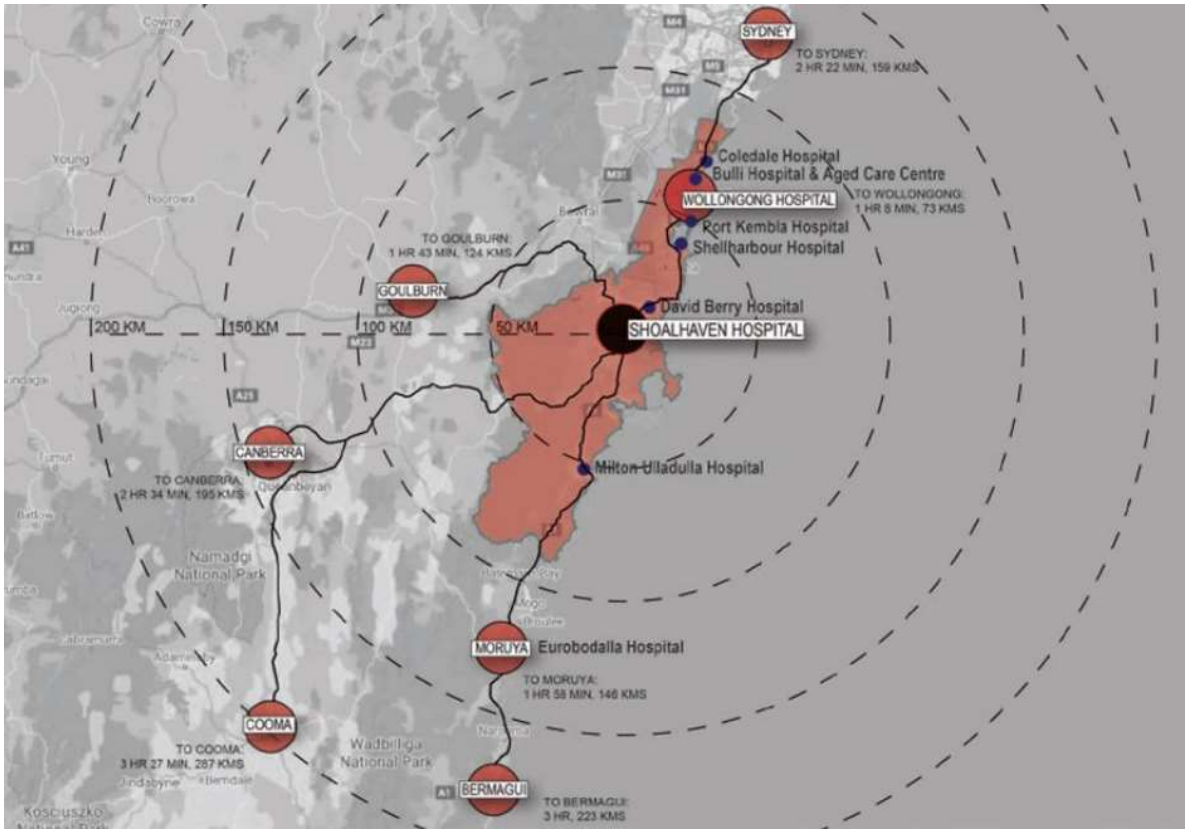

Figure 1 Regional Locality Plan

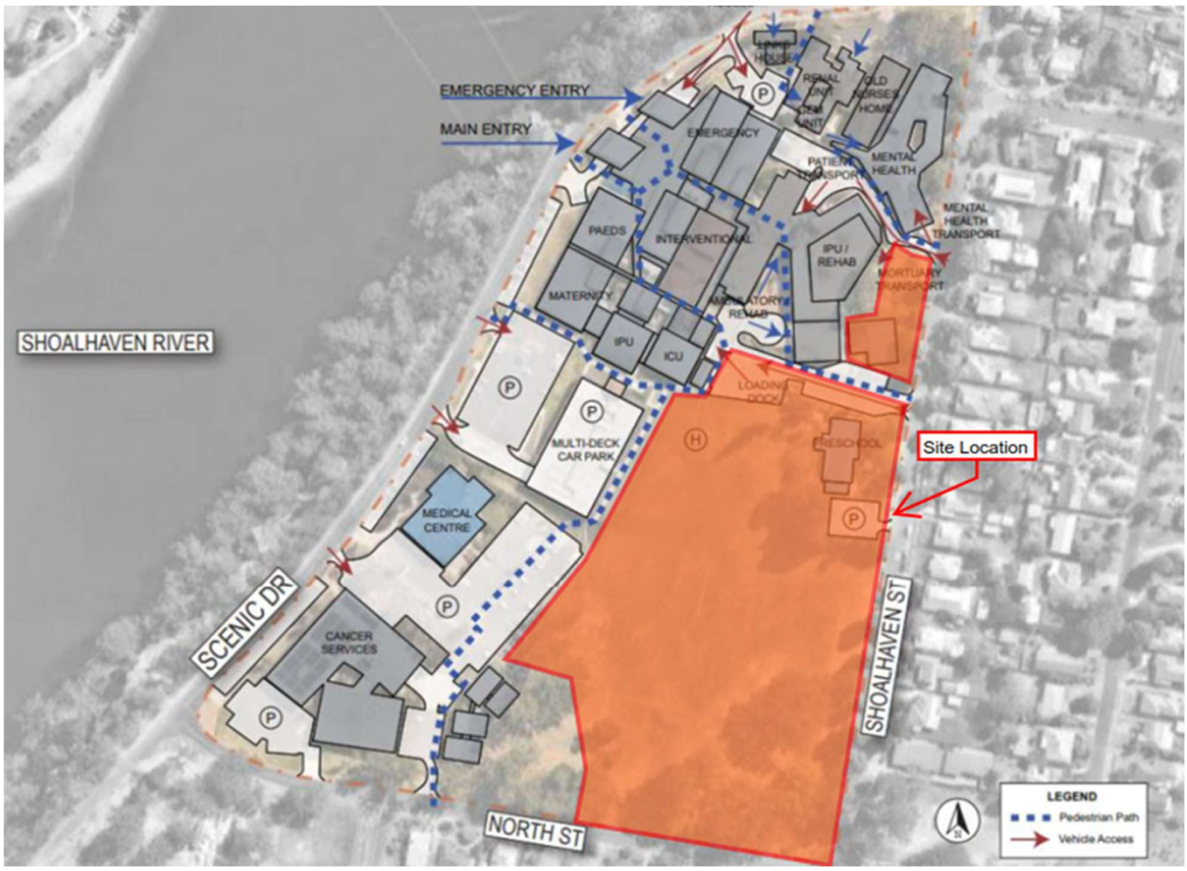

Figure 2 Locality Plan

4 Performance

4.1 Objectives

The Objectives of the ground water management plan are to:

- Ensure sustainable use of groundwater during construction and hospital operations.
- Prevent contamination of groundwater and nearby receptors.
- Comply with all relevant local, state, and federal regulations.
- Implement a groundwater monitoring program to assess impacts and trigger mitigation measures as necessary.

4.2 Groundwater Assessment

A groundwater assessment was conducted to understand the site's hydrogeology, including:

- Aquifer characteristics
- Groundwater flow direction and gradient
- Water quality analysis
- Depth to the water table
- Potential impacts on nearby wells and surface water bodies

5 Legislation and Guidance Documentation

5.1 State legislation, Standards & Codes

- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Protection of the Environment Operations Act 1997 (POEO Act)
- State Environmental PLANNING Policies (SEPPs)
- Local Environmental Plans (LEPs)
- Contaminated Land Management Act 1997
- National Construction Code (NCC)
- Water Management Act 2000
- Shoalhaven Council Regulations

5.2 Supporting Documentation

- Construction Environmental Management Plan (CEMP)
- Site Environmental plan (SEP)
- Soil & Erosion Control Plan
- Construction Soil and Water Management Plan (CSWMP)
- Construction Management Plan (CMP)
- John Holland Hazardous Chemical Management Procedure
- John Holland Resource Use Reporting Procedure (JH-MPR-ENV-002)
- John Holland Incident and Event Management Procedure (JH-MPR-SQE-010)
- Unexpected Finds protocol for contamination (Appendix 6 of the CEMP)
- John Holland Global Mandatory Requirements #9 –Environmental Management (GMR#9)
- State Significant Development approval SSD-10831778

- Storing and Handling Liquids: Environmental Protection – Participants Manual (NSW Department of Environment and Climate Change (DECC) 2007).
- State Significant Development Consent SSD-10831778
- Geotechnical Investigation Report (Stantec SHR-STC-STW-REP-GEO-91X003)
- Environmental Site Assessment (Stantec SHR-STC-STW-REP-HAZ-91X002)
- Data Gap Investigation (Stantec SHR-STC-STW-REP-HAZ-91X003)

6 Ground Water Monitoring Program

A comprehensive groundwater monitoring program was established prior to the commencement of construction to understand the following:

- Regularly measure groundwater levels and quality.
- Monitor nearby wells for potential impacts (pre-construction only)
- Establish baseline data before construction begins.
- Use appropriate analytical methods and reporting protocols.

6.1 Existing Groundwater Monitoring Wells

Two groundwater monitoring wells, BH104 and BH105, were installed along the western boundary of the Site as described in the JK Geotechnics report (2017). The installation details and initial standing water level (SWL) measurements for these wells are as follows:

6.1.1 BH104

- Installed Depth: 7.0 meters
- Condition at Completion: Dry
- SWL After 24 Hours: 6.0 meters below ground level (bgl)
- SWL After 40 Hours: 5.5 meters bgl

6.1.2 BH105

- Installed Depth: 5.5 meters
- Condition at Completion: Dry
- SWL After 24 Hours: 4.0 meters bgl
- These existing monitoring wells will be incorporated into the monitoring program to track changes in groundwater levels and quality over time.

6.2 Assessment of Nearby Bores

A review of publicly registered bores within the WaterNSW database identified twenty bores located within 500 meters of the Site. These bores comprise a mix of domestic and monitoring bores, all situated downgradient (east/northeast) of the Site. Key details about the two closest bores are as follows:

6.2.1 GW101695

- Location: Approximately 164 meters northeast of the Site
- Bore Type: Domestic water supply bore
- Installed Depth: 48 meters (in sandstone)
- No recorded standing water level or water-bearing zones.

6.2.2 GW112969

- Location: Approximately 293 meters east of the Site
- Bore Type: Monitoring bore
- Installed Depth: 7.70 meters (in clay and sandstone)
- No recorded standing water level or water-bearing zones.

These nearby bores will also be considered in the monitoring program to assess potential impacts from the construction and operation of the hospital on the groundwater resources in the area. Regular monitoring of these existing wells and bores prior to the commencement of construction was utilised to determine the groundwater levels and what impact construction would have on this.

7 Mitigation measures

The following mitigation measures were implemented to address potential groundwater-related issues, including maintaining the integrity of existing monitoring wells and assessing nearby bores prior to construction:

7.1 Maintenance of Existing Monitoring Wells (BH104 and BH105):

- Regularly inspect and maintain BH104 and BH105 to ensure their structural integrity.
- Conduct periodic checks to ensure that well screens remain free of obstructions.
- Measure and record groundwater levels and quality in these wells according to the established monitoring program.

7.2 Assessment of Nearby Bores:

- Regularly monitor the nearby bores GW101695 and GW112969 to ensure their structural integrity.
- Periodically assess the bores for any changes in standing water levels or water quality.
- Coordinate with relevant authorities to investigate potential impacts from the hospital's construction and operation on these nearby bores.

7.3 Contaminant Prevention:

- Implement best management practices during construction activities to prevent the release of contaminants that could impact groundwater quality – refer to project sub-plans.
- Properly store and handle hazardous materials, ensuring they are securely contained to prevent potential groundwater contamination.
- Adhere to a strict spill response plan to address any accidental releases promptly.

8 Contamination Response Plan

The Contamination Response Plan will include provisions for addressing groundwater-related emergencies, such as accidental contamination. It will incorporate the following elements:

8.1 Notification Procedures:

- Establish clear and immediate notification procedures in the event of a groundwater-related emergency.
- Ensure that relevant authorities, including local environmental agencies & project stakeholders are promptly informed.

8.2 Emergency Actions:

- Define specific actions to contain and mitigate the emergency, with a focus on preventing further contamination and safeguarding groundwater resources.
- Engage trained personnel and resources to respond effectively and to provide advise on any rectification required.

8.3 Reporting and Documentation:

- Maintain detailed records of the emergency response, including actions taken, individuals involved, and timelines.
- Prepare incident reports for regulatory agencies as required by applicable regulations and guidelines.

9 Conclusion

In conclusion, the Groundwater Management Plan for the new Shoalhaven Hospital site is designed to protect/inform and manage groundwater resources prior to, during construction and in the final state of hospital operations. The plan incorporates a comprehensive groundwater monitoring program which has been complete to understand groundwater conditions and levels.

By diligently adhering to this Groundwater Management Plan, we aim to safeguard groundwater resources, minimise environmental impact, and meet all relevant regulatory requirements. Regular monitoring of onsite works, maintenance, and compliance with all sub-plans will ensure non contamination of groundwater will occurring during construction of the project.

During the pre-construction survey of project bore holes and monitoring wells the project works have deemed to have no impact on the groundwater located within the vicinity of the project mainly due to the height of excavation and works involved to complete the project.

During construction there will be a high level of importance placed on the Soil & Erosion control plan/Environmental management plan & all project sub-plans to ensure that no run off or construction activities lead to leaching or contamination.