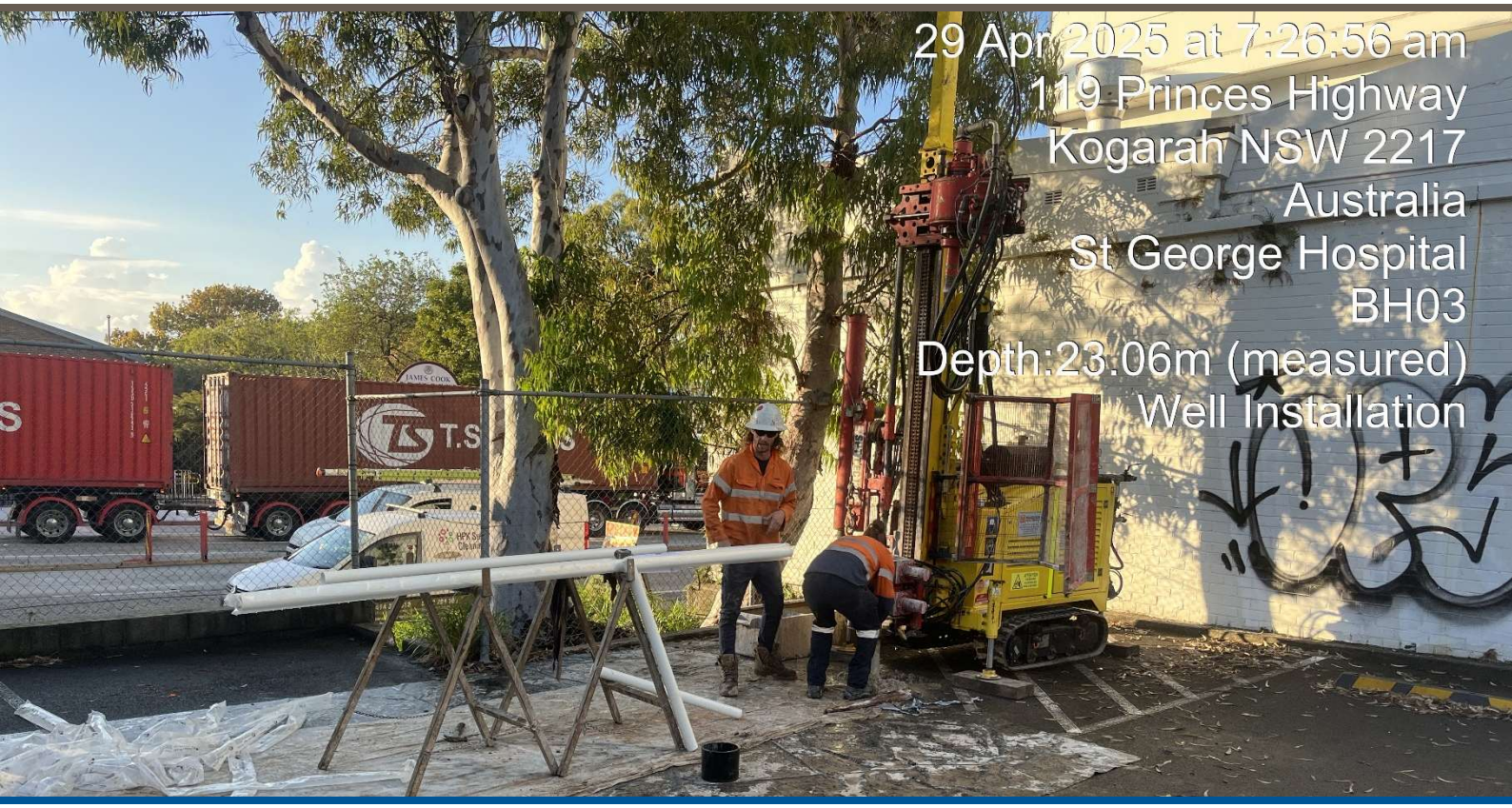
St George Private Hospital Expansion at 119 – 129 Princes Highway and 2 Hogben Street, Kogarah, and 1 South Street, Kogarah

Groundwater Impact Assessment

Akalan Projects Pty Ltd



Reference: SYDGE381816AB

22 October 2025

ST GEORGE PRIVATE HOSPITAL EXPANSION

Groundwater Impact Assessment

Report reference number: SYDGE381816AB
22 October 2025

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1. INTRODUCTION

Tetra Tech Coffey Pty Ltd (Tetra Tech Coffey) was engaged by Akalan Projects Pty Ltd to prepare this groundwater impact assessment in support of a State Significant Development Application (SSDA) submitted to the Department of Planning, Housing and Infrastructure (DPHI) under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act 1979).

The SSDA seeks approval for the expansion of the St George Private Hospital. Specifically, the SSDA seeks consent for two components: the first being the construction of a health services facility (hospital), and the second relating to upgrades to the main hospital campus, including a new emergency department.

This report covers the proposed clinical tower site only and excludes the main hospital campus. Fieldwork investigations were not necessary for the proposed main hospital upgrade works as these works do not require substantial ground works and largely relate to ground level layout alterations.

This groundwater impact assessment provides an assessment of existing groundwater conditions and a minimal impact assessment according to the NSW Aquifer Interference Policy (2012), and responds to the Secretary's Environmental Assessment Requirements (SEARs) issued by DPHI on 30 June 2025 in relation to the project.

This report includes the following:

- Summary of proposed development including basement geometry
- Site hydrogeology, including observed groundwater levels, aquifer hydraulic conductivity and well construction details.
- Groundwater inflow assessment and commentary on the estimated groundwater drawdown induced settlement.
- Summary of groundwater quality laboratory test results.
- Expected groundwater take and discussion of relevant licensing requirements or exemptions.
- Commentary on likely groundwater treatment and disposal methods.

2. SEARS RELEVANT TO THIS REPORT

This report has been prepared to respond to the SEARs issued for the St George Private Hospital Expansion project. The SEARs relevant to this groundwater impact assessment are detailed in Table 1.

Table 1: SEARs for groundwater

Issue and assessment requirements	Documentation	Response
13. Ground and Water Conditions • **Provide a Groundwater Impact Assessment that assesses potential impacts on:** ○ **Groundwater resources in accordance with the *Groundwater Guidelines*[1]**	Groundwater Impact Assessment	This SEARs requirement is addressed by this Groundwater Impact Assessment, which provides the results of groundwater investigations and assessment based on the NSW Aquifer Interference Policy (2012).

[1]: The Groundwater Guidelines were not defined in the SEARs. This report provides the results of groundwater investigations and assessment based on the NSW Aquifer Interference Policy (2012).

3. AVAILABLE INFORMATION

The following sources of information were referred to in preparation of this hydrogeological assessment:

- DPIE (2012). NSW Aquifer Interference Policy, NSW Government policy for the licensing and assessment of aquifer interference activities. Publication number: 11445. September 2012.
- DPIE (2022a). Guidelines for Groundwater Documentation for SSD/SSI Projects. Technical guideline. January 2022.
- DPIE (2022b). Minimum requirements for building site groundwater investigation and reporting, Information for developers and consultants. Ref. PUB20/940. October 2022.
- BoM (2016). Design Rainfall Data System
    - http://www.bom.gov.au/water/designRainfalls/revised-ifd/
- BoM (2020a). Groundwater Dependent Ecosystem Atlas.
    - http://www.bom.gov.au/water/groundwater/gde/map.shtml
- BoM (2020b). Climate Data Online.
    - http://www.bom.gov.au/climate/data/
- Patch Planning and Development (2025). Consultant report template, St George Private Hospital Expansion at 119 – 129 Princes Highway and 2 Hogben Street, Kogarah, and 1 South Street, Kogarah, dated July 2025

4. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The site is in the Georges River Local Government Area (LGA), within the Kogarah town centre.

Clinical Tower Site

The proposed new health services facility (hospital) will be located on land that is bound by three road frontages, being Princes Highway to the east (a classified road), Hogben Street to the north, and Bank Lane to the west. This site comprises eight adjoining allotments of land, known as 119 – 129 Princes Highway, Kogarah, and 2 Hogben Street, Kogarah.

The site currently accommodates a hard-stand parking lot, providing approximately 76 car parking spaces and a two-storey commercial premises (subject to separate demolition), which is attached to the existing multi-storey health services facility at 2 South Street, Kogarah.

The site comprises Lots A-C DP358876 and Lots 1-5 DP8864 and is approximately rectangular in shape with area of approximately 2,200 m^2 (refer to Figure A).

The site is adjoined to the south by an existing multi-storey health services facility, which forms part of the St George Private Hospital campus. South Street separates this facility from the main hospital campus, though a connecting sky-bridge provides pedestrian access between the buildings. Further west is the St George Public Hospital, and other surrounding development comprises a mix of commercial premises (typically at ground floor) and medium and high-density residential premises.

Figure A: Site Aerial Extract (from Patch Planning and Development, 2025)

Main Hospital Campus

The existing hospital is located at 1 South Street, Kogarah which is also known as 1A South Street, Kogarah. This site is bound by two road frontages, being South Street to the north and Princes Highway (a classified road) to the east.

The site accommodates the St George Private Hospital's main campus, with vehicular access provided off South Street. Refer to Figure for a site aerial excerpt.

Figure B: Main Hospital Site Aerial Extract (from Patch Planning and Development, 2025)

4.1 OVERVIEW OF PROPOSED DEVELOPMENT

The SSDA seeks approval for the expansion of the St George Private Hospital, seeking consent for two components: the first being the construction of a health services facility (hospital) at the site, and the second relating to upgrades to the main hospital campus, including a new emergency department.

In summary, approval for the following is sought for the site:

- Site preparation works and bulk earthworks, including tree clearing
- Construction of a seven (7) storey health services facility (hospital) equating to a total GFA of 9,952sqmConstruction of a five (5) level basement carpark including a radiation oncology unit, providing a total of 241 parking spaces
- Ancillary office, amenities, and loading dock provisions
- Basement storage and a substation
- Landscaping works

The architectural plans for the proposed development are included in Appendix E.

In addition, approval for the following is sought for the main hospital campus:

- Construction of an emergency department at the northern end of the existing hospital, to be operated 24 hours a day, seven days a week

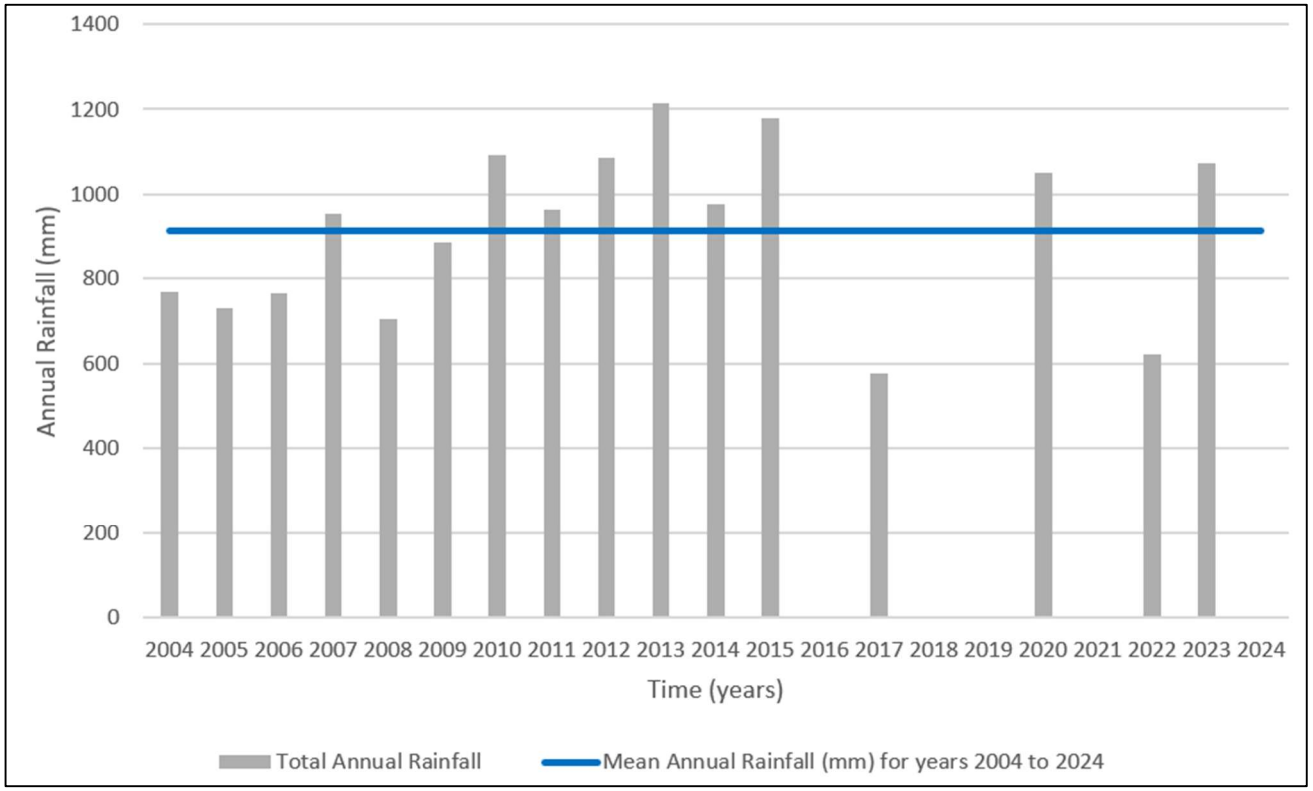
- Alterations to the South Street frontage, including surfacing and landscaping to facilitate ambulance bays and access requirements
- Associated internal re-configurations

5. CLIMATE AND RAINFALL

The climate of the project area is temperate with mild winters and warm summers, with no extreme seasonal differences. Weather is moderated by close proximity to the ocean.

Figure C presents the total annual rainfall for the last 20 years (2004 to 2024) for the Bureau of Meteorology (BoM) Sydney Airport AMO (Station Number 066037) weather station. The long term average rainfall at this location is 915 mm per year.

Figure D presents the average monthly rainfall based on the previous 20 years of data (2004 to 2024) for the Sydney Airport AMO weather station (ID 066037).



Note: Some years did not have complete data and are not shown

Figure C: Annual Rainfall (2004 to 2024) vs average annual rainfall at Sydney Airport AMO (Bureau of Meteorology weather station 066037)

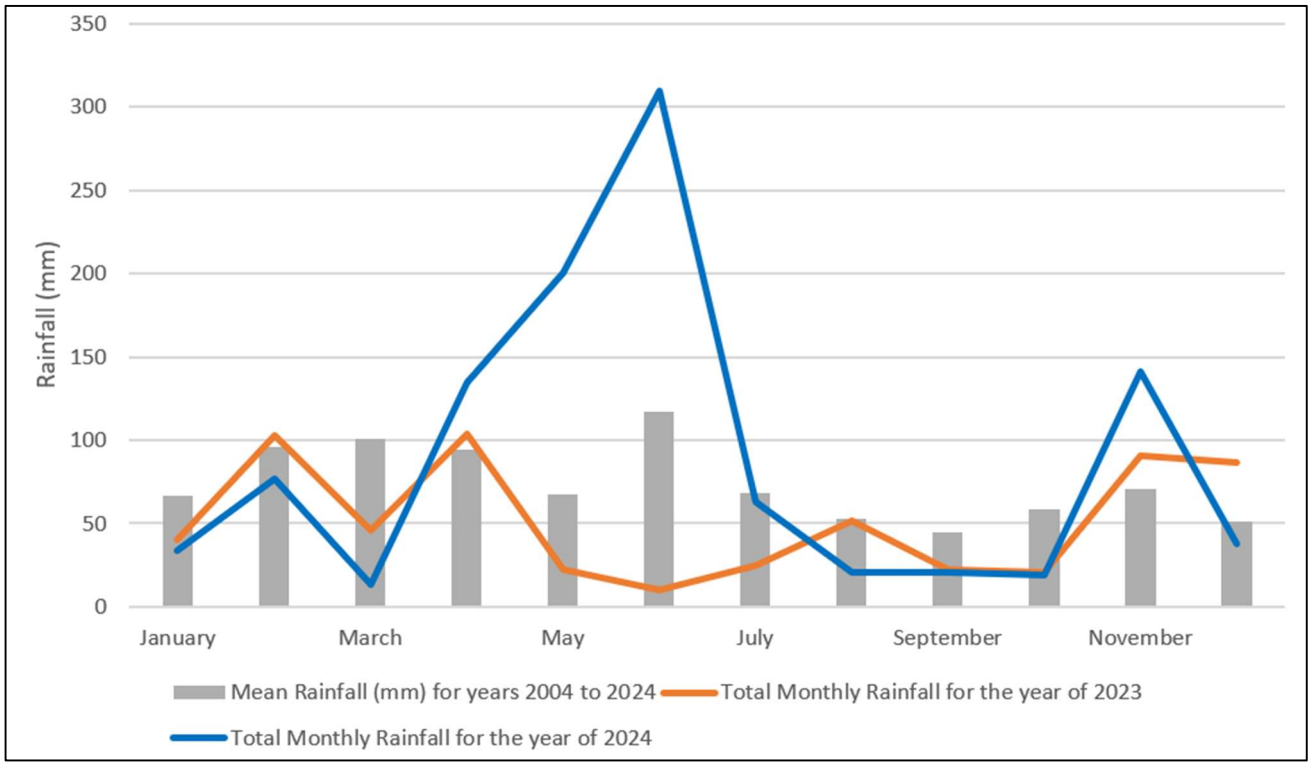


Figure D: Annual Rainfall (2004 to 2024) vs average annual rainfall at Sydney Airport AMO (Bureau of Meteorology weather station 066037)

6. GEOLOGY

6.1 REGIONAL GEOLOGY

The MinView website (ref: https://minview.geoscience.nsw.gov.au/) indicates the site is underlain by Triassic age Hawkesbury Sandstone as shown in Figure E. Hawkesbury Sandstone comprises medium to coarse grained quartzose sandstone displaying small to large scale, high angle cross bedding with minor shale and laminite lenses.

Our previous geotechnical investigations for St George Hospital and the neighbouring property indicate that the subsurface conditions of the site comprise fill overlying residual soil, overlying sandstone. This is consistent with the conditions indicated on the geological map.

Figure E: Regional geology of the site (source: MinView)

6.2 SITE GEOLOGY

Following our geotechnical investigation, we have developed a ground model of the subsurface conditions. For further information, refer to our Geotechnical Investigation Report (ref: SYDGE381816AA, dated 20 June 2025). For the location of the boreholes, refer to Figure L.

A summary of the encountered ground conditions is provided below:

Fill

Fill was encountered from the surface at each borehole location. A thin layer of asphalt was present in BH01 and BH03 up to 150mm thick. Topsoil fill was encountered in the upper 100mm of BH02. Compacted gravel and sand fill was present to up to 1.0m depth, typically with a thickness of up 800mm.

This fill profile was generally consistent across the boreholes, generally decreasing in thickness towards the northern end of site.

Residual Soil / Extremely Weathered Material

A thin layer of residual soil and extremely weathered bedrock was encountered in the three boreholes from 0.3m to 1.0m depth. Residual soil typically comprised orange brown to grey, fine to medium grained clayey sand to sandy clay.

Hawkesbury Sandstone

Hawkesbury Sandstone was encountered in the three boreholes at depths ranging from 1.6 to 2.9m and comprised typically pale grey, medium to coarse grained sandstone. The base of the Hawkesbury Sandstone was not intersected by the boreholes.

6.3 ACID SULFATE SOILS

The proposed development is not located within areas of acid sulfate soil risk according to the NSW Government SEED (Sharing and Enabling Environmental Data) database. The nearest known acid sulfate soils (Class H2) are located approximately 500m east of the site as shown in Figure F.

Figure F: SEED Acid Sulfate Hazard Map

7. HYDROGEOLOGY

7.1 REGIONAL AQUIFERS

Groundwater at the site is located within the fractured bedrock aquifer of the Hawkesbury Sandstone.

The site is located in the Sydney Basin Central Groundwater Source, as defined in the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023 under the Water Management Act 2000 (NSW Government, 2023).

7.2 SURFACE WATER

Surface water features (e.g. ponds / wetlands) are not present on site. Surface water from rainfall is expected to be captured within the local Council's stormwater drainage system that is present across the site and likely discharge into either Botany Bay (a marine ecosystem) or drain towards Scarborough Creek (possibly freshwater environment), located approximately 800 m east of the site, and then into Botany Bay. Surface elevation contours are shown in Figure G.

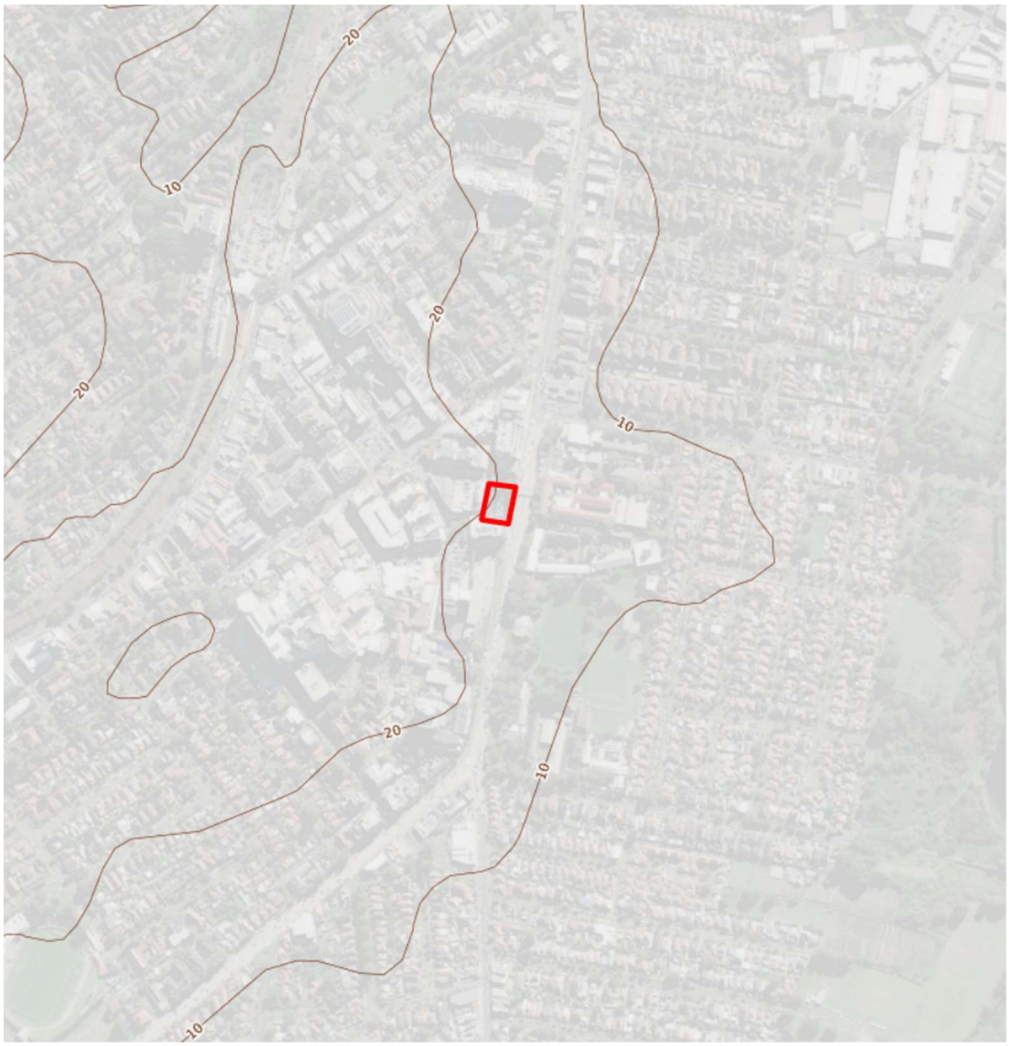


Figure G: Surface elevation contours (mAHD) around the site

7.3 GROUNDWATER LEVELS

7.3.1 Measured groundwater levels

Groundwater levels were measured at the three piezometers using an electronic water level dip meter. The results are provided in Table 2.

Table 2: Manually measured groundwater levels

Date	BH01 (metres below ground)	BH01 (mAHD)	BH02 (metres below ground)	BH02 (mAHD)	BH03 (metres below ground)	BH03 (mAHD)
14 May 2025	6.28	14.81	3.81	16.62	5.03	14.98
11 Aug 2025	6.26	14.83	5.00	15.43	5.03	14.98

Observed groundwater levels in May were approximately 2.4 to 2.6m higher in the southwest of the site at BH02 compared to BH01 at the north and BH03 at the east of the site. Note, however, that following the collection of continuous groundwater level monitoring data in August 2025, it appears that long term groundwater levels at BH02 are lower and consistent with levels at BH03. This indicates a relatively minor gradient of groundwater levels falling towards the north across the site, compared to the observations on 14 May which are shown in Figure L.

7.3.2 Groundwater level variability

Continuous groundwater level monitoring data from May 2025 to August 2025 is shown in Figure H, Figure I and Figure J for each monitoring well location.

There was some variability observed in groundwater levels at BH02 in May 2025 which appeared inconsistent with observations at the other two boreholes. The reason for this variability is not known, however it can be seen from Figure I that groundwater levels in BH02 from late May to early August 2025 were similar to those observed in BH01 and BH03. We therefore consider that groundwater levels in early May 2025 at BH02 are not representative of levels in the aquifer.

Groundwater response to rainfall was observed to be relatively limited in the three boreholes. The response to 194 mm of rainfall over the 13 days to 11 August 2025 resulted in increases in groundwater levels of less than 0.25 m.

The Bureau of Meteorology Design Rainfall Data System indicates that a 1% annual exceedance probability rainfall event at the site would be 449 mm of rainfall over a seven day period. This is approximately 4.4 times greater than the event over the 13 days to 11 August 2025 averaged to a seven day rate. As such, it is likely that a 1% annual exceedance probability rainfall would result in a temporary increase in groundwater levels of 1.1 m (4.4 x 0.25 m) from the levels observed over the three months to early August as shown in Figure H, Figure I and Figure J (except the levels in May at BH02 as discussed above). This would result in levels of approximately 16.4 mAHD at BH01 and BH02.

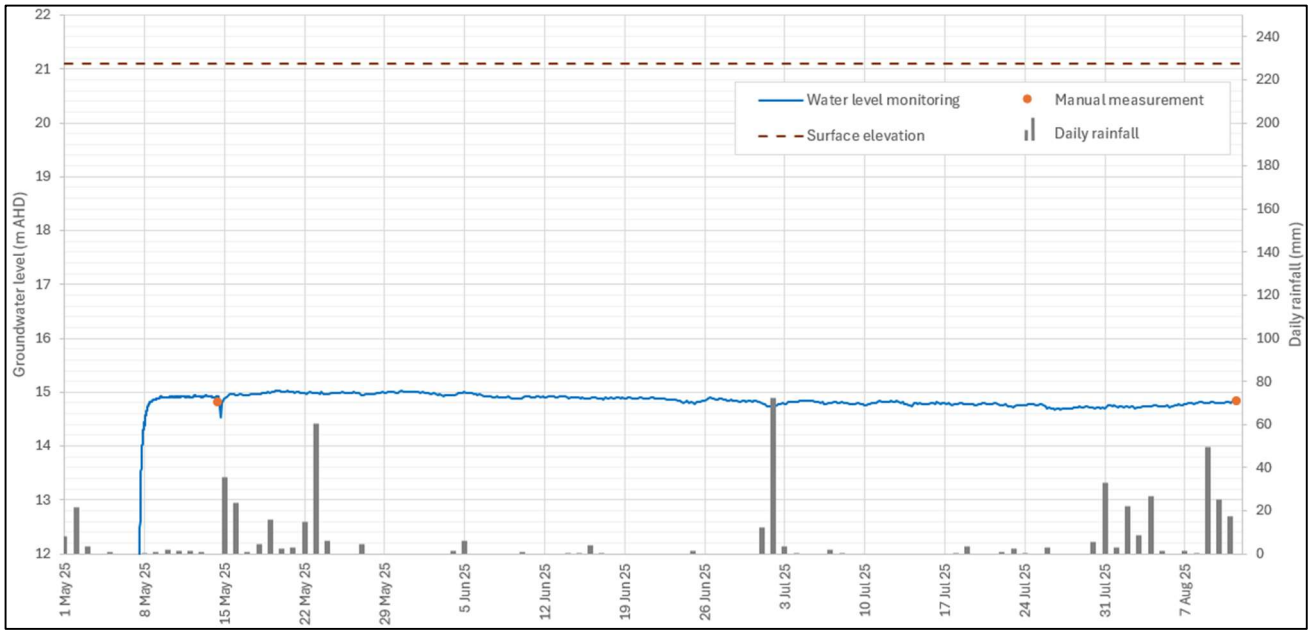


Figure H: Groundwater levels at BH01 (daily rainfall from Sydney Airport AMO, Bureau of Meteorology)

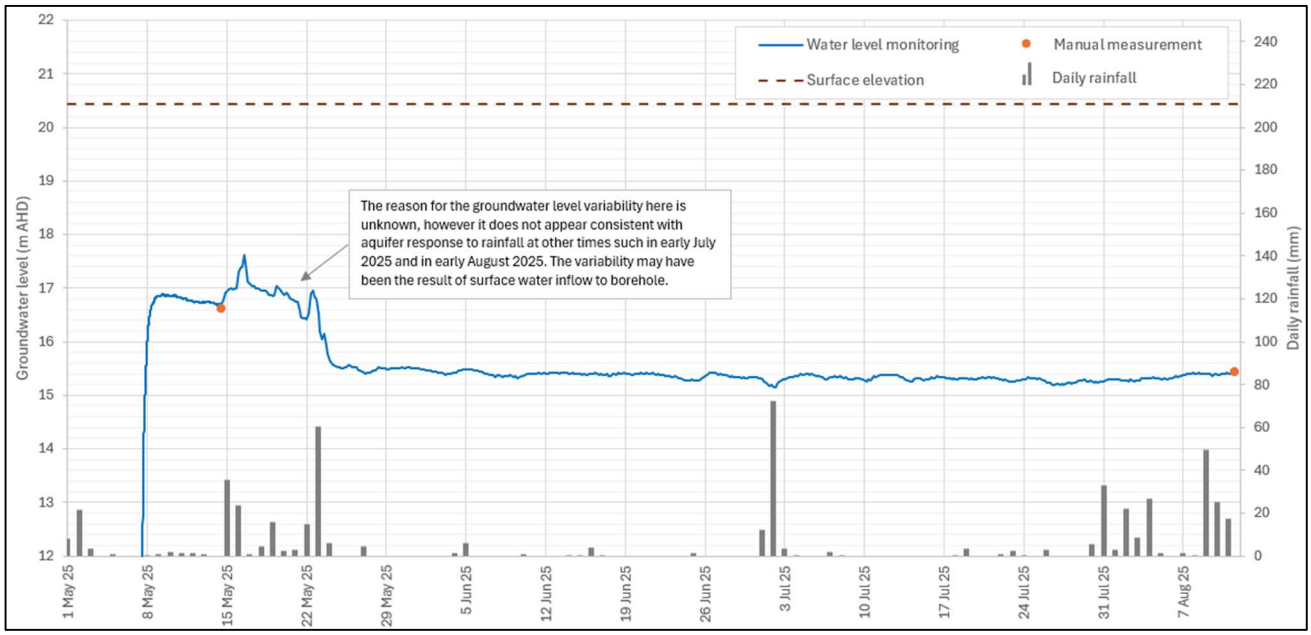


Figure I: Groundwater levels at BH02 (daily rainfall from Sydney Airport AMO, Bureau of Meteorology)

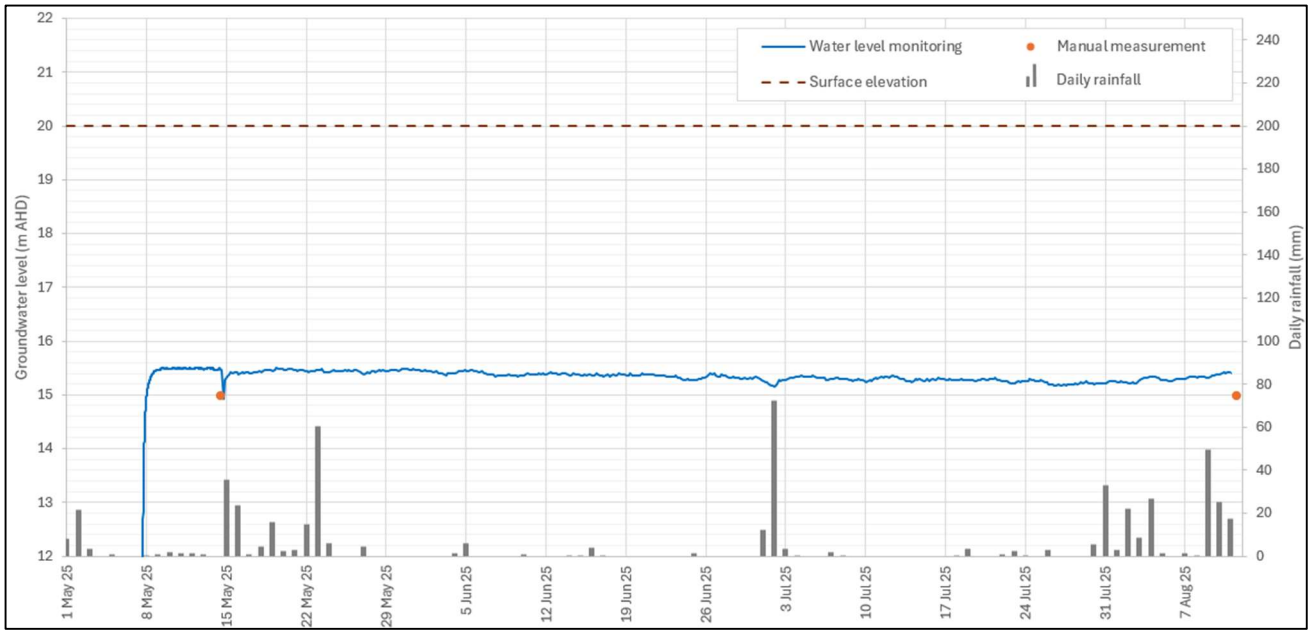


Figure J: Groundwater levels at BH03 (daily rainfall from Sydney Airport AMO, Bureau of Meteorology)

7.4 AQUIFER PARAMETERS

Rising head tests were undertaken at each borehole by Tetra Tech Coffey on 7 May 2025. These tests provide an assessment of the hydraulic conductivity in the bedrock adjacent to these wells.

The rising head tests were conducted at each borehole as follows:

- Groundwater levels were measured using an electronic dip meter.
- Water was extracted from the borehole using a disposable bailer to lower the groundwater level in the wells.
- An electronic logger was then installed within the well to monitor the recovery of groundwater levels.

The tests were analysed using the method of Hvorslev (1951). The assessed results are shown in Table 3.

Table 3: Rising head test results

Piezometer ID	Hydraulic conductivity (m/s)
BH01	3.3×10^{-8}
BH02	2.1×10^{-8}
BH03	2.5×10^{-8}

The tests yielded reasonably consistent values, with an average hydraulic conductivity of 2.6×10^{-8} m/s and a maximum value of 3.3×10^{-8} m/s. The test reports are provided in Appendix C.

These assessed values are reasonably close to the median values for Hawkesbury Sandstone reported by Best and Parker (2004) which were based on the test results for over 900 packer tests, as shown in Figure K. Note that one Lugeon is approximately equal to a hydraulic conductivity of 1×10^{-7} m/s.

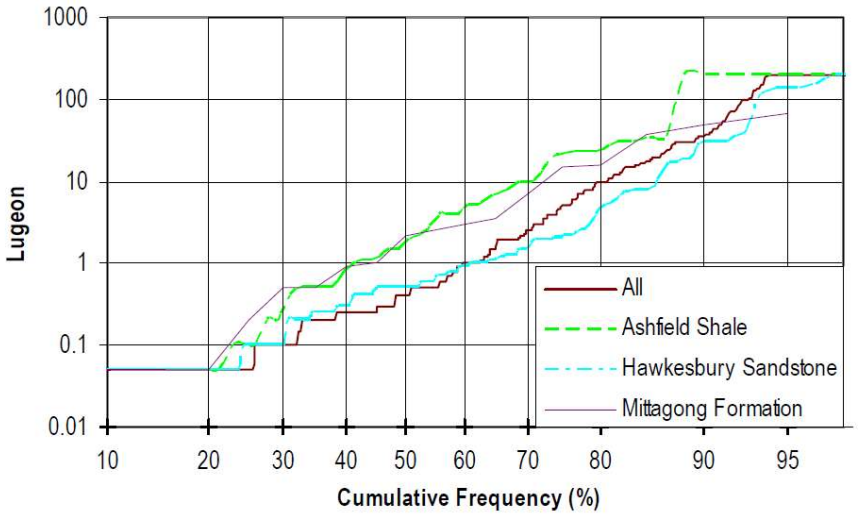


Figure K: Cumulative permeability frequency based on packer testing in Sydney Sandstone (after Best and Parker, 2004)

7.5 GROUNDWATER CHEMISTRY

Groundwater samples were collected on 14 May 2025 from piezometers BH01, BH02 and BH03, along with a duplicate sample at BH01. Samples were sent to a NATA accredited laboratory for testing of selected analytes.

The field water quality parameters are shown in Table 4 and selected laboratory results are shown in Table 5. Note that total recoverable hydrocarbons or BTEX were not identified above the limit of reporting in the three boreholes, except for a result of 11 ug/L for Toluene at BH01.

Laboratory reports are included in Appendix D.

Table 4: Field parameters

	Date	pH	Electrical Conductivity (µS/cm)	Redox Potential (ORP mV)	Dissolved Oxygen (mg/L)	Temperature (°C)
BH01	14 May 2025	5.65	892	-30.0	0.55	22.6
BH02	14 May 2025	5.44	287.5	82.7	0.71	24.6
BH03	14 May 2025	4.68	959	117.1	1.64	24.6

Table 5: Summary of selected groundwater quality results

	Units	ANZG (2018) Freshwater 95% LOSP Toxicant DGVs[1]	BH01	BH02	BH03
pH (Field)	-	-	5.65	5.44	4.68
Electrical Conductivity	µS/cm	-	808	238	845
Total Dissolved Solids	mg/L	-	424	150	441
Suspended Solids (SS)	mg/L	-	57	25	7
Turbidity	NTU	-	50	12.2	9.8
Bicarbonate Alkalinity as CaCO3	mg/L	-	51	41	6
Total Alkalinity as CaCO3	mg/L	-	51	41	6
Sulfate as SO4 - Turbidimetric	mg/L	-	33	34	28
Chloride	mg/L	-	223	20	286
Calcium	mg/L	-	14	13	6
Magnesium	mg/L	-	15	4	16
Sodium	mg/L	-	130	33	144
Potassium	mg/L	-	4	2	2
Aluminium	mg/L	-	0.02	<0.01	0.15
Arsenic	mg/L	-	<0.001	<0.001	<0.001
Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001
Chromium	mg/L	-	<0.001	<0.001	<0.001
Copper	mg/L	0.0014	<0.001	**0.004**	**0.006**
Lead	mg/L	0.0034	<0.001	<0.001	<0.001
Manganese	mg/L	1.9	0.735	0.057	0.302
Nickel	mg/L	0.011	0.008	0.006	0.008
Zinc	mg/L	0.008	**0.071**	**0.062**	**0.132**
Boron	mg/L	-	<0.05	0.08	<0.05
Iron	mg/L	-	18.1	<0.05	10.6
Mercury	mg/L	0.0006	<0.0001	<0.0001	<0.0001
Toluene	mg/L	0.180	0.011	< 0.002	< 0.002

[1]: This guideline is included for reference only. Water treatment requirements and selection of relevant guidelines should be specified in the dewatering management plan

[2]: Numbers in bold indicate exceedance of guidelines

8. GROUNDWATER INFLOW AND DRAWDOWN ASSESSMENT

This section provides an assessment of the estimated rate of groundwater inflow into the excavation.

8.1 BASIS OF ASSESSMENT

It is assumed that the basement will be drained with groundwater inflows occurring from seepage through the bedrock. It is assumed that dewatering will be carried out for the permanent design life of the basement.

The assessment assumes a steady-state analysis.

8.1.1 Basement geometry

For the purpose of the groundwater inflow assessment the basement geometry can be summarised as follows:

- The basement is treated as a rectangular excavation with approximate dimensions of 35m x 60m in plan.
- A bulk excavation level of 5.95 mAHD has been assumed across the site.

8.1.2 Conceptual cross section

Figure L provides site plan showing the outline of the proposed basement, including interpolated groundwater level contours based on observations on 14 May 2025.

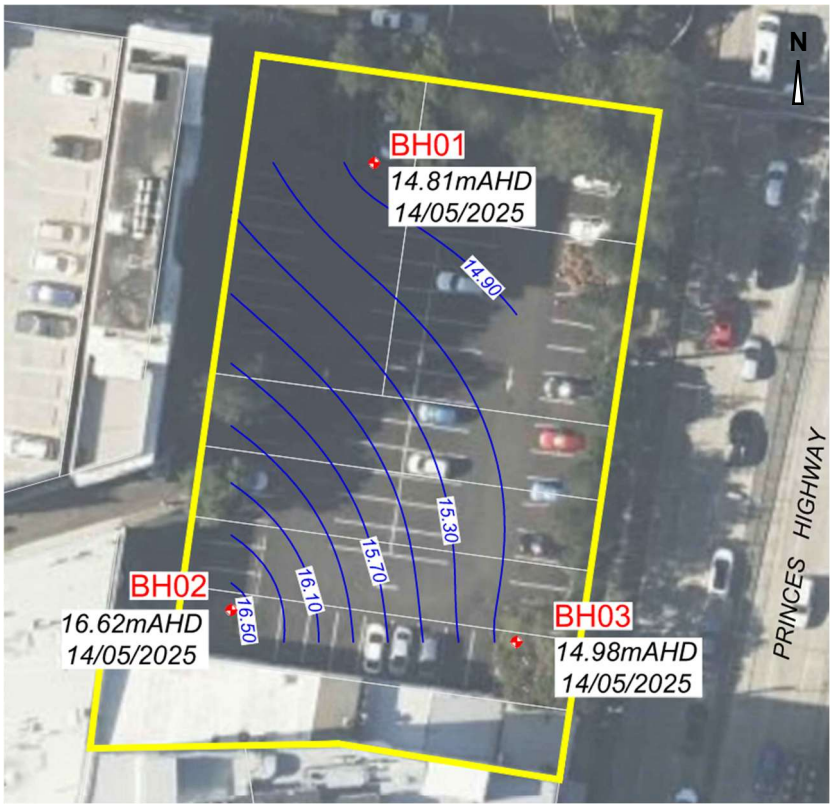


Figure L: Plan view of excavation showing boreholes with observed groundwater levels observed on 14 May 2025 and interpolated groundwater level contours (mAHD)

Figure M presents a conceptual cross section of the site showing the proposed excavation in relation to the observed groundwater level on 14 May 2025.

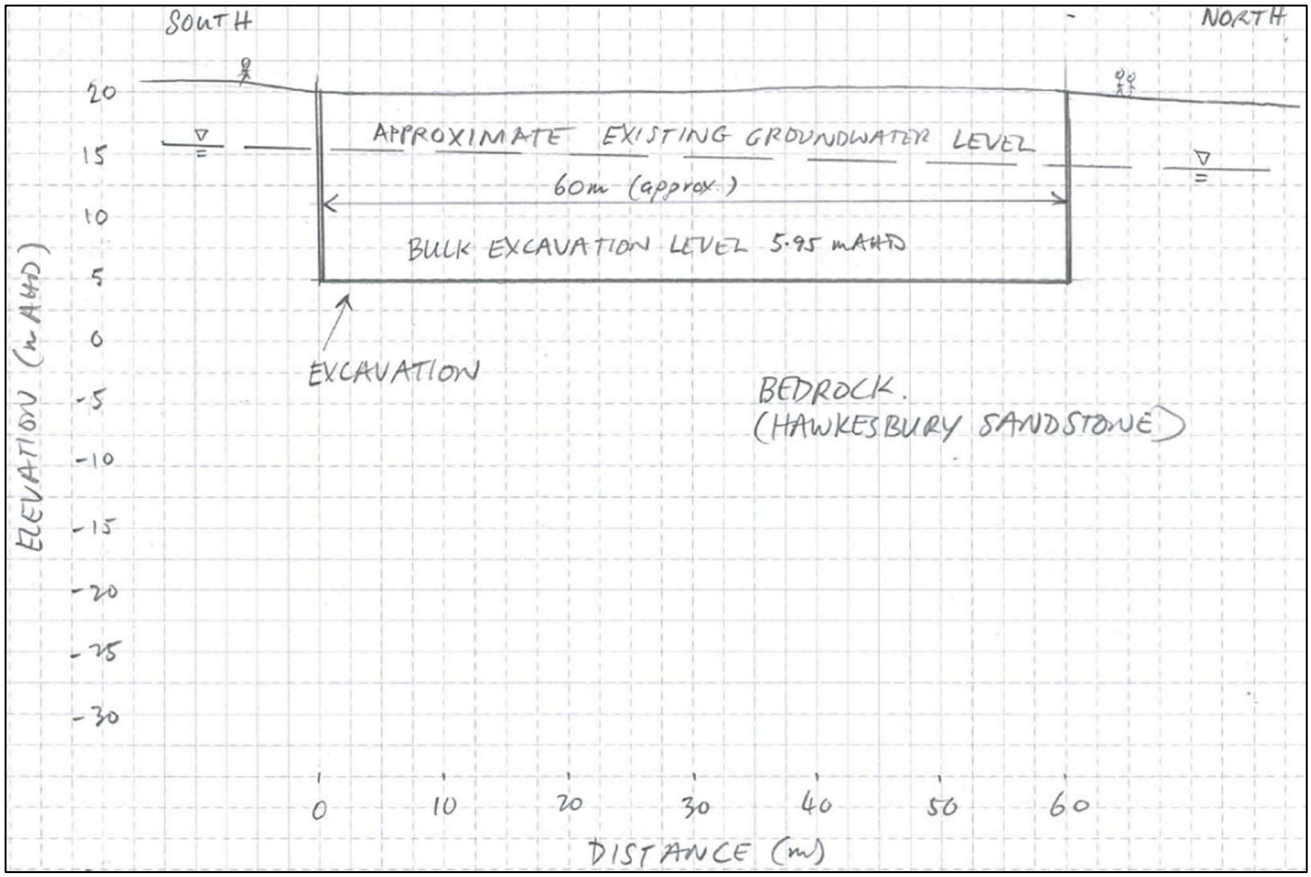


Figure M: Section looking west showing approximate groundwater level in relation to the proposed excavation

8.1.3 Assessment method and boundary conditions

An assessment of the steady state inflow to the excavation was completed using the Thiem equation for unconfined flow to a well.

$$Q = \frac{\pi k(H^2 - h^2)}{\ln(\frac{R}{r})}$$

Where:

k = Hydraulic conductivity (m/s)

h = Vertical distance from no flow boundary to the bulk excavation level (m)

H = Vertical distance from no flow boundary to existing groundwater level (m)

r = Radius of basement (m) for a circle with equivalent area to the basement

R = Adopted radius of influence (m)

The following assumptions were adopted:

- The basement was represented as an equivalent circular area in plan, with radius of 26.8 m
- The groundwater level within the basement was set at 5.95 mAHD

- A fixed groundwater level of 16.7 mAHD was set at 100 m from the centre of the excavation (the radius of influence). This level is higher than predicted temporary levels during a 1% annual exceedance probability rain event as discussed in Section 7.3.2.
- A no flow boundary was set at an elevation of -12.0 mAHD
- The hydraulic conductivity of the Hawkesbury Sandstone at the site was adopted as 3.3 x 10^{-8} m/s, which is the highest of the three rising head test results discussed in Section 5.4
- We have assumed that the horizontal and vertical hydraulic conductivity of the Hawkesbury Sandstone at the site are equal

The assumptions above are considered to be reasonably conservative for the purposes of estimating inflow to the excavation.

8.2 ASSESSED INFLOWS

The assessed inflow to the excavation, with the assumptions and parameters discussed above, is 0.039 L/s or 1.2 ML/year.

8.2.1 Sensitivity

The following sensitivity cases were considered:

- A doubling of the hydraulic conductivity to 6.6 x 10^{-8} m/s resulted in an inflow of 2.4 ML/year
- Increasing the radius of influence to 250 m (compared to 100 m for the base case) resulted in an inflow of 0.7 ML/year
- Setting the vertical no flow boundary elevation at -22 mAHD (10 m lower than the base case) resulted in an inflow of 1.8 ML/year

8.2.2 Total groundwater take

The estimated groundwater take from groundwater seepage during construction and in the permanent condition is 1.2ML per year.

An assessment of groundwater within excavated soil/rock has also been considered based on the following assumptions:

- An excavated volume of rock below the groundwater table of 21,000m^3 and
- A rock porosity of 0.1.

It is expected, based on these assumptions, that an additional 2.1ML of groundwater take will be required during excavation due to groundwater contained within the excavated bedrock.

The assessed groundwater inflow rates are for working conditions based on information available at the time of writing this report, prior to excavation of the basement. Unforeseen ground conditions may result in inflows different to those assessed here.

8.3 ASSESSED DRAWDOWNS

Figure N and Figure **O** present the assessed groundwater head and groundwater drawdown versus distance from the excavation face respectively. The figures are based on the Theim equation as described in Section 8.1.3.

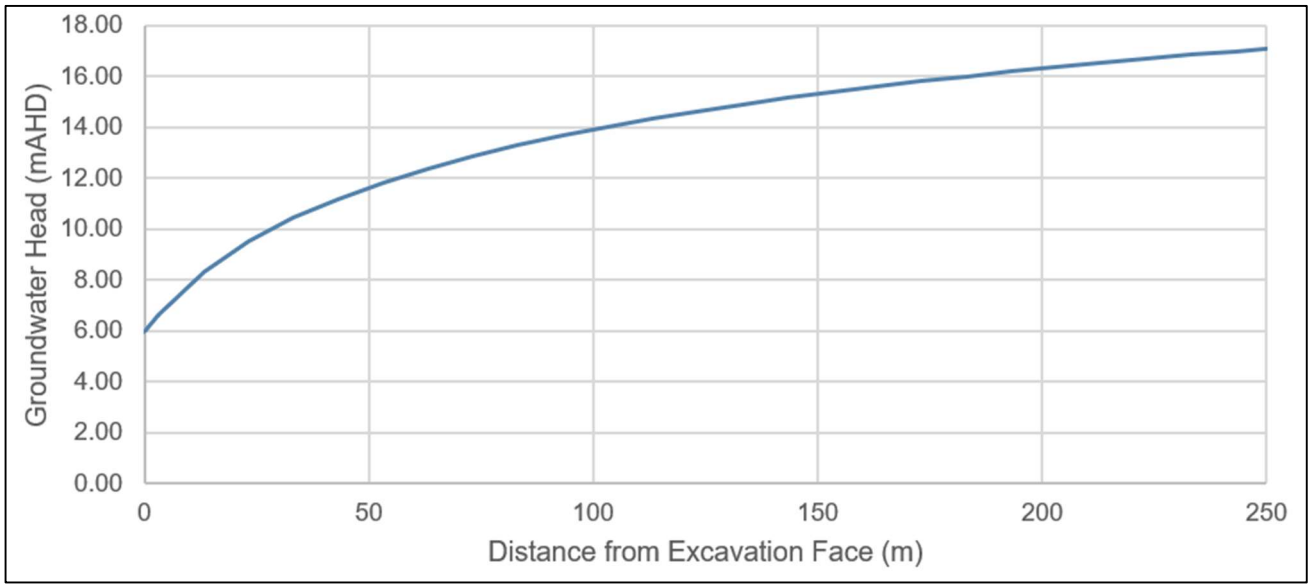


Figure N: Groundwater head (mAHD) versus distance from excavation

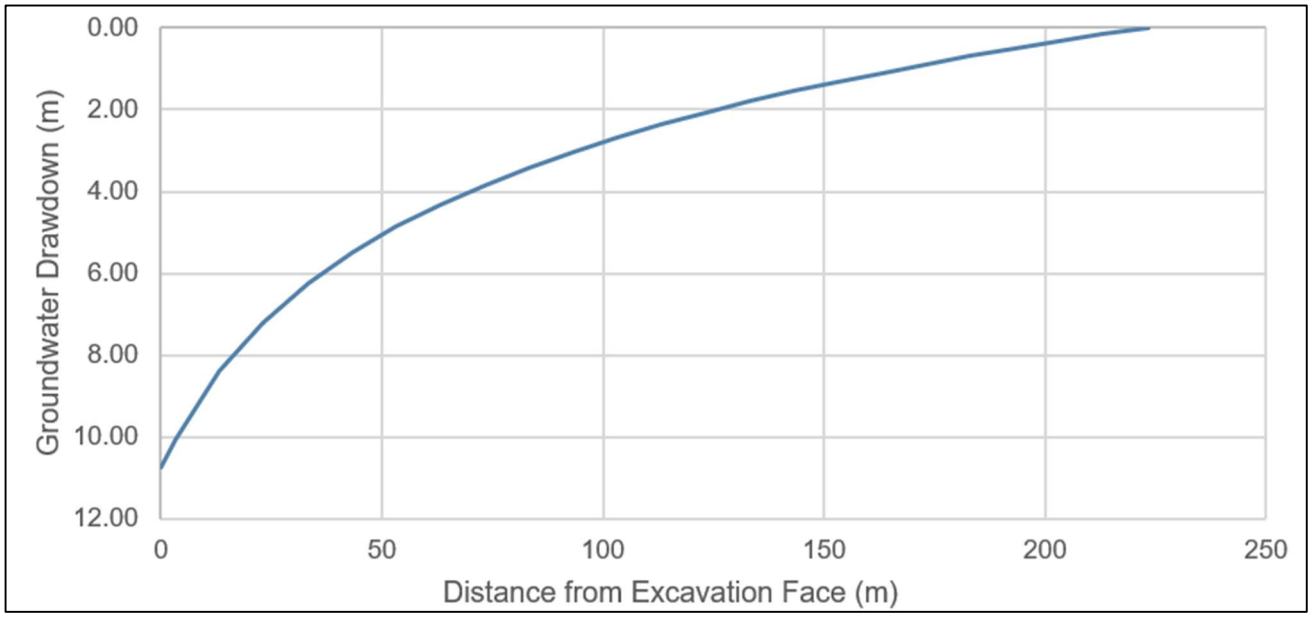


Figure O: Groundwater drawdown (m) versus distance from excavation

Table 6 summarises the estimated distances from the excavation face for the predicted 1m and 2m groundwater drawdowns.

Table 6: Distance from excavation face for predicted 1m and 2m drawdown

Distance from excavation (m)	
1m drawdown	**2m drawdown**
160	125

These assessed drawdowns are based on the analysis presented above, and the assumptions related to the zone of influence. Considering the relatively low permeability of the aquifer from the rising head test results, it is possible that the zone of influence may be less than the 250 m adopted for drawdown assessment. We consider the assessed drawdowns represent a reasonable assessment, noting that there is an unavoidable degree of uncertainty in predictions of drawdown prior to construction observations becoming available.

This assessment considers drawdown related to the site excavation and dewatering only. Should dewatering occur simultaneously at other locations, by other proponents, the effects may result in wider cumulative drawdowns.

9. RISK ASSESSMENT

9.1 EFFECTS ON NEARBY USERS

A search for nearby registered bores was made on 12 June using the Bureau of Meteorology Australian Groundwater Explorer database. Based on the search results, eight registered groundwater supply bores were found within 500m of the site (Figure P).

Based on the assessed drawdowns shown in Figure **O**, the risk to nearby groundwater users is assessed to be negligible, as drawdowns due to the development at these locations are likely to be less than 1m.

Figure P: Groundwater supply bores within 500m of site

9.2 EFFECTS ON NEARBY GROUNDWATER DEPENDENT ECOSYSTEMS

The closest high priority groundwater dependent ecosystems (GDE) shown on the Bureau of Meteorology Groundwater Dependent Ecosystems Atlas are the Eastern Suburbs Banksia Scrub and Estuarine Fringe Forest which is located approximately 800m to the east of the site at a lower elevation than the bulk excavation level.

Due to the distance and lower elevation, the risk to this GDE from the development is assessed to be negligible.

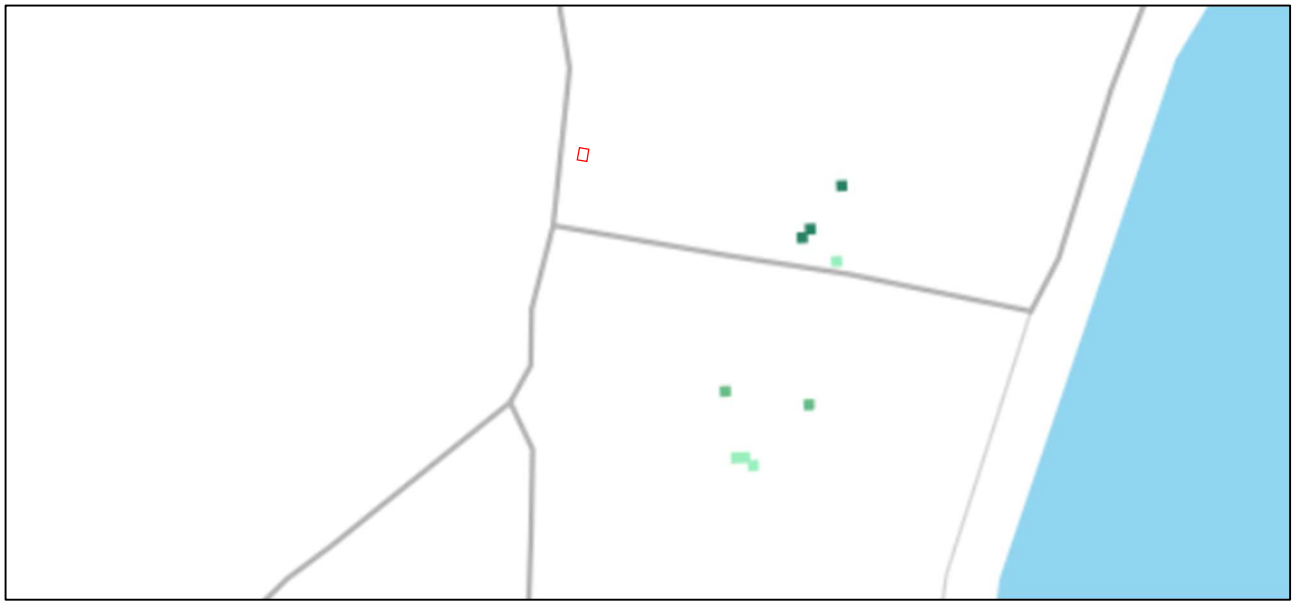


Figure Q: GDEs located approximately 800m east of the site

9.3 RISK OF INCREASED SALINITY

The closest saltwater source to the site is approximately 1.6km to the east of the site at Botany Bay at an elevation of approximately 6 m below the base of the proposed excavation.

Based on the assessments presented in this report and the distance to the nearest saltwater source, the risk of saltwater intrusion into the aquifer as a result of the proposed development is considered to be negligible.

9.4 RISK OF INCREASED CONTAMINATION IN AQUIFERS

A review of the preliminary site investigation (PSI) report prepared of the site by Tetra Tech Coffey indicates that the site was once used as a motor mechanics and tyre centre. As a result, there is the potential for underground storage tanks (USTs) to be present. Further commentary is included in the PSI (Ref. SYDGE381816, dated 20 June 2025). As the development will be a groundwater sink, the risk to the groundwater system of mobilisation of contaminants from these storage tanks, if found to be present, is low.

The PSI report has identified that several historical business on properties at and surrounding the site which pose potential contamination risk. Considering the low permeability of the bedrock aquifer (see Section 7.4), the risk to the identified groundwater users shown in Figure P from mobilisation of potential contaminants in groundwater as a result of the development is considered to be low.

9.5 SURFACE SETTLEMENT

A decrease in groundwater pressure in the aquifer due to drawdown results in an increase in effective stress, which may result in surface settlement due to compression of the aquifer. The magnitude of settlement depends on the aquifer stiffness in one-dimensional compression E'_0, the magnitude of drawdown in groundwater levels, and the saturated thickness of the compressible layer. Table 7 (Preene, Roberts and Powrie, 2016) shows, for example, the groundwater induced settlement for a 1 m drawdown in groundwater levels over a 1 m thick compressible layer.

Considering that groundwater around the excavation is within competent bedrock (with one dimensional stiffness likely more than 1 Gpa), groundwater drawdown due to the development is not expected to cause settlements over 5 mm, and groundwater drawdown induced settlement impacts are therefore assessed to be negligible.

Table 7: Groundwater induced settlement for a 1 m drawdown in groundwater levels over a 1 m thick compressible soil layer

The basic settlement is defined as the compression of a soil layer 1 m thick from an increase in vertical effective stress corresponding to a drawdown of 1 m. For a given situation, the total settlement in mm may be obtained by multiplying the basic settlement by the drawdown and the thickness of the soil layer (both in metres)

One-dimensional soil stiffness, E'_o (MPa)	1	5	10	15	20	25
Basic settlement (mm)	10.0	2.0	1.0	0.667	0.5	0.4
One-dimensional soil stiffness, E'_o (MPa)	40	50	75	100	150	200
Basic settlement (mm)	0.25	0.20	0.133	0.10	0.067	0.05

9.6 MINIMAL IMPACT ASSESSMENT

According to the NSW Aquifer Interference Policy (NSW Department of Primary Industries, 2012) the fractured rock groundwater source from which the site will be extracting water is classed as ‘less productive’ considering it does not contain water supply works that can yield water at a rate greater than 5 L/sec.

Table 8 presents a ‘Minimal Impact Consideration’ for Aquifer Interference Activities for porous and fractured rock water sources following the NSW Aquifer Interference Policy. Based on this assessment we conclude that the development presents a low risk for groundwater impacts.

Table 8: Minimal impact consideration – Less Productive – Porous and fractured rock water sources

Consideration	Response
WATER TABLE 1. Less than or equal to a 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan"(2) variations, 40m from any: (a) high priority groundwater dependent ecosystem; or (b) high priority culturally significant site; listed in the schedule of the relevant water sharing plan; or A maximum of a 2m decline cumulatively at any water supply work. 2. If more than 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan" variations, 40m from any: (a) high priority groundwater dependent ecosystem; or (b) high priority culturally significant site; listed in the schedule of the relevant water sharing plan then appropriate studies(5) will need to demonstrate to the Minister's satisfaction that the variation will not prevent the long-term viability of the dependent ecosystem or significant site. If more than 2m decline cumulatively at any water supply work then make good provisions should apply.	Refer to Section 8.2: Negligible water level decline is predicted within 40 m of any high priority groundwater dependent ecosystem. There is not known to be a high priority culturally significant site within 40 m from the site Refer to Section 8.1: There are no registered bores with the listed purpose of water supply are located within the predicted 2 m drawdown contour around the site.
WATER PRESSURE 1. A cumulative pressure head decline of not more than 2m decline, at any water supply work. 2. If the predicted pressure head decline is greater than requirement 1. above, then appropriate studies are required to demonstrate to the Minister's satisfaction that the decline will not prevent the long-term viability of the affected water supply works unless make good provisions apply.	Refer to Section 8.1: There are no registered bores with the listed purpose of water supply are located within the predicted 2 m drawdown contour around the site.
WATER QUALITY 1. Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40m from the activity. 2. If condition 1. is not met then appropriate studies will need to demonstrate to the Minister's satisfaction that the change in groundwater quality will not prevent the long-term viability of the dependent ecosystem, significant site or affected water supply works.	Refer to Section 8.4: The development will act as a groundwater sink, and injection/recharge of water to the groundwater system is not proposed. Therefore, the risk of increased contamination in aquifers due to the development is considered to be negligible. Considering the low permeability of the bedrock aquifer (see Section 6.4), the risk to the identified groundwater users shown in Figure 12 from mobilisation of potential contaminants in groundwater as a result of the development is low. Refer to Section 8.3: Based on the distance to and elevation of the nearest salt water source, the risk of salt water intrusion into due to the proposed development is considered to be negligible.

10. CONCLUDING REMARKS

Based on this assessment, it is considered that a drained basement for the proposed development is feasible and presents a low risk to the groundwater system, provided that appropriate monitoring of groundwater discharge volumes, water quality and levels is carried out during construction and the results and recommendations for the Detailed Site Investigation (DSI) being completed concurrently together with this assessment are taken into consideration.

Tetra Tech Coffey consider that this development would be eligible for a Water Access License exemption for taking 3ML or less per year of groundwater. Further information on this exemption can be found on the DPIE website (ref: https://water.dpie.nsw.gov.au/our-work/licensing-and-approvals/exemptions-for-water-licences-and-works-and-or-use-approvals/groundwater-wal-exemptions). To claim the exemption, DPIE require that discharge volumes are recorded by the site owner.

If groundwater from the site cannot be recycled and used in gardens, cooling towers or toilet flushing, then approval from local government or Transport for NSW will be required for discharge to stormwater. To obtain approval, groundwater would likely need to be treated prior to discharge for pH, turbidity and potentially the removal of heavy metals such as zinc.

The attached document in Appendix A entitled “Important Information about your Tetra Tech Coffey Report” presents additional information about the uses and limitations of this report.

11. REFERENCES

- ANZG (2018). Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines
- Best R. J., and Parker C. J. (2004) Groundwater in Sydney, tunnel inflows and settlement – theory and experience.
- Hvorslev M. J. (1951) Time lag and soil permeability in ground-water observations, Waterways Experiment Station, Corps of Engineers, US Army, Bulletin No 36
- NSW Government (2023). Sydney Basin Central Groundwater Source as defined in the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023 under the Water Management Act 2000, Published LW 23 June 2023 (2023 No 328)
- NSW Department of Primary Industries, (2012). NSW Aquifer Interference Policy. Sydney, September 2012.
- Preene M., Roberts T. O. L., and Powrie W. (2016), Groundwater control: design and practice, second edition, CIRIA C750

APPENDIX A: LIMITATIONS

IMPORTANT INFORMATION ABOUT YOUR TETRA TECH COFFEY REPORT

As a client of Tetra Tech Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Tetra Tech Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Tetra Tech Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Tetra Tech Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Tetra Tech Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Tetra Tech Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Tetra Tech Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Tetra Tech Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Tetra Tech Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Tetra Tech Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Tetra Tech Coffey to work with other project design professionals who are affected by the report. Have Tetra Tech Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Tetra Tech Coffey for information relating to geoenvironmental issues.

Rely on Tetra Tech Coffey for additional assistance

Tetra Tech Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Tetra Tech Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Tetra Tech Coffey to other parties but are included to identify where Tetra Tech Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Tetra Tech Coffey closely and do not hesitate to ask any questions you may have.

APPENDIX B: BOREHOLE AND WELL CONSTRUCTION LOGS

TETRA TECH COFFEY

Engineering Log - Borehole

Borehole ID.	***BH01***
sheet:	1 of 4
project no.	***754-SYDGE381816***
client:	***Akalan Project Pty Ltd***
date started:	***30 Apr 2025***
principal:	
date completed:	***30 Apr 2025***
project:	***St George Private Hospital***
logged by:	***RZ/EO***
location:	***Refer to Site Plan***
checked by:	***IG***

position: E: 327,832.40; N: 6,240,107.90 (GDA2020) | surface elevation: 21.09 m (AHD) | angle from horizontal: 90°

drill model: D-4T, Truck mounted | drilling fluid: Water | hole diameter : 52/120

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	soil origin, structure and additional observations
HA		Not Observed	D	21				**ASPHALT CONCRETE**.	D			**FILL**
								FILL: Gravelly SAND: fine to medium grained, brown-grey mottled red and pale grey, fine to medium grained, sub-angular to angular gravel, trace glass fragments.				
C							SP	**SAND**: fine to medium grained, brown to pale brown-grey.				**EXTREMELY WEATHERED MATERIAL**
AD/V				20	1.0			1.0 m: becoming pale grey 1.2 m: becoming orange brown				No SPT conducted due to shallow bedrock
								Borehole BH01 continued as cored hole				
				19	2.0							
				18	3.0							
				17	4.0							
				16	5.0							
				15	6.0							
				14	7.0							

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method
DT diatube
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore
RR rock roller

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nil

penetration
1 2 3 no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
HP hand penetrometer (kPa)
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
VS vane shear; peak/remouded (kPa)
R refusal
HB hammer bouncing

soil group symbol & material description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

TETRA TECH COFFEY

Engineering Log - Cored Borehole

Borehole ID.	**BH01**
sheet:	2 of 4
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**30 Apr 2025**
principal:	
date completed:	**30 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,832.40; N: 6,240,107.90 (GDA2020) | surface elevation: 21.09 m (AHD) | angle from horizontal: 90°

drill model: D-4T, Truck mounted | drilling fluid: Water | hole diameter : 52/120

drilling information | **material substance** | **rock mass defects**

method & support	water	RL (m)	depth (m)	material description (ROCK TYPE: grain characterisics, colour, structure, minor components)	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral)	samples, field tests & Is(50) (MPa) (a = axial; d = diametral)	core run & RQD	defect spacing (mm)	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
		21								
		20	1.0	started coring at 1.36m						
NMLC	Not Observed	19	2.0	**CLAYEY SAND**: fine to medium grained, pale grey mottled orange-brown and red.	RS					PT, 5°, PL, RO, Fe SN - Clay VN
				SANDSTONE: medium to coarse grained, red-brown and pale grey.	MW					PT, 5 - 10°, UN, RO, CN
					RS					PT, 5°, PL, RO, Fe SN
				Silty CLAY: high plasticity, pale grey mottled dark grey, with bands of siltstone up to 50 mm.				0%		
				2.30 to 2.40 m: becoming pale grey mottled dark grey and red						
		18	3.0	**SILTSTONE**: dark grey, banded orange-brown, distinctly laminated at 5° to 10°.	HW					**CLASS IV HAWKESBURY SANDSTONE**
				SANDSTONE: medium to coarse grained, dark red-brown and orange-brown.						Fracture zone, 30 mm
										SM, Clay, 70 mm
										PT, 5°, PL, RO, Fe SN
										PT, 10°, PL, RO, Fe SN
										JT, 40 - 85°, ST, RO, Fe SN - Clay
										PT, 15°, PL, RO, Fe SN
										SM, Clay, 35 mm
										SM, Clay, 35 mm
										PT, 15°, PL, RO, Fe healed
		17	4.0	**SANDSTONE**: medium to coarse grained, dark red and orange-brown.	MW		d=0.42 a=0.63			**CLASS III/II HAWKESBURY SANDSTONE**
				4.49 m: singular siltstone lamina				84%		PT, 20°, PL, RO, Fe SN
										SM, Clay, 5 mm
		16	5.0	**SANDSTONE**: medium to coarse grained, pale grey, banded orange-brown grading to pale grey, indistinctly cross bedded at 5° - 10°.	SW		d=0.67 a=0.55			PT, 5°, PL, RO, Fe SN
				5.12 m: no orange-brown bands						PTx4, 5 - 10°, PL, Fe healed
					FR		d=0.87 a=1.08			SM, Clay, 5 mm
		15	6.0							
	14/05/25									PT, 10°, PL, RO, CN
		14	7.0				d=0.86 a=0.67	99%		
				7.46 to 7.50 m: with siltstone laminae						
							d=0.88			

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method
DT diatube
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
RR rock roller

support
C casing M mud N none

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
PT parting
JT joint
SS sheared surface
SZ sheared zone
CO contact
CS crushed seam
SM seam

roughness
VR very rough
RO rough
SO smooth
POL polished
SL slickensided

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

coating
CN clean
SN stained
VN veneer
CO coating

TETRA TECH COFFEY

Engineering Log - Cored Borehole

Borehole ID.	**BH01**
sheet:	3 of 4
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**30 Apr 2025**
principal:	
date completed:	**30 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,832.40; N: 6,240,107.90 (GDA2020) | surface elevation: 21.09 m (AHD) | angle from horizontal: 90°

drill model: D-4T, Truck mounted | drilling fluid: Water | hole diameter : 52/120

drilling information | **material substance** | **rock mass defects**

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	Not Observed	13			**SANDSTONE**: medium to coarse grained, pale grey, banded orange-brown grading to pale grey, indistinctly cross bedded at 5° - 10°. *(continued)*	FR		a=1.34	99%		**CLASS III/II HAWKESBURY SANDSTONE** PT, 5°, PL, RO, CN
		12	9.0		**SANDSTONE**: medium to coarse grained, pale grey, distinctly cross bedded at 5° - 15°.			d=1.45 a=2.51			PT, 5°, PL, RO, CN CS, 15 mm
		11	10.0		**SANDSTONE**: medium to coarse grained, dark grey speckled pale grey and pale brown, indistinctly cross bedded at 5° - 15°. **SANDSTONE**: medium to coarse grained, pale grey, distinctly cross bedded at 5° - 15°.			d=1.18 a=0.89	99%		SM, Clay, 10 mm PT, 5°, PL, RO, CN **CLASS I HAWKESBURY SANDSTONE**
		10	11.0					d=1.89 a=1.47			
		9	12.0					d=1.94 a=1.84			
		8	13.0					d=1.77 a=1.62	100%		
		7	14.0					d=2.09 a=1.31			
		6	15.0		14.84 m: siltstone nodule			d=0.76 a=2.05	100%		

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method
DT diatube
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
RR rock roller

support
C casing M mud N none

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
PT parting
JT joint
SS sheared surface
SZ sheared zone
CO contact
CS crushed seam
SM seam

roughness
VR very rough
RO rough
SO smooth
POL polished
SL slickensided

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

coating
CN clean
SN stained
VN veneer
CO coating

TETRA TECH COFFEY

Engineering Log - Cored Borehole

Borehole ID.	**BH01**
sheet:	4 of 4
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**30 Apr 2025**
principal:	
date completed:	**30 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,832.40; N: 6,240,107.90 (GDA2020) | surface elevation: 21.09 m (AHD) | angle from horizontal: 90°

drill model: D-4T, Truck mounted | drilling fluid: Water | hole diameter : 52/120

drilling information				material substance					rock mass defects		
method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	Not Observed	5			15.90 to 16.04 m: fine to medium sandstone band, dark grey, trace siltstone **SANDSTONE**: medium to coarse grained, pale grey, distinctly cross bedded at 5° - 15°. *(continued)*	FR		d=0.35 a=0.64			**CLASS I HAWKESBURY SANDSTONE**
		4	17.0					d=1.24 a=1.16	100%		
		3	18.0					d=2.22 a=1.57			
		2	19.0		18.64 to 18.75 m: distinctly cross bedded at 10° - 15° 19.65 to 19.80 m: turbulent bedding			d=2.60 a=1.42	100%		
		1	20.0					d=1.91 a=2.14			
		0	21.0					d=1.47 a=1.61			
		-1	22.0					d=1.74 a=1.52	100%		
		-2	23.0		Borehole BH01 terminated at 23.10 m Target depth			d=1.16 a=1.29			

method
DT diatube
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
RR rock roller

support
C casing M mud N none

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
PT parting
JT joint
SS sheared surface
SZ sheared zone
CO contact
CS crushed seam
SM seam

roughness
VR very rough
RO rough
SO smooth
POL polished
SL slickensided

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

coating
CN clean
SN stained
VN veneer
CO coating

TETRA TECH COFFEY

Piezometer Installation Log

Hole ID.	***BH01***
sheet:	1 of 1
project no.	***754-SYDGE381816***
client:	***Akalan Project Pty Ltd***
date started:	***30 Apr 2025***
principal:	
date completed:	***30 Apr 2025***
project:	***St George Private Hospital***
logged by:	***RZ/EO***
location:	***Refer to Site Plan***
checked by:	***IG***

position: E: 327,832.40; N: 6,240,107.90 (GDA2020) | surface elevation: 21.09 m (AHD) | angle from horizontal: 90°

equipment type: D-4T, Truck mounted | drilling fluid: Water | hole diameter : 52/120

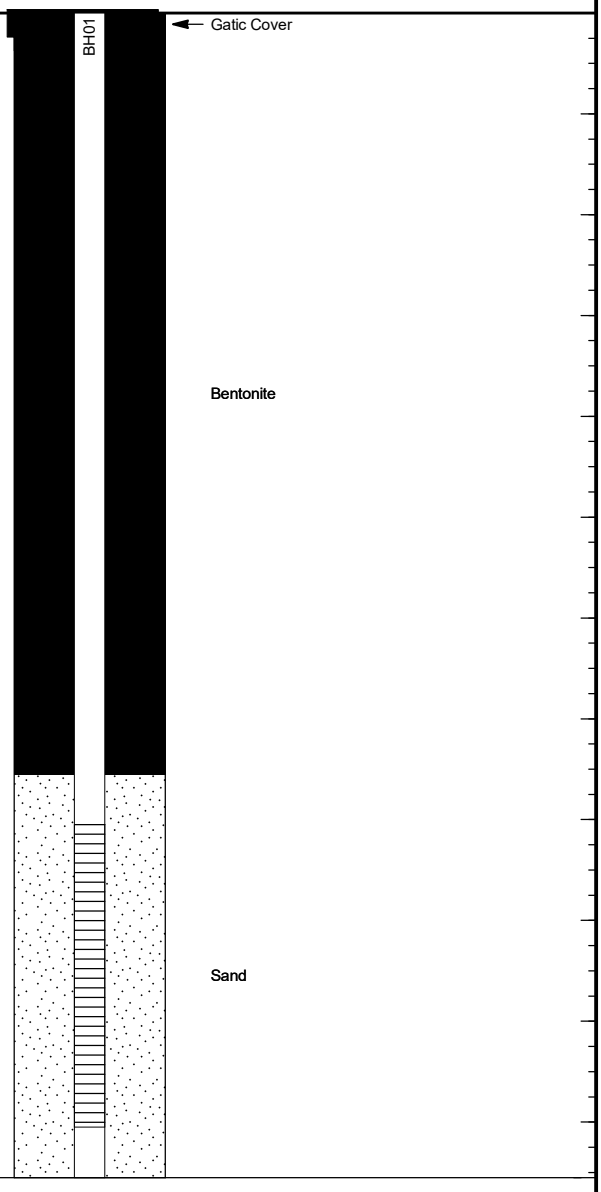
drilling information | **material substance** | **piezometer construction details**

method & support	water	RL (m)	depth (m)	graphic log	material description (refer to engineering log for full description)
HA		20			**FILL**
					EXTREMELY WEATHERED MATERIAL
			4		**CLASS IV HAWKESBURY SANDSTONE**
		16			**CLASS III/II HAWKESBURY SANDSTONE**
	14/05/25		8		
		12			
			12		**CLASS I HAWKESBURY SANDSTONE**
		8			
			16		
		4			
			20		
		0			

D/C — NMLC — HWT

completion details: Flush Gatic
pvc type: 50mm PVC Pipe
sand type: 1-2mm Sand
grout type: N/A

bore construction license: N/A
drilling company: Stratacore
driller: N/A
driller's permit no.: N/A



method & support
see engineering log for details

water
- 10-Oct-12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25 — water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

ID	type	installation date	development date	stickup (m)	tip depth (m)	water level (m)	Relative Levels (AHD) stickup	tip	water level
BH01	standpipe				23.10 m			-2.01	

TETRA TECH COFFEY

Engineering Log - Borehole

Borehole ID.	**BH02**
sheet:	1 of 4
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**29 Apr 2025**
principal:	
date completed:	**29 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,819.46; N: 6,240,067.43 (GDA2020) | surface elevation: 20.43 m (AHD) | angle from horizontal: 90°

drill model: Massenza MI2, Track mounted | drilling fluid: Water | hole diameter : 52/120

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	soil origin, structure and additional observations
HA, C, AD/T		Not Observed	D	20				**TOPSOIL: SILTY SAND**: fine to medium grained, dark brown, with organic matter, trace fine to medium grained, angular to sub-angular gravel, trace root fibres.	M			**FILL**
			SPT 2, 4, 23/149mm HB N*=R	19	1.0		SC	**FILL: Gravelly SAND**: fine to medium grained, dark brown, fine to medium grained, angular to sub-angular gravel. 0.5 to 0.6 m: orange-brown sand band **FILL: CLAYEY SAND**: fine to coarse grained, orange-brown, with fine grained gravel.		D	HP 130 kPa HP 130 kPa	**EXTREMELY WEATHERED MATERIAL**
				18	2.0			**CLAYEY SAND**: medium to coarse grained, red grading to pale grey, mottled orange-brown, with silt, trace iron induration. Borehole BH02 continued as cored hole				
				17	3.0							
				16	4.0							
				15	5.0							
				14	6.0							
				13	7.0							

CDF_0_10_00.4_LIBRARY 1.GLB rev:CDF_0_10_00.4 2021-09-30 Log COF BOREHOLE: NON CORED SGPH_GINT_16.06.2025.GPJ <<DrawingFile>> 03/09/2025 13:32

method
DT diatube
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore
RR rock roller

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nil

penetration
1 2 3 no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
HP hand penetrometer (kPa)
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
VS vane shear; peak/remouded (kPa)
R refusal
HB hammer bouncing

soil group symbol & material description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

TETRA TECH COFFEY

Engineering Log - Cored Borehole

Borehole ID.	**BH02**
sheet:	2 of 4
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**29 Apr 2025**
principal:	
date completed:	**29 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,819.46; N: 6,240,067.43 (GDA2020) | surface elevation: 20.43 m (AHD) | angle from horizontal: 90°

drill model: Massenza MI2, Track mounted | drilling fluid: Water | hole diameter : 52/120

drilling information | **material substance** | **rock mass defects**

method & support	water	RL (m)	depth (m)	graphic log	material description (ROCK TYPE: grain characterisics, colour, structure, minor components)	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
		20									
			1.0		started coring at 1.60m						
NMLC	Not Observed 14/05/25	19	2.0		**Sandy CLAY**: medium to high plasticity, orange-red mottled pale grey, medium to coarse grained sand.	RS - XW / MW		d=0.14 a=0.13			**CLASS IV HAWKESBURY SANDSTONE**
		18			**SANDSTONE**: medium to coarse grained, orange-red speckled pale grey, distintly cross bedded at 15°-20°.				88%		Fracture Zone, 80 mm
			3.0		**SANDSTONE**: medium to coarse grained, pale grey speckled pale red, distintly cross bedded at 10°-15°, shale laminations.			d=0.16 a=0.20			SM, Clay, 10 mm
		17			3.35 to 3.68 m: pale grey streaked red						SM, Clay, 60 mm
			4.0					d=0.15 a=0.17			SM, Clay, 100 mm SM, Clay, 20 mm PT, 0 - 5°, UN, RO, Clay SN
		16			4.20 to 4.45 m: pale grey streaked red						PT, 5 - 10°, PL, RO, CN SM, Clay, 10 mm
			5.0					d=0.02 a=0.06	65%		PT, 0 - 5°, UN, RO, Fe SN
		15									SM, Clay, 50 mm SM, Clay, 40 mm SM, Clay, 100 mm SM, Clay, 30 mm PT, 10°, PL, RO, X CO JT, 70°, PL, RO, CN JT, 70°, PL, RO, Fe SN PT, 0 - 10°, PL, RO, CN
			6.0		**SANDSTONE**: medium to coarse grained, pale grey, distintly cross bedded at 10°-15°, shale laminations.	SW		d=0.15 a=0.17			
		14			6.19 to 6.61 m: sandy clay band, medium to high plasticity						**CLASS III/II HAWKESBURY SANDSTONE**
			7.0					d=0.50 a=0.71	83%		
		13			7.10 to 7.20 m: sandstone massive band						SM, Clay, 50 mm
					7.80 to 8.10 m: flat bedded			d=0.94			

method
DT diatube
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
RR rock roller

support
C casing M mud N none

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
PT parting
JT joint
SS sheared surface
SZ sheared zone
CO contact
CS crushed seam
SM seam

roughness
VR very rough
RO rough
SO smooth
POL polished
SL slickensided

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

coating
CN clean
SN stained
VN veneer
CO coating

TETRA TECH COFFEY

Engineering Log - Cored Borehole

Borehole ID.	**BH02**
sheet:	3 of 4
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**29 Apr 2025**
principal:	
date completed:	**29 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,819.46; N: 6,240,067.43 (GDA2020) | surface elevation: 20.43 m (AHD) | angle from horizontal: 90°

drill model: Massenza MI2, Track mounted | drilling fluid: Water | hole diameter : 52/120

drilling information | **material substance** | **rock mass defects**

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	Not Observed	12			**SANDSTONE**: medium to coarse grained, pale grey, distintly cross bedded at 10°-15°, shale laminations. *(continued)* 8.12 to 8.75 m: becoming pale grey flecked brown-orange and red	SW		a=1.09	83%		**CLASS III/II HAWKESBURY SANDSTONE** SM, Clay, 30 mm
			9.0			FR		d=1.12 a=0.86			
		11									
			10.0					d=1.45 a=1.06			**CLASS I HAWKESBURY SANDSTONE**
		10							100%		PTx2, 10°, PL, RO, CN
			11.0					d=0.92 a=1.21			
		9									
			12.0		11.82 to 12.30 m: massive			d=1.14 a=1.43			
		8									PT, 15°, PL, RO, CN Fracture zone, 160 mm
			13.0					d=1.25 a=1.86			PT, 5 - 10°, UN, RO, CN
		7							92%		
			14.0					d=1.71 a=2.14			
		6									
			15.0		14.90 to 15.40 m: massive			d=1.27 a=1.71			SM, Clay, 20 mm
		5							98%		
					15.90 to 15.94 m: 35mm shale band			d=0.97 a=0.80			

method
DT diatube
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
RR rock roller

support
C casing M mud N none

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
PT parting
JT joint
SS sheared surface
SZ sheared zone
CO contact
CS crushed seam
SM seam

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

roughness
VR very rough
RO rough
SO smooth
POL polished
SL slickensided

coating
CN clean
SN stained
VN veneer
CO coating

TETRA TECH COFFEY

Engineering Log - Cored Borehole

Borehole ID.	**BH02**
sheet:	4 of 4
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**29 Apr 2025**
principal:	
date completed:	**29 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,819.46; N: 6,240,067.43 (GDA2020) surface elevation: 20.43 m (AHD) angle from horizontal: 90°

drill model: Massenza MI2, Track mounted drilling fluid: Water hole diameter : 52/120

drilling information | **material substance** | **rock mass defects**

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	Not Observed	4	17.0		**SANDSTONE**: medium to coarse grained, pale grey, distintly cross bedded at 10°-15°, shale laminations. *(continued)*	FR		d=1.03 a=0.82	98%		PT, 10°, PL, RO, CN **CLASS I HAWKESBURY SANDSTONE** PT, 10°, PL, RO, CN SM, Clay, 25 mm PT, 5°, PL, RO, CN
		3	18.0					d=1.77 a=1.75			
		2	19.0					d=1.36 a=1.10	96%		SM, Clay, 20 mm PT, 5°, PL, RO, CN
		1	20.0					d=1.22 a=1.26			PT, 5°, UN, RO, Clay VN CS, Clay, 25 mm SM, Clay, 10 mm
		0	21.0					d=1.74 a=0.77 d=1.34 a=1.24			
		-1	22.0		21.60 to 22.30 m: with quartz inclusions				99%		SM, Clay, 20 mm
		-2	23.0					d=1.16 a=1.97	100% 0%		PT, 5°, PL, RO, CN NMLC drill bit was damaged. Drill swap to PCD. No core recovery.
		-3			Borehole BH02 terminated at 23.09 m Target depth						

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method
DT diatube
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
RR rock roller

support
C casing M mud N none

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
PT parting
JT joint
SS sheared surface
SZ sheared zone
CO contact
CS crushed seam
SM seam

roughness
VR very rough
RO rough
SO smooth
POL polished
SL slickensided

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

coating
CN clean
SN stained
VN veneer
CO coating

TETRA TECH COFFEY

Piezometer Installation Log

Hole ID.	**BH02**
sheet:	1 of 1
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**29 Apr 2025**
principal:	
date completed:	**29 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,819.46; N: 6,240,067.43 (GDA2020) | surface elevation: 20.43 m (AHD) | angle from horizontal: 90°

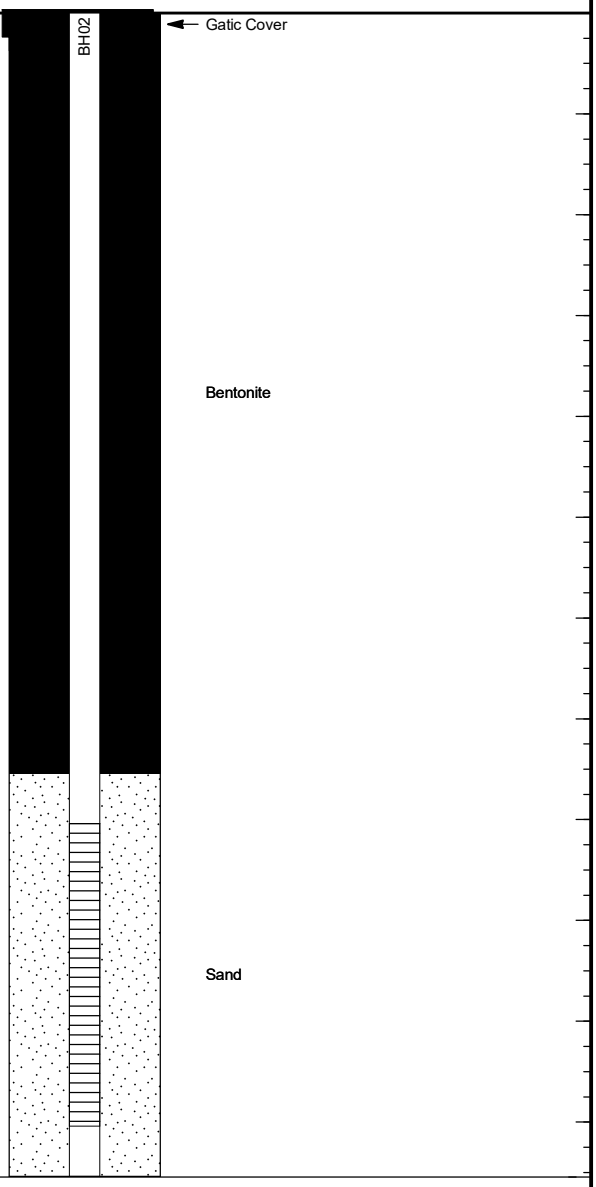
equipment type: Massenza MI2, Track mounted | drilling fluid: Water | hole diameter : 52/120

drilling information | **material substance** | **piezometer construction details**

completion details: Flush Gatic
pvc type: 50mm PVC Pipe
sand type: 1-2mm Sand
grout type: N/A

bore construction license: N/A
drilling company: Stratacore
driller: N/A
driller's permit no.: N/A

method & support	water	RL (m)	depth (m)	graphic log	material description (refer to engineering log for full description)
HA / C	Not Observed; 14/05/25	20	0		**FILL**
					EXTREMELY WEATHERED MATERIAL
		16	4		**CLASS IV HAWKESBURY SANDSTONE**
		12	8		**CLASS III/II HAWKESBURY SANDSTONE**
NMLC / HWT		8	12		**CLASS I HAWKESBURY SANDSTONE**
		4	16		
		0	20		



method & support
see engineering log for details

water
- 10-Oct-12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

ID	type	installation date	development date	stickup (m)	tip depth (m)	water level (m)	Relative Levels (AHD) stickup	tip	water level
BH02	standpipe				23.08 m			-2.65	

TETRA TECH COFFEY

Engineering Log - Borehole

Borehole ID.	**BH03**
sheet:	1 of 4
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**28 Apr 2025**
principal:	
date completed:	**28 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,845.22; N: 6,240,064.94 (GDA2020) | surface elevation: 20.01 m (AHD) | angle from horizontal: 90°

drill model: Massenza MI2, Track mounted | drilling fluid: Water | hole diameter : 52/120

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	soil origin, structure and additional observations
DT		Not Observed		20				**ASPHALT**.				**FILL**
HA			D					**FILL: Gravelly SAND**: fine to medium grained, dark brown-grey mottled dark grey and orange-yellow, gravel is fine to medium and angular to sub-angular, trace silt, trace glass fragments and 110mm length of rebar.	D - M			
			D	19	1.0		SP-SC	**FILL: CLAYEY SAND**: fine to medium grained, dark grey mottled pale brown-yellow, with silt, trace ironstone gravel.				
AD/T			SPT 2, 2, 4 N*=6				CL-CI	**Sandy CLAY**: medium to high plasticity, pale brown and orange mottled pale grey, sand is fine to medium grained, trace fine grained gravel. 1.7 m: becoming pale grey mottled red-brown	<Wp	St	X	**RESIDUAL SOIL** HP 180 kPa HP 130 kPa HP 130 kPa
C				18	2.0			**SAND**: medium to coarse grained, pale red mottled brown.		D - VD		**EXTREMELY WEATHERED MATERIAL** At 2.20m: drilling resistance increased
			SPT 5/50mm HB N*=R					Borehole BH03 continued as cored hole				
				17	3.0							
				16	4.0							
				15	5.0							
				14	6.0							
				13	7.0							

CDF_0_10_00.4_LIBRARY 1.GLB rev:CDF_0_10_00.4 2021-09-30 Log COF BOREHOLE: NON CORED SGPH_GINT_16.06.2025.GPJ <<DrawingFile>> 03/09/2025 13:32

method
DT diatube; AD auger drilling*; AS auger screwing*; HA hand auger; W washbore; RR rock roller
* bit shown by suffix e.g. AD/T; B blank bit; T TC bit; V V bit

support
M mud; C casing; N nil

penetration
1 2 3 — no resistance ranging to refusal

water
10-Oct-12 water level on date shown; water inflow; water outflow

samples & field tests
B bulk disturbed sample; D disturbed sample; E environmental sample; SS split spoon sample; U## undisturbed sample ##mm diameter; HP hand penetrometer (kPa); N standard penetration test (SPT); N* SPT - sample recovered; Nc SPT with solid cone; VS vane shear; peak/remouded (kPa); R refusal; HB hammer bouncing

soil group symbol & material description based on AS 1726:2017

moisture condition
D dry; M moist; W wet; Wp plastic limit; Wl liquid limit

consistency / relative density
VS very soft; S soft; F firm; St stiff; VSt very stiff; H hard; Fb friable; VL very loose; L loose; MD medium dense; D dense; VD very dense

TETRA TECH COFFEY

Engineering Log - Cored Borehole

Borehole ID.	**BH03**
sheet:	2 of 4
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**28 Apr 2025**
principal:	
date completed:	**28 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,845.22; N: 6,240,064.94 (GDA2020) surface elevation: 20.01 m (AHD) angle from horizontal: 90°

drill model: Massenza MI2, Track mounted drilling fluid: Water hole diameter : 52/120

drilling information | **material substance** | **rock mass defects**

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
		20									
		19	1.0								
		18	2.0		started coring at 2.65m						
NMLC	I14/05/25rved	17	3.0		**CLAYEY SAND**: fine to coarse grained, pale brown.	XW					**CLASS IV HAWKESBURY SANDSTONE** SM, Clay, 20 mm
					SANDSTONE: medium to coarse grained, pale grey and orange-brown, speckled red, indistinctly cross bedded at 10° - 15°. 3.30 m: becoming red-purple mottled pale grey	MW		d=0.12 a=0.20	75%		
		16	4.0					d=0.26 a=0.33			SM, Clay, 80 mm PT, 10°, PL, Fe healed PT, 10°, PL, RO, Fe SN SM, Clay, 70 mm PT, 10°, PL, Clay, closed JT, 70°, PL, RO, CN
					SANDSTONE: medium to coarse grained, pale grey, bands of red and orange-brown, indistinctly cross bedded at 10° - 15°.	SW		d=0.15 a=0.14			Fracture Zone, Fe SN, 80 mm SM, Clay, 50 mm CS, 30 mm PT, 15°, PL, RO, Fe SN
		15	5.0								Fracture zone, Fe SN, 60 mm
		14	6.0					d=0.33 a=0.43	86%		**CLASS III/II HAWKESBURY SANDSTONE** PT, 5°, PL, RO, CN PT, 5°, PL, RO, CN PT, 0 - 5°, UN, RO, Clay CO - Fe SN SM, Clay, 20 mm
		13	7.0		7.08 m: becoming distinctly cross bedded at 10° - 15°			d=0.47 a=0.55			
								d=0.23	97%		

CDF_0_10_00.4_LIBRARY 1.GLB rev:CDF_0_10_00.4 2021-09-30 Log COF BOREHOLE: CORED SGPH_GINT_16.06.2025.GPJ <<DrawingFile>> 03/09/2025 13:34

method
DT diatube
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
RR rock roller

support
C casing M mud N none

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
PT parting
JT joint
SS sheared surface
SZ sheared zone
CO contact
CS crushed seam
SM seam

roughness
VR very rough
RO rough
SO smooth
POL polished
SL slickensided

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

coating
CN clean
SN stained
VN veneer
CO coating

TETRA TECH COFFEY

Engineering Log - Cored Borehole

Borehole ID.	**BH03**
sheet:	3 of 4
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**28 Apr 2025**
principal:	
date completed:	**28 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,845.22; N: 6,240,064.94 (GDA2020) | surface elevation: 20.01 m (AHD) | angle from horizontal: 90°

drill model: Massenza MI2, Track mounted | drilling fluid: Water | hole diameter : 52/120

drilling information | **material substance** | **rock mass defects**

method & support	water	RL (m)	depth (m)	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral)	samples, field tests & Is(50) (MPa) (a = axial; d = diametral)	core run & RQD	defect spacing (mm)	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	Not Observed	12					a=0.29			SM, Clay, 90 mm **CLASS III/II HAWKESBURY SANDSTONE**
		11	9.0	**SANDSTONE**: medium to coarse grained, pale grey mottled orange-brown speckled red-purple, indistinctly cross bedded at 10° - 15°.	SW		d=1.21 a=1.12			
		10	10.0	**SANDSTONE**: medium to coarse grained, pale grey flecked orange-brown, grading to pale grey, distinctly cross bedded at 10° - 15°.	FR		d=1.07 a=1.62	97%		**CLASS I HAWKESBURY SANDSTONE** PT, 0 - 5°, UN, RO, CN PT, 5 - 10°, UN, RO, CN
		9	11.0				d=1.08 a=1.50			PT, 15°, PL, RO, CN SM, Clay, 5 mm
		8	12.0				d=1.69 a=1.59	97%		PT, 10°, PL, RO, X CO
		7	13.0	12.75 to 12.79 m: siltstone nodule, up to 40 mm thick 12.83 to 12.94 m: pale grey mottled orange-brown 13.18 to 13.25 m: siltstone lamination, distinctly laminated at 15°			d=1.36 a=2.44			PT, 5 - 15°, UN, RO, CN SM, Clay, 30 mm
		6	14.0	**SANDSTONE**: medium to coarse grained, pale grey, massive.			d=1.23 a=1.44			
		5	15.0	14.71 to 14.79 m: distinctly cross bedded at 0° - 10° band			d=1.34 a=1.61	100%		PT, 10°, PL, RO, CN PT, 5 - 10°, UN, RO, CN CS, 10 mm PT, 10°, PL, RO, CN PT, 10°, PL, RO, CN
				15.35 to 15.55 m: distinctly cross bedded at 10° - 15° band			d=1.26			

method
DT diatube
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
RR rock roller

support
C casing M mud N none

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
PT parting
JT joint
SS sheared surface
SZ sheared zone
CO contact
CS crushed seam
SM seam

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

roughness
VR very rough
RO rough
SO smooth
POL polished
SL slickensided

coating
CN clean
SN stained
VN veneer
CO coating

TETRA TECH COFFEY

Engineering Log - Cored Borehole

Borehole ID.	**BH03**
sheet:	4 of 4
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**28 Apr 2025**
principal:	
date completed:	**28 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,845.22; N: 6,240,064.94 (GDA2020) surface elevation: 20.01 m (AHD) angle from horizontal: 90°

drill model: Massenza MI2, Track mounted drilling fluid: Water hole diameter : 52/120

drilling information				material substance					rock mass defects		
method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	Not Observed	4			**SANDSTONE**: medium to coarse grained, pale grey, indistinctly cross bedded at 10° - 15°. *(continued)*	FR		a=0.68	100%		**CLASS I HAWKESBURY SANDSTONE**
		3	17.0					d=1.54 a=1.67			PT, 10°, PL, RO, Clay VN CS, 30 mm
		2	18.0					d=1.18 a=1.26	98%		PT, 15°, PL, RO, Clay CO SM, Clay, 60 mm
		1	19.0		18.80 m: becoming pale grey-yellow			d=0.81 a=1.23			
		0	20.0					d=1.53 a=1.71	100%		SM, Clay, 10 mm PT, 5 - 10°, UN, RO, CN
		-1	21.0					d=1.06 a=1.03			
		-2	22.0					d=1.41 a=1.76	100%		
		-3	23.0					d=0.68 a=1.22			
					23.20 m: medium vitrinite coal band Borehole BH03 terminated at 23.22 m Target depth						

CDF_0_10_00.4_LIBRARY 1.GLB rev:CDF_0_10_00.4 2021-09-30 Log COF BOREHOLE: CORED SGPH_GINT_16.06.2025.GPJ <<DrawingFile>> 03/09/2025 13:34

method
DT diatube
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
RR rock roller

support
C casing M mud N none

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
PT parting
JT joint
SS sheared surface
SZ sheared zone
CO contact
CS crushed seam
SM seam

roughness
VR very rough
RO rough
SO smooth
POL polished
SL slickensided

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

coating
CN clean
SN stained
VN veneer
CO coating

TETRA TECH COFFEY

Piezometer Installation Log

Hole ID.	**BH03**
sheet:	1 of 1
project no.	**754-SYDGE381816**
client:	**Akalan Project Pty Ltd**
date started:	**28 Apr 2025**
principal:	
date completed:	**28 Apr 2025**
project:	**St George Private Hospital**
logged by:	**RZ/EO**
location:	**Refer to Site Plan**
checked by:	**IG**

position: E: 327,845.22; N: 6,240,064.94 (GDA2020) | surface elevation: 20.01 m (AHD) | angle from horizontal: 90°

equipment type: Massenza MI2, Track mounted | drilling fluid: Water | hole diameter : 52/120

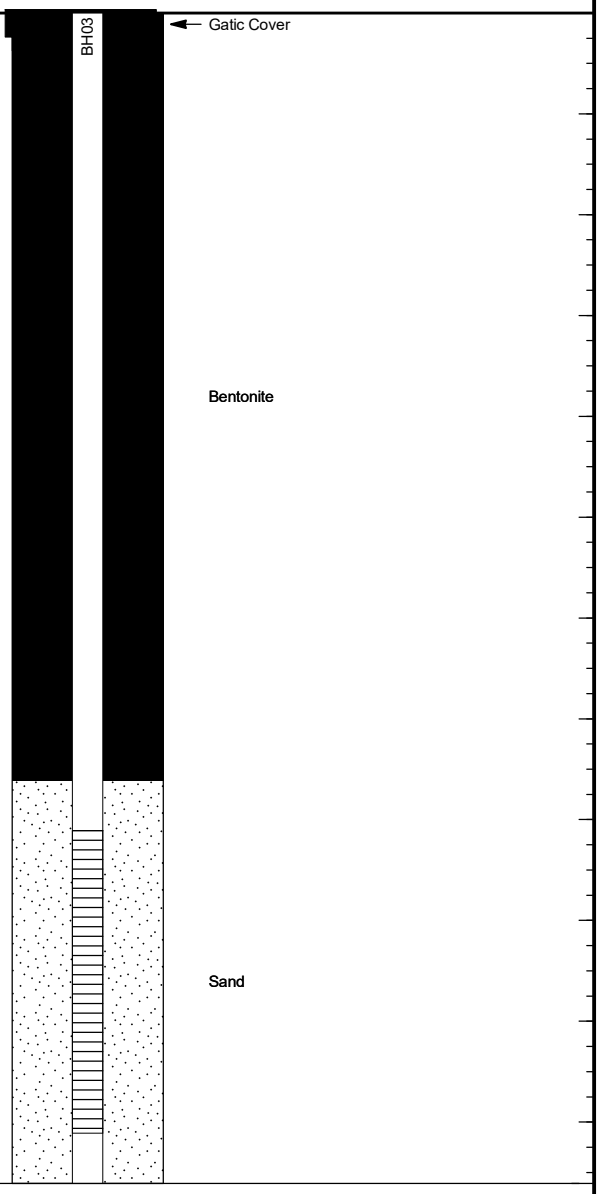
drilling information | **material substance** | **piezometer construction details**

completion details: Flush Gatic
pvc type: 50mm PVC Pipe
sand type: 1-2mm Sand
grout type: N/A

bore construction license: N/A
drilling company: Stratacore
driller: N/A
driller's permit no.: N/A

material description (refer to engineering log for full description)	RL (m)	depth (m)
FILL	20	
RESDIUAL SOIL		
EXTREMELY WEATHERED MATERIAL		
CLASS IV HAWKESBURY SANDSTONE	16	4
CLASS III/II HAWKESBURY SANDSTONE	12	8
CLASS I HAWKESBURY SANDSTONE	8	12
	4	16
	0	20

method & support: AD/T, C, NMLC, HWT
water: Not Observed; 14/05/25



method & support see engineering log for details

water
- 10-Oct-12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

ID	type	installation date	development date	stickup (m)	tip depth (m)	water level (m)	Relative Levels (AHD) stickup	tip	water level
BH03	standpipe				23.22 m			-3.21	

APPENDIX C: RISING HEAD TEST REPORTS

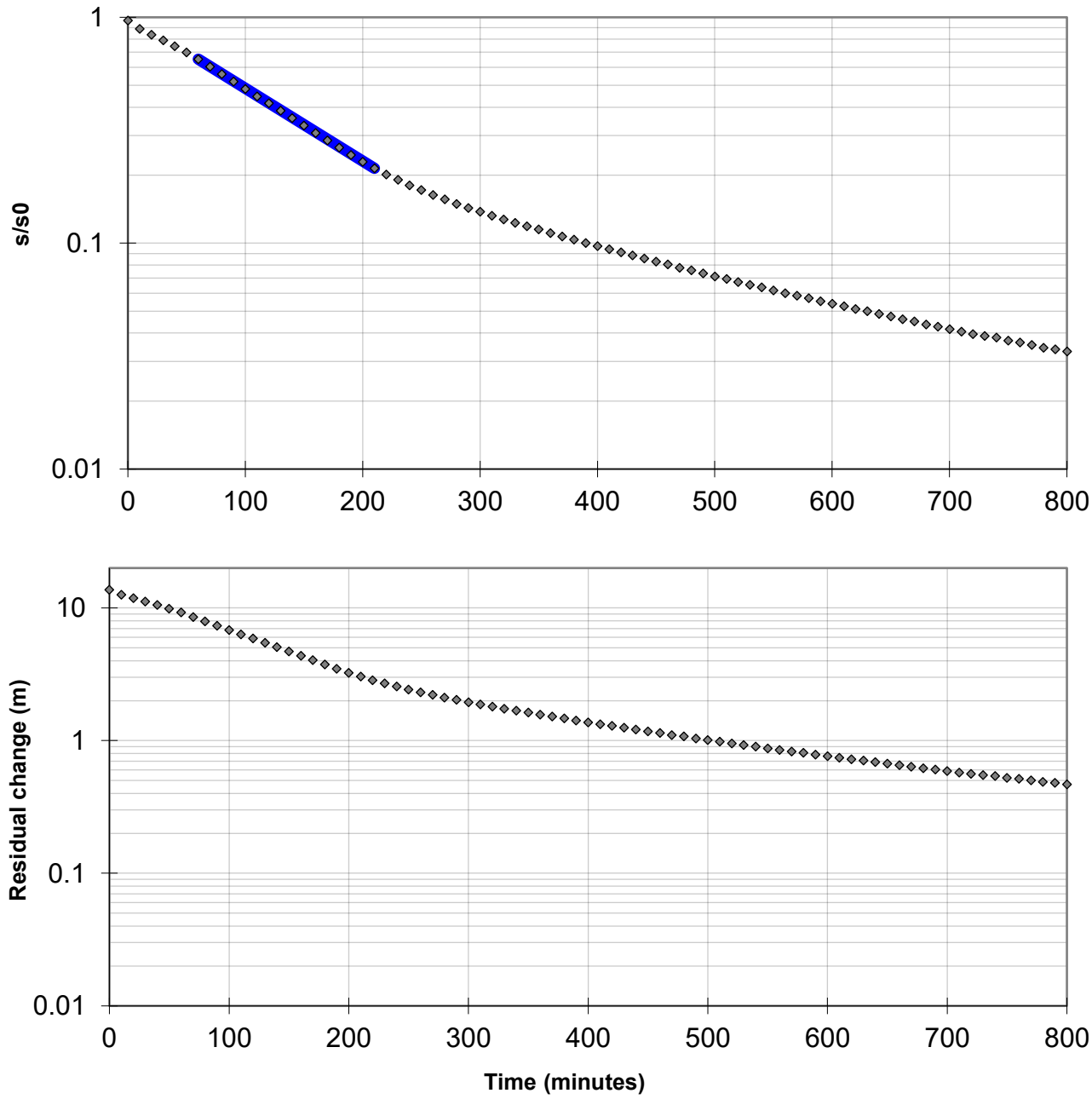
RISING OR FALLING HEAD TEST ANALYSIS

Bore Data	Units	Value
Initial groundwater depth	m	6.18
Groundwater depth at t=0	m	20.34
Casing radius (r)	m	0.025
Bore radius (R)	m	0.037
Saturated screen length (L)	m	6
Match time start	min	50
Match time end	min	200
Characteristic Time (t_0)	**min**	**134.11**
Hydraulic Conductivity (K)	**m/s**	**3.3E-08**

Test: BH01 - Rising Head Test

Method Developed by Hvorslev (1951)

$$K = \frac{r^2 \ln(L/R)}{2Lt_0}$$



Reference: Hvorslev, M.J. (1951), Time lag and soil permeability in ground water observations. U.S. Army Corps of Engineers Waterway Experimentation Station, Bulletin 36.

drawn	EP	TETRA TECH COFFEY	client:	Akalan Projects Pty Ltd
approved	AO		project:	St George Private Hospital Kogarah, NSW
date	15 May 2025		title:	BH01 - Rising Head Test
scale	AS SHOWN		project no:	SYDGE381816
original size	A4			

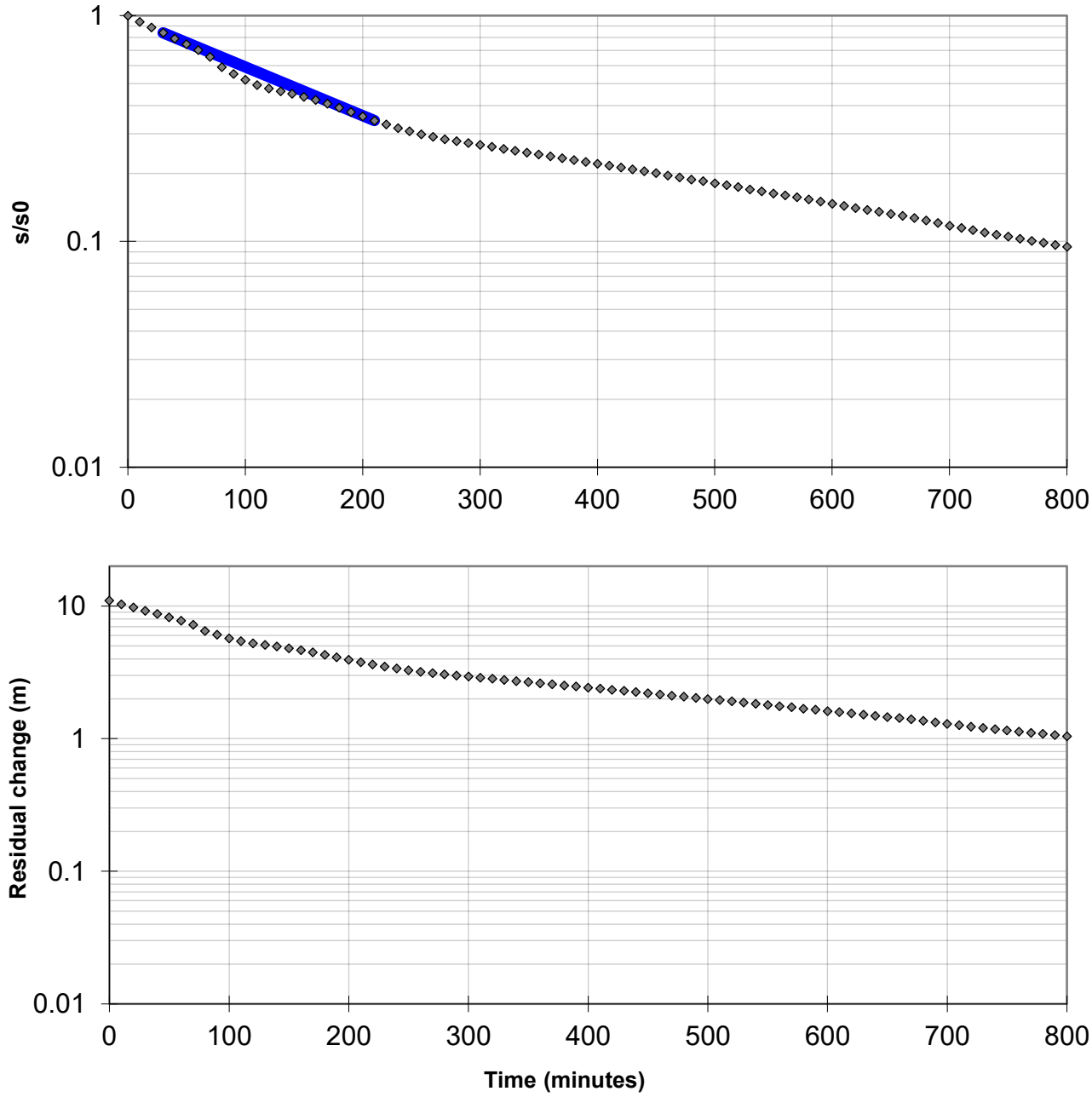
RISING OR FALLING HEAD TEST ANALYSIS

Bore Data	Units	Value
Initial groundwater depth	m	3.2
Groundwater depth at t=0	m	14.21
Casing radius (r)	m	0.025
Bore radius (R)	m	0.037
Saturated screen length (L)	m	6
Match time start	min	25
Match time end	min	200
Characteristic Time (t_0)	**min**	**207.29**
Hydraulic Conductivity (K)	**m/s**	**2.1E-08**

Test: BH02 - Rising Head Test

Method Developed by Hvorslev (1951)

$$K = \frac{r^2 \ln(L/R)}{2Lt_0}$$



Reference: Hvorslev, M.J. (1951), Time lag and soil permeability in ground water observations. U.S. Army Corps of Engineers Waterway Experimentation Station, Bulletin 36.

drawn	EP	TETRA TECH COFFEY	client:	Akalan Projects Pty Ltd
approved	AO		project:	St George Private Hospital Kogarah, NSW
date	15 May 2025		title:	BH02 - Rising Head Test
scale	AS SHOWN		project no:	SYDGE381816
original size	A4			

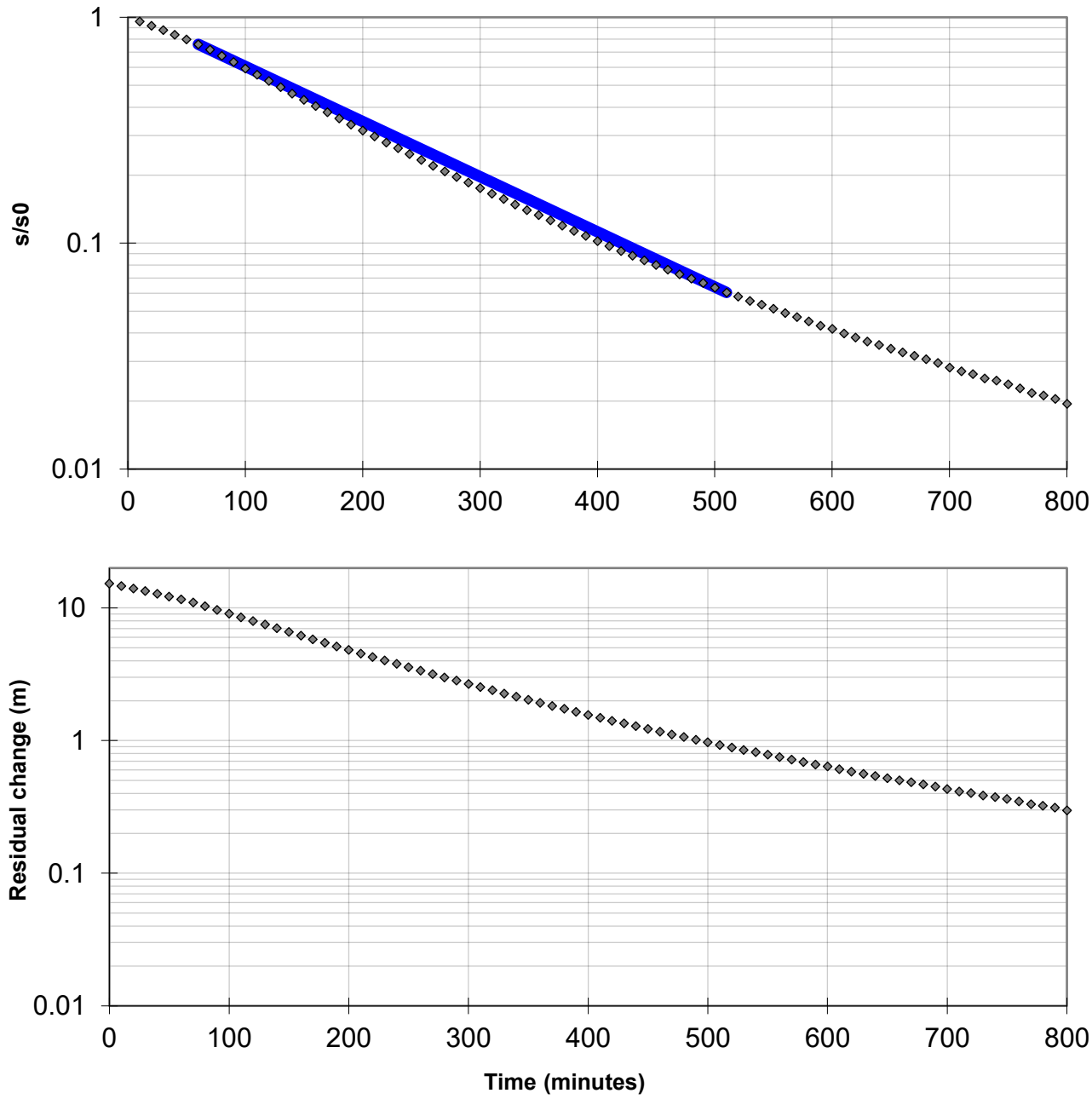
RISING OR FALLING HEAD TEST ANALYSIS

Bore Data	Units	Value
Initial groundwater depth	m	5.06
Groundwater depth at t=0	m	20.35
Casing radius (r)	m	0.025
Bore radius (R)	m	0.037
Saturated screen length (L)	m	6
Match time start	min	50
Match time end	min	500
Characteristic Time (t_0)	**min**	**176.33**
Hydraulic Conductivity (K)	**m/s**	**2.5E-08**

Test: BH03 - Rising Head Test

Method Developed by Hvorslev (1951)

$$K = \frac{r^2 \ln(L/R)}{2Lt_0}$$



Reference: Hvorslev, M.J. (1951), Time lag and soil permeability in ground water observations. U.S. Army Corps of Engineers Waterway Experimentation Station, Bulletin 36.

drawn	EP		client:	Akalan Projects Pty Ltd
approved	AO	TETRA TECH COFFEY	project:	St George Private Hospital Kogarah, NSW
date	15 May 2025		title:	BH03 - Rising Head Test
scale	AS SHOWN		project no:	SYDGE381816
original size	A4			

APPENDIX D: LABORATORY RESULTS

CERTIFICATE OF ANALYSIS

Work Order	: **ES2514009**	Page	: 1 of 7
Client	: **TETRA TECH COFFEY PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Ethan Potter	Contact	: Jason Dighton
Address	: LEVEL 19, TOWER B- CITADEL TOWER 799 PACIFIC HIGHWAY CHATSWOOD NSW, AUSTRALIA 2067	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: SYDGE381816 St George Private Hospital	Date Samples Received	: 14-May-2025 19:20
Order number	: ----	Date Analysis Commenced	: 15-May-2025
C-O-C number	: ----	Issue Date	: 22-May-2025 15:48
Sampler	: Ethan Potter		
Site	:		
Quote number	: EN/000		
No. of samples received	: 4		
No. of samples analysed	: 4		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EP080: The result for sample ES2514009-004 was confirmed by re-analysis.
- EP080: Positive result for ES2514009-01 has been confirmed by re-analysis.
- EG020: It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH01	BH02	BH03	DUP - 1	----
			Sampling date / time	14-May-2025 11:30	14-May-2025 11:30	14-May-2025 11:30	14-May-2025 11:30	----
Compound	CAS Number	LOR	Unit	ES2514009-001	ES2514009-002	ES2514009-003	ES2514009-004	--------
				Result	Result	Result	Result	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	808	238	845	765	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	424	150	441	414	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	57	----	----	106	----
Suspended Solids (SS)	----	5	mg/L	----	25	7	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	50.0	12.2	9.8	51.2	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	51	41	6	51	----
Total Alkalinity as CaCO3	----	1	mg/L	51	41	6	51	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	33	34	28	34	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	223	20	286	214	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	14	13	6	9	----
Magnesium	7439-95-4	1	mg/L	15	4	16	14	----
Sodium	7440-23-5	1	mg/L	130	33	144	125	----
Potassium	7440-09-7	1	mg/L	4	2	2	4	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.02	<0.01	0.15	0.01	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH01	BH02	BH03	DUP - 1	----
			Sampling date / time	14-May-2025 11:30	14-May-2025 11:30	14-May-2025 11:30	14-May-2025 11:30	----
Compound	CAS Number	LOR	Unit	ES2514009-001	ES2514009-002	ES2514009-003	ES2514009-004	--------
				Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued								
Copper	7440-50-8	0.001	mg/L	<0.001	**0.004**	**0.006**	<0.001	----
Nickel	7440-02-0	0.001	mg/L	**0.008**	**0.006**	**0.008**	**0.007**	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	**0.071**	**0.062**	**0.132**	**0.096**	----
Manganese	7439-96-5	0.001	mg/L	**0.735**	**0.057**	**0.302**	**0.760**	----
Boron	7440-42-8	0.05	mg/L	<0.05	**0.08**	<0.05	<0.05	----
Iron	7439-89-6	0.05	mg/L	**18.1**	<0.05	**10.6**	**18.9**	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.14**	**0.95**	**0.31**	**0.19**	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	**0.002**	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	**0.001**	<0.001	**0.002**	----
Copper	7440-50-8	0.001	mg/L	<0.001	**0.006**	**0.008**	**0.002**	----
Nickel	7440-02-0	0.001	mg/L	**0.008**	**0.004**	**0.006**	**0.008**	----
Lead	7439-92-1	0.001	mg/L	<0.001	**0.001**	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	**0.089**	**0.056**	**0.120**	**0.095**	----
Manganese	7439-96-5	0.001	mg/L	**0.793**	**0.060**	**0.299**	**0.782**	----
Boron	7440-42-8	0.05	mg/L	<0.05	**0.06**	<0.05	<0.05	----
Iron	7439-89-6	0.05	mg/L	**19.6**	**0.80**	**11.8**	**21.6**	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**8.00**	**2.09**	**8.77**	**7.76**	----
ø Total Cations	----	0.01	meq/L	**----**	**----**	**8.51**	**----**	----
ø Total Cations	----	0.01	meq/L	**7.69**	**2.46**	**----**	**7.14**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH01	BH02	BH03	DUP - 1	----
				Sampling date / time	14-May-2025 11:30	14-May-2025 11:30	14-May-2025 11:30	14-May-2025 11:30	----
Compound	CAS Number	LOR	Unit		ES2514009-001	ES2514009-002	ES2514009-003	ES2514009-004	--------
					Result	Result	Result	Result	----
EN055: Ionic Balance - Continued									
ø Ionic Balance	----	0.01	%		----	----	1.50	----	----
ø Ionic Balance	----	0.01	%		1.95	----	----	4.18	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	30	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	30	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L		11	<2	<2	11	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L		11	<1	<1	11	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
EP080S: TPH(V)/BTEX Surrogates									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH01	BH02	BH03	DUP - 1	----
				Sampling date / time	14-May-2025 11:30	14-May-2025 11:30	14-May-2025 11:30	14-May-2025 11:30	----
Compound	CAS Number	LOR	Unit		ES2514009-001	ES2514009-002	ES2514009-003	ES2514009-004	--------
					Result	Result	Result	Result	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
1.2-Dichloroethane-D4	17060-07-0	2	%		**115**	**77.8**	**86.2**	**109**	**----**
Toluene-D8	2037-26-5	2	%		**108**	**75.4**	**108**	**103**	**----**
4-Bromofluorobenzene	460-00-4	2	%		**102**	**80.1**	**108**	**111**	**----**

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137

APPENDIX E: ARCHITECTURAL PLANS

St George Private Hospital

119 Princes Highway Kogarah NSW 2217 Australia

2500814 Consultant Set

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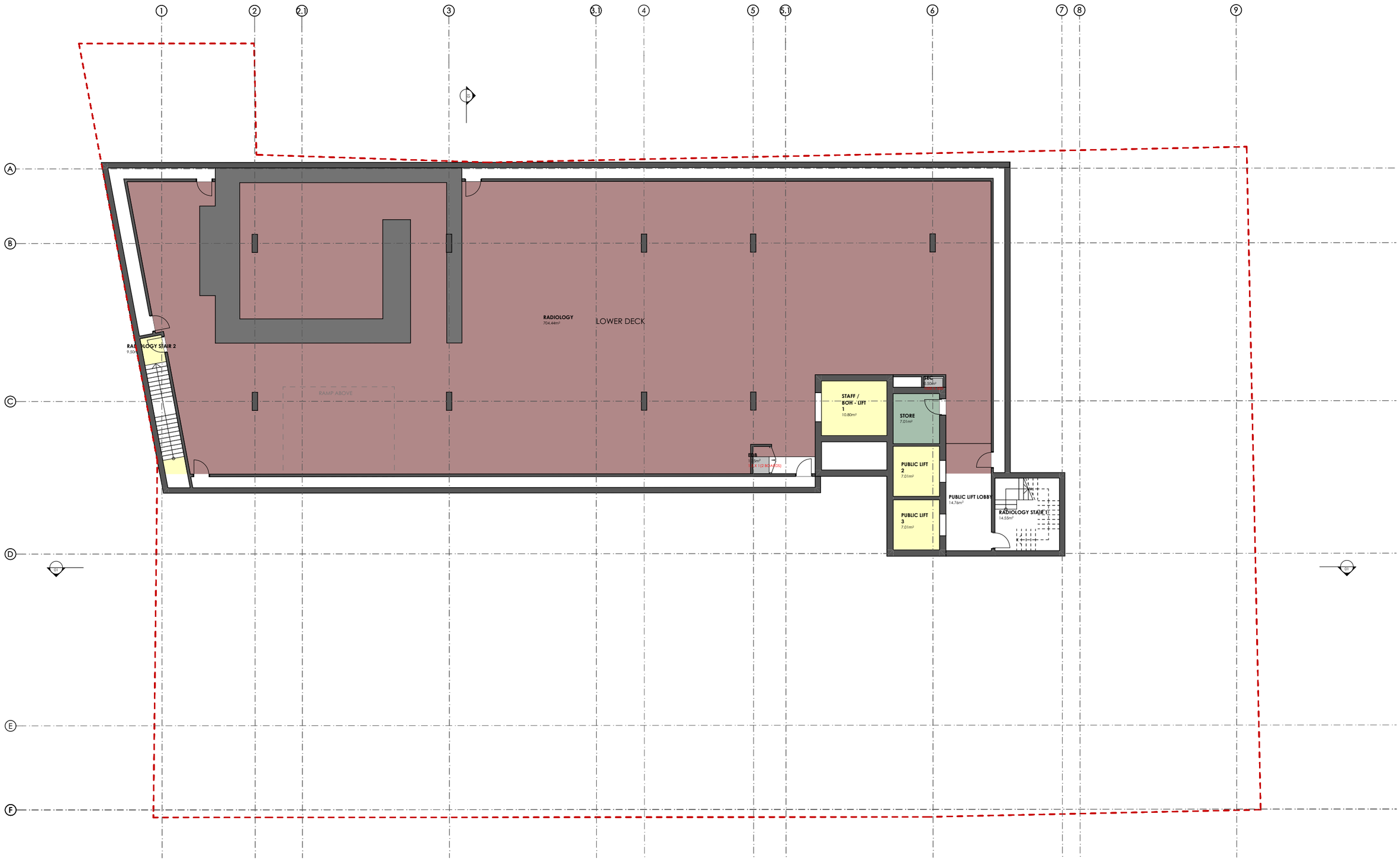
Ramsay Health Care



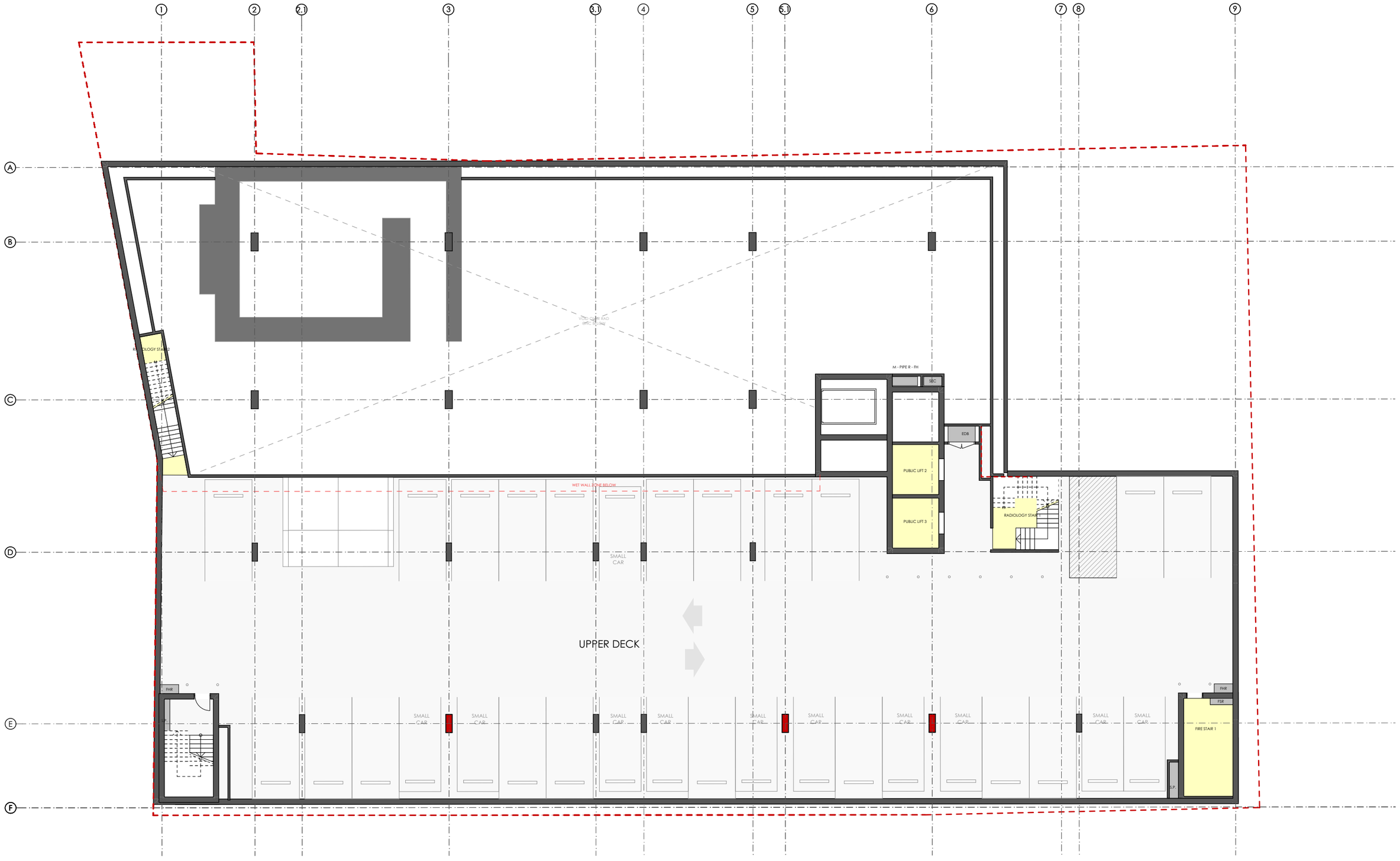
SK250814 | Newbuild - Basemen 5 Lower Deck - Radiology

1:200 @ A3

St George Private Hospital |

fitzpatrick + partners

Ramsay Health Care



SK250814 | Newbuild - Basement 5 Upeer Deck

1:200 @ A3

St George Private Hospital |

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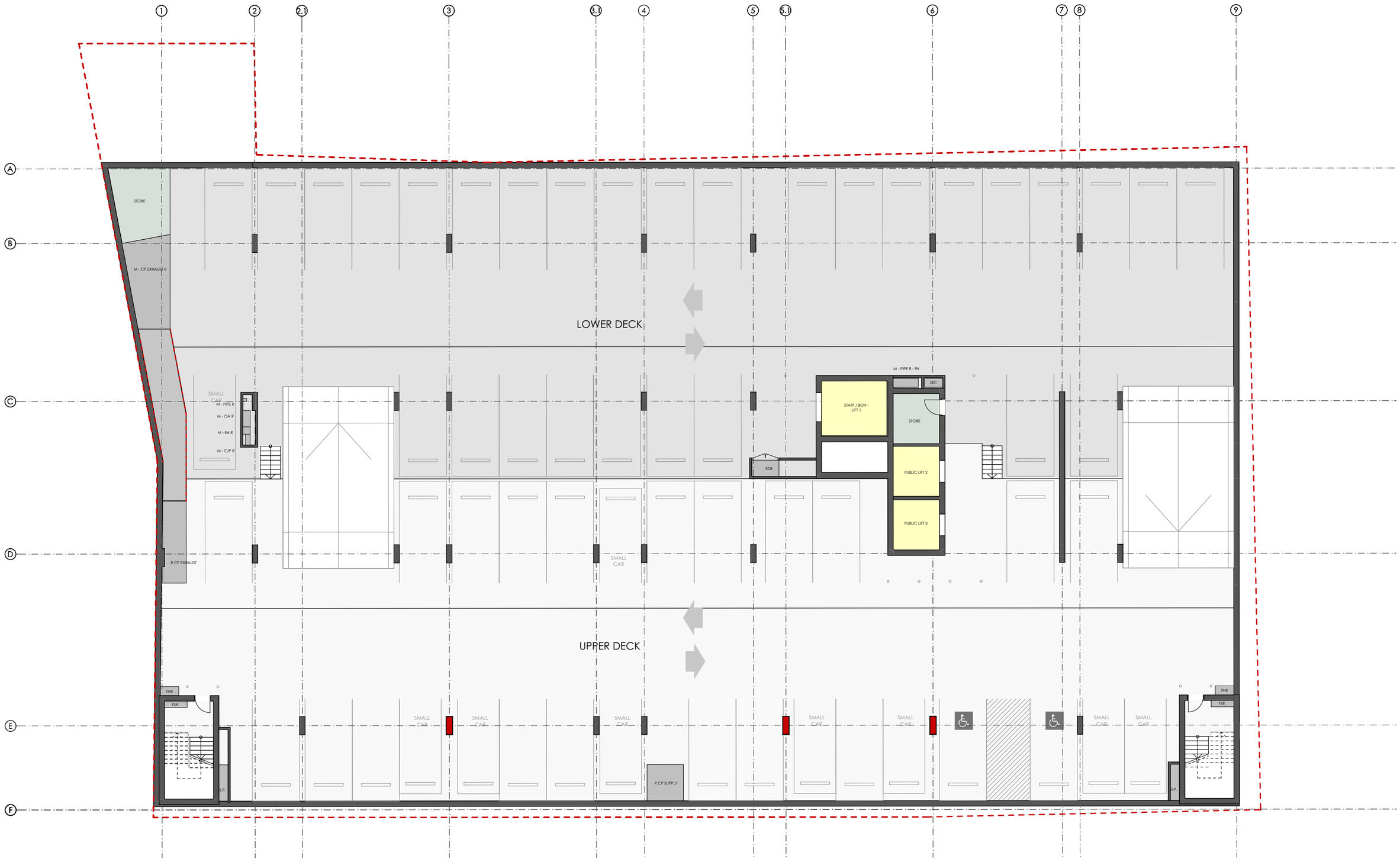
Ramsay Health Care



SK250814 | Newbuild - Basement 4
1:200 @ A3

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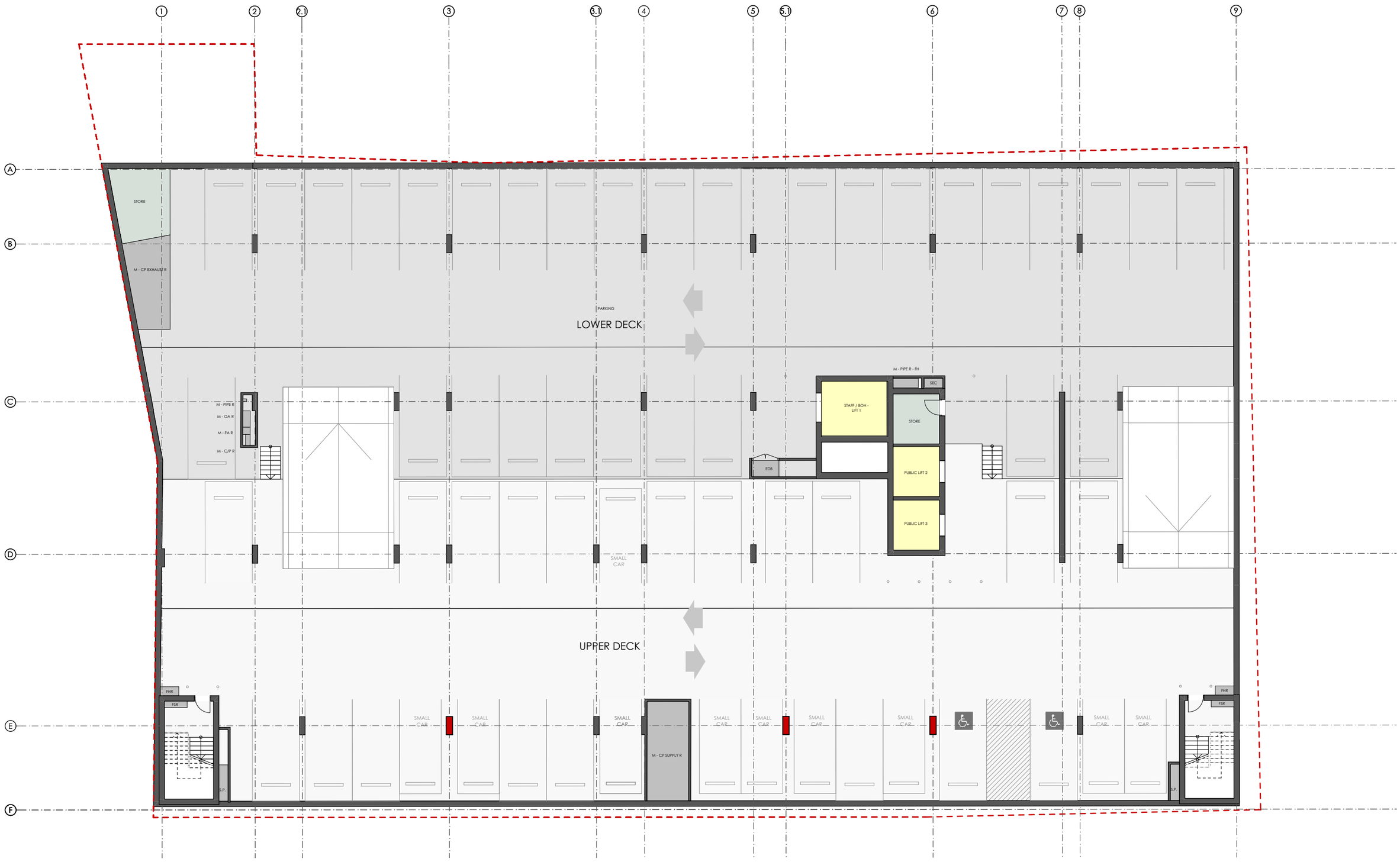
Ramsay Health Care



SK250814 | Newbuild - Typical Basement 2-3

1:200 @ A3

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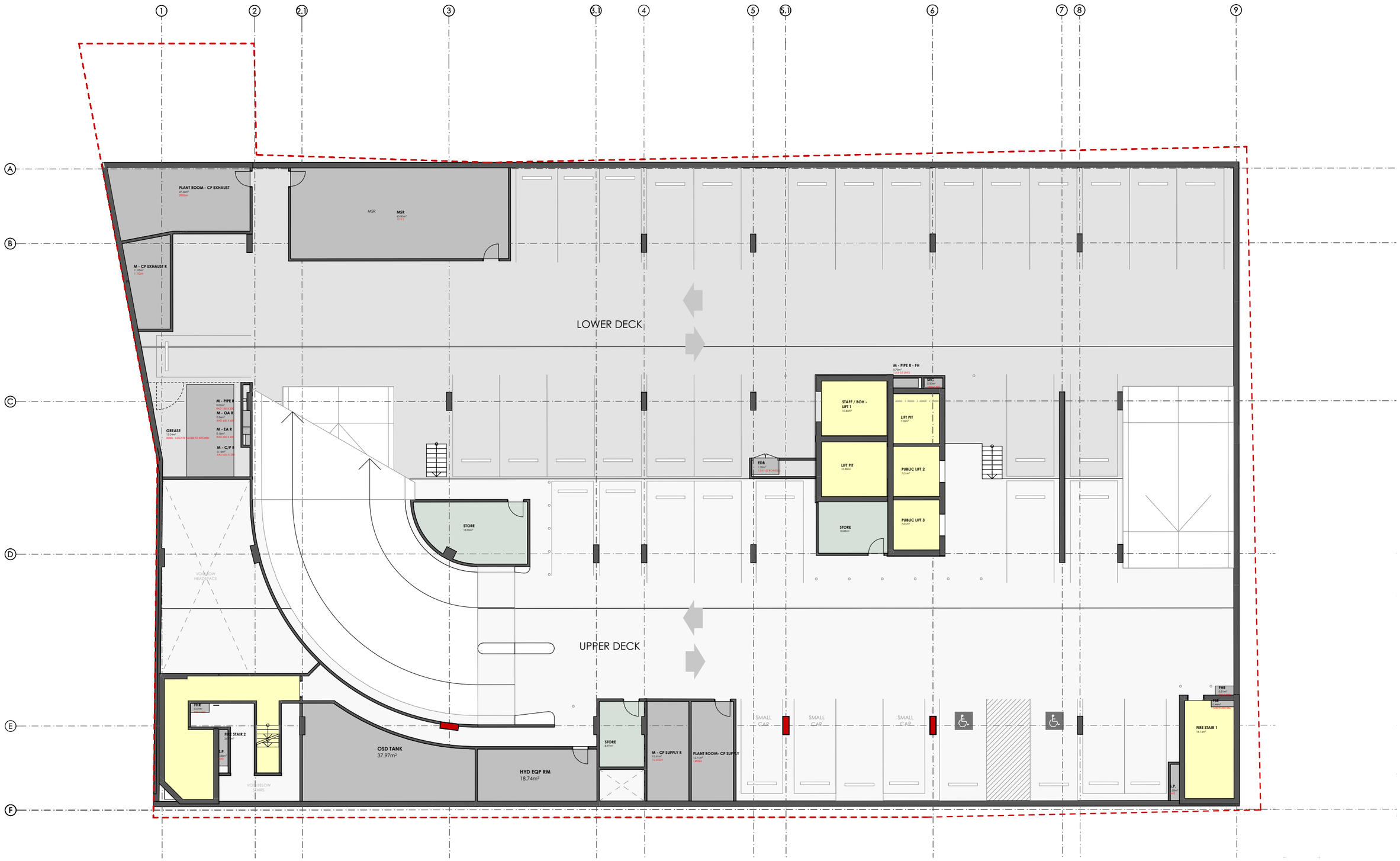
Ramsay Health Care

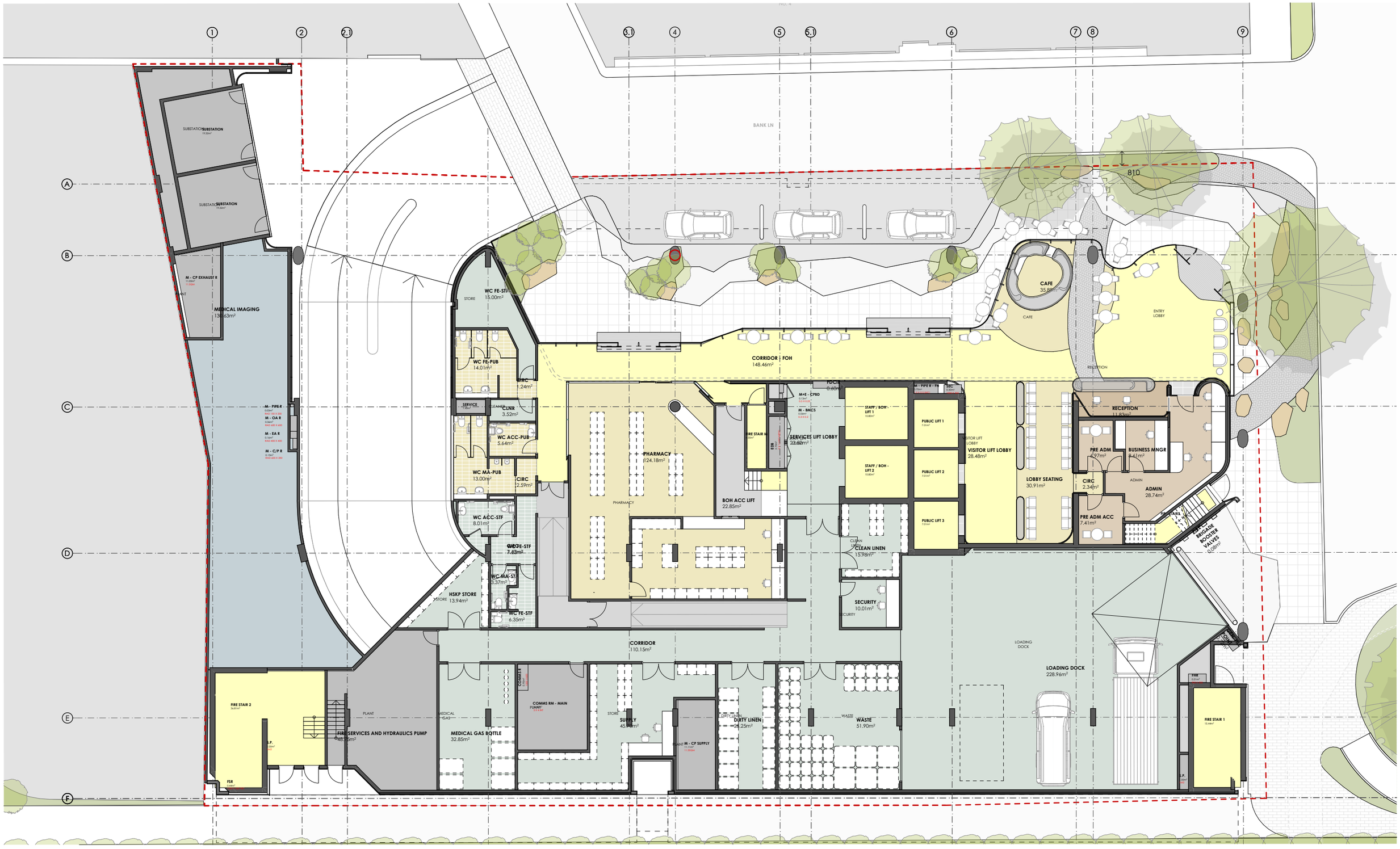


SK250814 | Newbuild - Basement 1

1:200 @ A3

fitzpatrick + partners

Ramsay Health Care



SK250814 | Newbuild - Ground
1:200 @ A3

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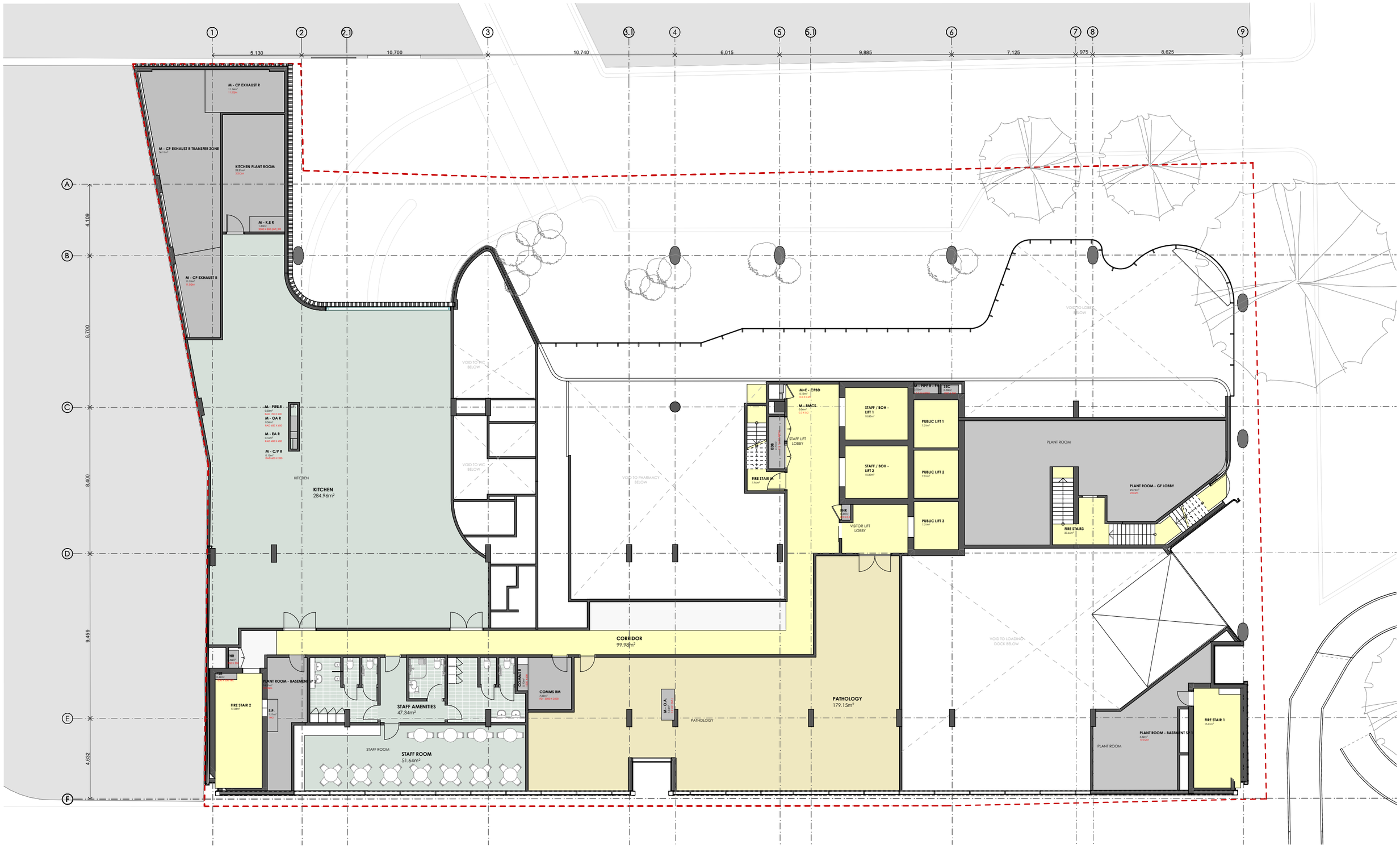

SK250814 | Newbuild - Mezzanine

1:200 @ A3

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SK250814 | Newbuild - Level 1
1:200 @ A3

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SK250814 | Newbuild - Level 2

1:200 @ A3

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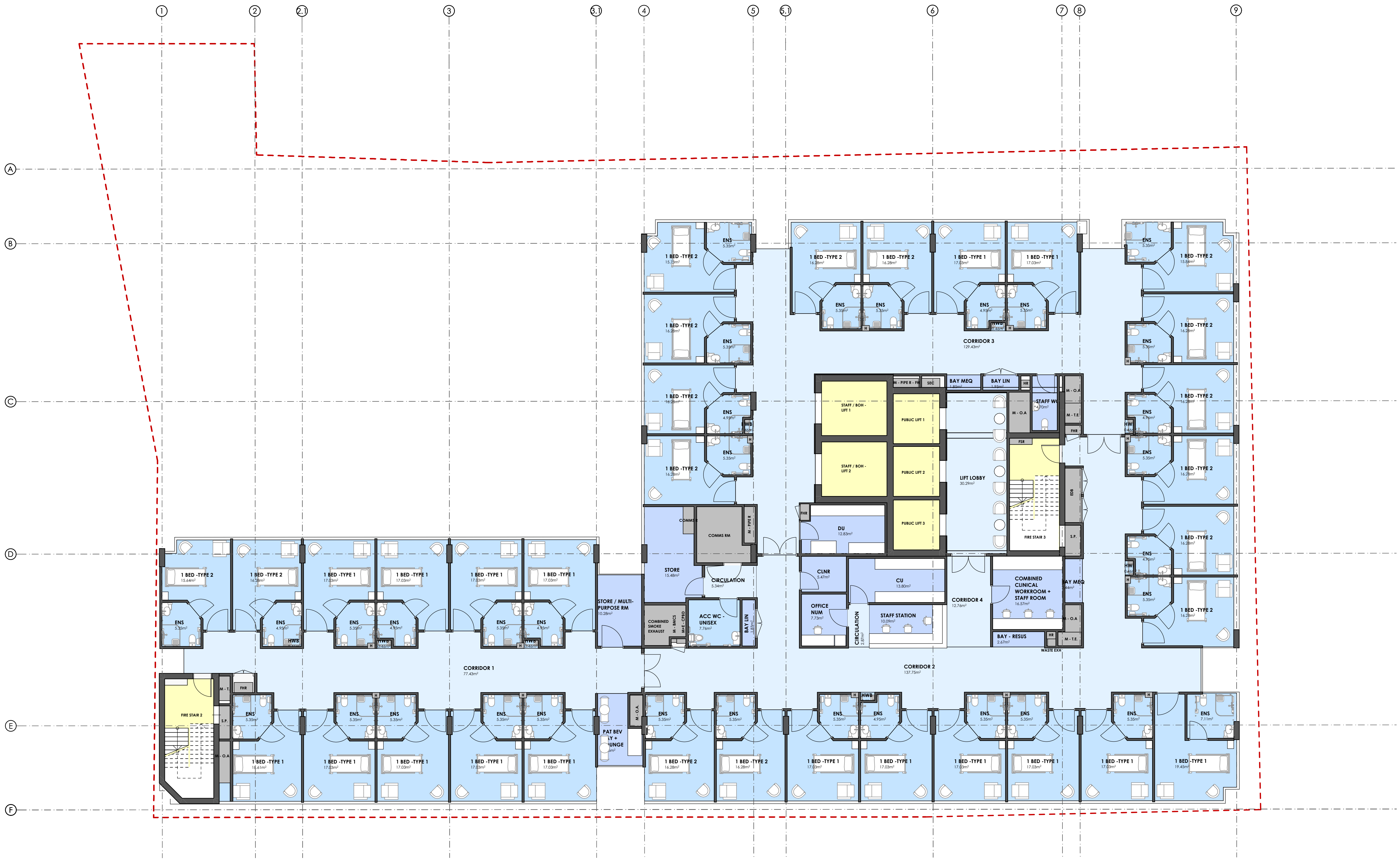

SK250814 | Newbuild - Level 3-5: Typical IPU
1:200 @ A3

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SK250814 | Newbuild - Level 6: Concultant Suites/Plant

1:200 @ A3

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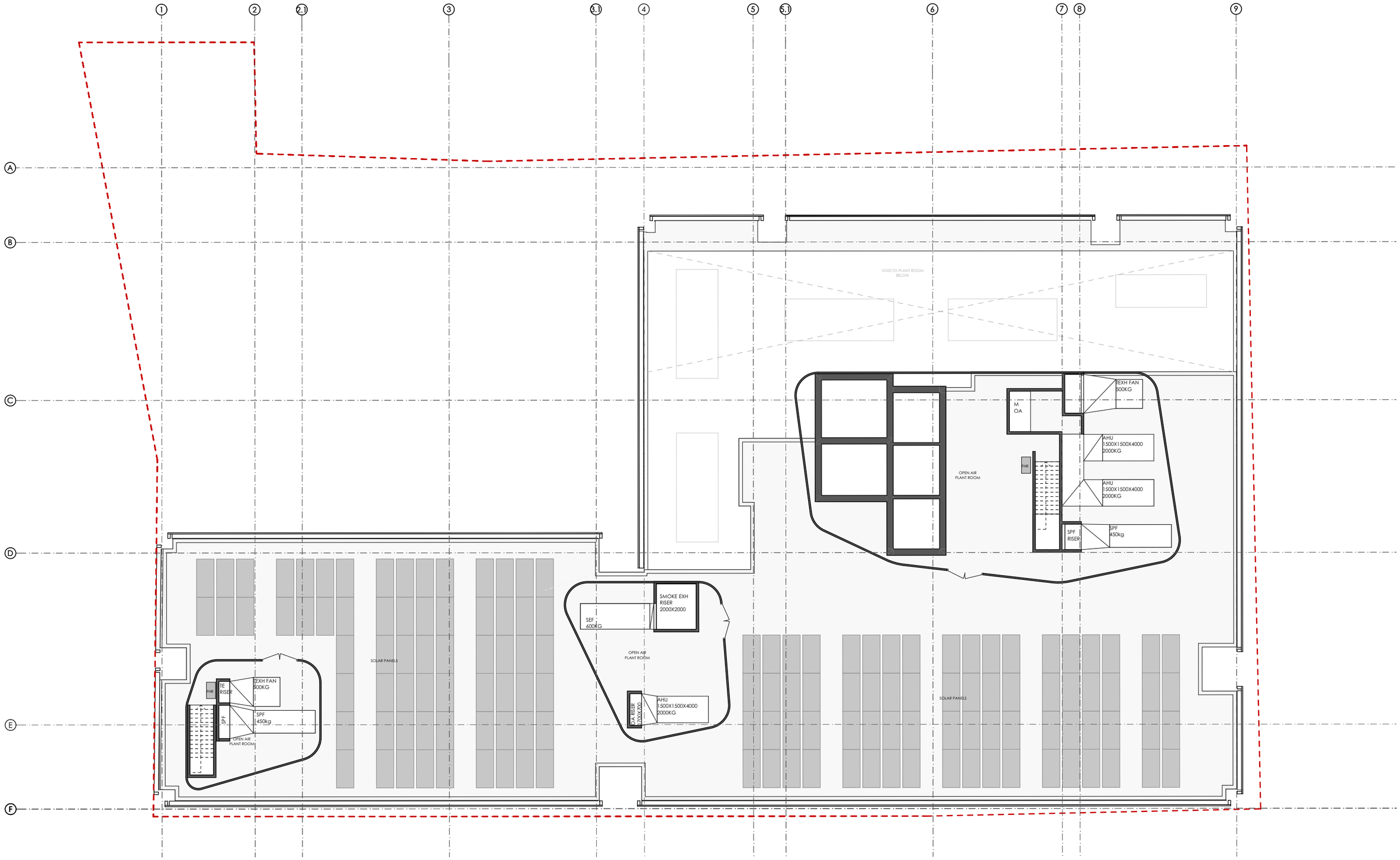

SK250814 | Newbuild - Roof
1:200 @ A3

St George Private Hospital |

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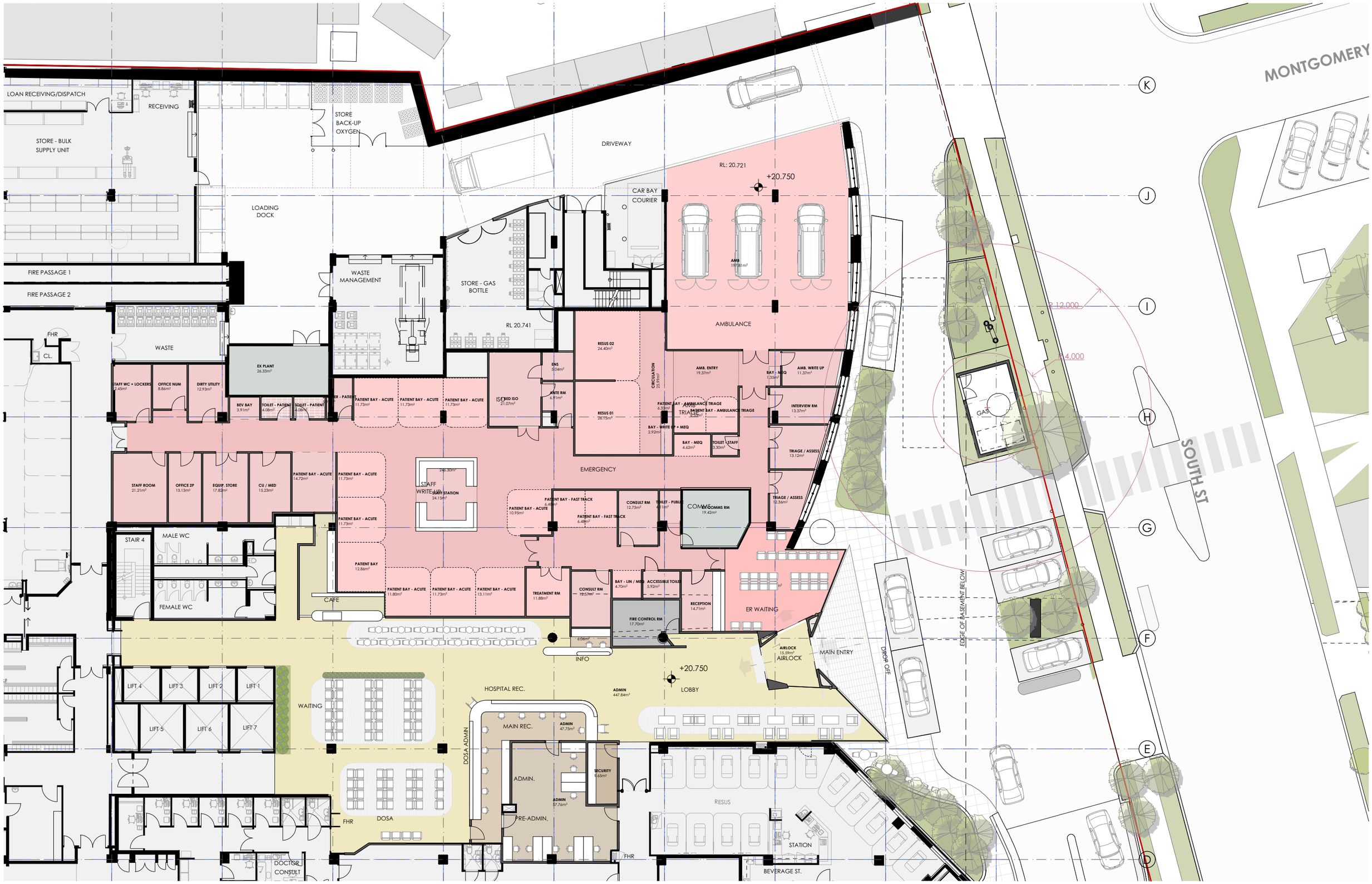
Ramsay Health Care



SK250814 | Existing Hospital Alterations - Ground

1:250 @ A3

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