

Tweed Valley Hospital Development

SEAR's Report

Water Sources

Issued for: State Significant Development Application

130559-BON-CIV-RPT-002

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Report Amendment Register

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Appendices

Appendix A Civil and Stormwater and Piling Drawings

This report addresses the following SEAR's:

Concept Proposal	14. Water and Soils	Sections 4.2, 4.3 & 4.4
	17. Flooding and Coastal Hazards	Sections 4.2.3
Stage 1 Works	11. Drainage	Section 4.3

1. Overview

On 13 June 2017, the NSW Government announced the allocation of \$534 million for the development of a new state-of-the art hospital on a greenfield site in the Tweed, to be known as Tweed Valley Hospital (Project). The Project is located on a portion of 771 Cudgen Road, Cudgen, legally described as Lot 102 DP 870722 (Project Site).

This EIS has been prepared to accompany a State Significant Development Application for the Tweed Valley Hospital which will be assessed under Part 4 of the Environmental Planning and Assessment Act. The project has been established based on the following supporting documentation:

- Tweed Valley Hospital Business Case
- Tweed Valley Hospital Masterplan
- Tweed Valley Hospital Concept Proposal and design.

The Tweed Valley Hospital Project for which a staged approval is sought consists of:

- Delivery of a new Level 5 major referral hospital to provide the health services required to meet the needs of the growing population of the Tweed-Byron region, in conjunction with the other hospitals and community health centres across the region;
- Master planning for additional health, education, training and research facilities to support these health services, which will be developed with service partners over time. These areas will be used initially for construction site/ compound and at-grade car parking;
- Delivery of the supporting infrastructure required for the hospital, including green space and other amenities, campus roads and car parking, external road upgrades and connections, utilities connections, and other supporting infrastructure.

The development application pathway for the Project consists of a staged Significant Development Application under section 4.22 of the Environmental Planning and Assessment Act 1979 (EP&A Act) which will consist of:

- A concept development application and detailed proposal for Stage 1 (early and enabling works); and
- A second development application for Stage 2 works which will include detailed design, construction and operation of the Tweed Valley Hospital.

A detailed description of the proposed staging of the development is provided in the following sections.

1.1. Concept Proposal and Stage 1 Early and Enabling Works

This component (and EIS) seeks approval for a Concept proposal of the Tweed Valley Hospital and Stage 1 early and enabling works.

The Concept Proposal is informed by service planning to 2031/32 and has a gross floor area in the range of 55,000m² to 65,000m². The hospital is expected to include (with more detail to be confirmed/provided at Stage 2) the following components/ services:

- A main entry and retail area
- Administration Services
- Ambulatory Services
- Acute and Sub-Acute in-patient units
- Paediatrics
- Intensive Care Unit
- Close Observation Unit
- Mental Health Services
- Maternity Unit
- Renal Dialysis
- Pathology
- Pharmacy
- Cancer Services including Day Oncology and Radiation Oncology
- Emergency Department
- Integrated Interventional Services
- Interventional Cardiology
- Medical Imaging
- Mortuary
- Back of house Services
- Car parking
- Future expansion area

Stage 1 includes:

- Early and enabling works (for site clearance and preparation), generally comprising:
 - Construction Compound for Stage 1 works,
 - Augmentation and connection of permanent services for the new facility (water, sewer, electricity, telecommunications),
 - General clearance of site vegetation within the footprint of construction works, including tree stumps,
 - Chipping of cleared vegetation (excluding weed species) to use on site for ground stabilisation/ erosion control, or off-site disposal (as required),
 - Bulk earthworks to establish the required site levels and create a stable landform by recycling the excavated material in preparation for hospital construction,
 - Piling and associated works,
 - Stormwater and drainage infrastructure for the new facility,
 - Rehabilitation and revegetation of part of the wetland area,
 - Construction of internal roadways for use during construction and in preparation for final road formations in Stage 2, and
 - Retaining walls.

1.2. Stage 2: Hospital Delivery - Main Works and Operation

Stage 2 (which will be subject to a separate application) would include the detailed design, construction and operation of the Tweed Valley Hospital. Stage 2 will be subject to a separate application following Stage 1.

1.3. Subsequent Stages: Potential Future Expansion

Any subsequent stages would be subject to a separate application(s) as required and would be related to works for potential future expansion of the facility. Details of this are unknown at this stage and would be developed as required.

2. Introduction

Bonacci has been commissioned by Health Infrastructure NSW to describe the water sources including the stormwater strategy associated with the State Significant Development Application (DA) for the new Tweed Valley Hospital at Lot 102 in DP870722, 771 Cudgen Road, Cudgen NSW.

The development application pathway for the Tweed Valley Hospital (the Project) will consist of a staged State Significant Development (SSD) Application, which will consist of:

- a concept development application and stage 1 early and enabling works (this stage); and
- a second development application for stage 2, which will include detailed design, main construction and operation of the Tweed Valley Hospital.

Preliminary works have been undertaken including demolition of the existing structures and the setup of temporary site offices and associated infrastructure, the enabling of appropriate site access, security, parking and the enabling of appropriate stormwater management by constructing catch drains and basins for the former agricultural land.

This report describes the concept development, and Stage 1 works and how they interact with the newly constructed stormwater management basins (as part of the preliminary works) and the existing wetlands downstream. This report will specifically address the following:

- Flooding impacts and controls,
- Groundwater,
- Stormwater Runoff volumes and detention strategies (Stormwater Quantity),
- Stormwater Quality treatment measures (Stormwater Quality), and
- Erosion and Sedimentation Control measures.

2.1. Existing Documentation

The following relevant existing documentation has been referenced for the design:

- Masterplan Report by STH and BatesSmart Architects, dated October 2018,
- Preliminary Geotechnical Investigation by Morrison Geotechnic, dated 28th September 2018,
- Level and Detail Survey by B & P Surveys, dated 15 June 2018,
- Biodiversity Development Assessment Report by Greencap, dated October 2018,
- Tweed Valley Flood Study, 2009 Update by BMT WBM, dated 19th October 2009, and
- Tweed Valley Hospital - Flooding and Coastal Hazards Assessment by BMT WBM, dated 28th September 2018.

3. Site Description

3.1. Location

The project site is located within the parcel of land identified as Lot 102 in DP870722, 771 Cudgen Road, Cudgen NSW. The site is bordered by Cudgen Road to the south, Turnock Street to the east, private property to the west, an environmental area to the north-west and a wetland to the north and north-east. An environmental area traverses the northern parts of the site. The project site is located within Tweed Shire Council Local Government Area (LGA). The locality map of the site is shown in [Figure 3-1](#) below:



Figure 3-1: Site Locality Map (Source: nearmap)

3.2. Topography

The site is located on a localised crest. The proposed location of the earthworks and associated infrastructure sit on a local crest and generally fall to the north and north-west. There are a number of constructed channels and a bund with openings to the west and north west boundary that direct flows through and off the site.

4. Proposed Development

The Concept Development is comprised of a new building and four carparks, landscaped gardens, and identifies future supplementary development zones. The Stage 1 proposed works are comprised of general site clearance of vegetation within the footprint of the of the hospital construction works including tree stumps, bulk earthworks to the desired site levels and create a stable landform, stormwater and drainage infrastructure for the new facility, construction of internal roadways for use during construction and in preparation of final road formations in Stage 2, construction of retaining and support structures, installation of services and site compound and associated works. The concept plan for the project for the site is shown in [Figure 4-1](#) below:



Figure 4-1: The Architectural Site Plan (by STH and Bates Smart Architects)

4.1. Water Sources

The site is affected by the following water sources, rainwater, groundwater and an intermittent water course. The management of each will be described in the following sections.

4.2. Rainwater

Rain is liquid water in the form of droplets that have condensed from atmospheric water vapour and then become heavy enough to fall under gravity. Rain is a major component of the water cycle and is responsible for depositing most of the fresh water on the Earth. Management of rainwater on the site is described in detail below:

4.2.1. Stormwater Drainage

A stormwater drainage system will be constructed to convey stormwater runoff from the newly constructed, buildings and associated, roads, carparks and landscape areas. It will be designed to mimic natural flows to minimise future impact to the environmental area downstream.

The stormwater drainage systems for the project have been designed to cater for design storms up to and including 100-year ARI (1% AEP) storm events. The hydrology and hydraulic analysis for the proposed site was established using a DRAINS (computer program for hydrological and hydraulic assessment) model. The hydrological parameters used in DRAINS are in accordance with Tweed Shire Council's Specifications.

To comply with Council's permissible site discharge requirements, approximately 6000m³ of on-site detention will be provided.

4.2.2. Water Quality Strategy

The project site was formerly used as agricultural land. Stormwater quality treatment strategies have been developed for the site to reduce stormwater pollutant discharge resulting from the project related works. The project site has been distributed into the following sub-catchments based on the specific WSUD measures required for the site. A summary of the impervious area was based on the masterplan.

The water quality strategy for the site will incorporate swales, enviropods, bioretention basins and extended detention basins. A Purceptor (or similar) will be provided to treat helipad roof runoff from the new building. The non-helipad roof runoff will be directed into the bioretention basin by a pit and pipe system while hardstand runoff will be first treated by enviropods, and then either swales that discharge to the bioretention system or directly into the bioretention systems. Ultimately the bulk of the stormwater will end up in an extended detention basin where it will settle and discharge to the receiving waters in a controlled manner.

The proposed treatment measures, meet the current Council pollution reduction targets. It is important to note that when the site operated as agricultural land, the site discharged a very high quantity of total suspended solids and this is reduced by approximately one third by the change (without treatment) of use alone. It is also important to note, that once the project has been completed, and all water quality measures constructed and functioning, the site will have lower discharge of Gross Pollutants, Total Suspended Solids, Phosphorous and Nitrogen than if the site was left undeveloped grass covered field.

4.2.3. Flood Impact Assessment

A flood study "Tweed Valley Flood Study, 2009 Update, Revision 1 (dated 19 October 2009)," has been produced by BMT WBM on behalf of Tweed Shire Council. This study identifies that the northern portion of the site is flood affected. The flood levels burdening the northern portions of the site are as follows:

- 5% AEP 2.3m AHD
- 1% AEP 3.2m AHD
- PMF 8.0m AHD

A subsequent site-specific flooding assessment has been carried out by BMT. The site-specific flooding assessment confirmed the flood levels above.

Section A3 – Development of Flood Liable Land of Tweed Shire Council, requires all critical infrastructure and facilities to be located above the PMF level. The NSW Floodplain Development Manual, for the management of flood liable land, recommends that the PMF is set as the FPL (minimum floor level) for emergency response facilities such as hospitals. The location of the project is intentionally selected to be above the PMF level, making the proposed development lot ideal for critical infrastructure such as a hospital.

The proposed finished floor level for the lowest level of the proposed new hospital building is RL18.75m AHD.

4.3. Groundwater

Groundwater or water table has been identified at a depth of approximately 11 metres. It is envisaged that the foundation system will utilise bore piers installed with a Continuous Flight Auger (CFA) or casing extending to the high strength basalt. It is not expected to encounter groundwater during construction of the building support piles. During the construction of the piles, if groundwater is encountered, CFA or casing method of construction allows for local management of groundwater without taking water from the aquifer and discharging it off site. This is done by keeping groundwater out of the casing by not permitting contact between the auger the groundwater table.

As a result, no construction impact is expected on the groundwater and the water table.

4.4. Watercourse

The project site is traversed by an intermittent watercourse, defined as a costal wetland (zoned as an environmental area), at the north east portion of the site (adjacent to Turnock Street). The project works do not encroach on the costal wetland to the north. At its nearest, the closed proposed works are a minimum 200metres away from the intermittent watercourse. Since the discharge of water is controlled both in quantity and quality (see Section 4.2 above and Section 4.5 below), it is not proposed to provide water monitoring for the project, other than that required as part of soil and water management measures during construction.

4.5. Bulk Earthworks / Excavation

The bulk earthworks for the project and associated infrastructure are detailed on Drawing No. C0005, C0006, C0007, C00011 and C00013. The proposed finished floor level for the main building is RL18.75m AHD.

Soil and water management of the project will be implemented during construction. The design of these measures is in accordance with the Landcom "Blue Book". Refer to drawings C0005, C0006 and C0007 for the Soil and Water Management plan, Typical Detailing and sediment basin volume calculation sheets.

For soil and water management of the site, the following measures are provided to minimise the risk of sediments being washed into neighbouring properties, receiving environmental areas and erosion of the site.

- *As preliminary works, basins were constructed along the northern portions of the site. Utilise the new basins as sedimentation basins by providing a minimum of 7126 cubic metres to the overall disturbed site assuming that any upstream catchment is excluded by providing diversion stormwater drainage lines (which bypasses the proposed site during the construction stage) to control stormwater quality overall as per Soil and Construction Volume 1, March 2004 by Landcom*
- *Catch drains and similar infrastructure to manage the runoff within the site and direct it to the appropriate basin*
- *A sediment fence/catch drain (or diversion bund) around the site*
- *Temporary access to site with shaker pad*
- *Indicative stockpile areas with sediment fence around it during construction. The stockpile must be located out of water flow paths (and be protected by earth banks/drains as required).*

5. Summary

This report describes that water sources including stormwater management strategy on this site can be managed to not disturb ground waters and provide beneficial water quality and quantity outcome to the receiving waters.

By demonstrating the project will have no adverse effects and actually result in beneficial effects to some water sources, it is safe to conclude that the site is suitable for the proposed use and development and demonstrates compliance with all the requirements of Tweed Shire Council Development Control Plans (DCP) including Tweed Urban Stormwater Quality Management Plan (2016), Development Design Specifications – D5: Stormwater Drainage Design, D7: Stormwater Quality, Landcom Managing Urban Stormwater: Soils and Construction, NSW Floodplain Development Manual (2005) and Guidelines for Development Adjoining Land and Water Managed by DECCW (OEH, 2013).

Appendix A – Civil, Stormwater and Piling Drawings

TWEED VALLEY HOSPITAL DEVELOPMENT

STAGE 1 - EARLY AND ENABLING WORKS

DRAWING No.

DESCRIPTION

20 10748 C001	DRAWING REGISTER AND CONSTRUCTION NOTES
20 10748 C005	SOIL AND WATER MANAGEMENT PLAN
20 10748 C006	SOIL AND WATER MANAGEMENT DETAILS
20 10748 C007	SOIL AND WATER MANAGEMENT CALCULATIONS
20 10748 C011	GENERAL EARTHWORKS PLAN
20 10748 C030	CONCEPT STORMWATER MANAGEMENT PLAN
20 10748 C055	RETAINING WALL DETAILS
20 10748 C056	RETAINING WALL DETAILS

GENERAL NOTES

- G1 THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS OR SKETCHES AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE SUPERINTENDENT BEFORE PROCEEDING WITH WORK.
- G2 MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION, CURRENT SAA CODES, BUILDING REGULATIONS AND THE REQUIREMENTS OF ANY OTHER RELEVANT STATUTORY AUTHORITIES.
- G3 THESE DRAWINGS MUST NOT BE SCALED. ALL DIMENSIONS ARE IN METERS. ALL SET OUT DIMENSIONS AND LEVELS, INCLUDING THOSE SHOWN ON THESE DRAWINGS SHALL BE IN ACCORDANCE WITH THE ARCHITECT'S DRAWINGS AND VERIFIED ON SITE.
- G4 ALL SETOUT AND DIMENSIONS OF THE STRUCTURE INCLUDING KERBS AND RETAINING WALLS, AND BULK EARTHWORKS MUST BE TAKEN FROM THE ARCHITECT'S DRAWINGS, SETOUT OF THE STORMWATER PITS BY OTHERS. CONTRACTOR TO CONFIRM SETOUT OF SERVICE TRENCHING INCLUDING SUBSOIL ON SITE.
- G5 THE CONTRACTOR SHALL COMPLY WITH ALL REGULATIONS OF AUTHORITIES HAVING JURISDICTION OVER THE WORKS. REFER TO GEOTECHNICAL REPORT BY MORRISON GEOTECHNIC PTY LTD, REFERENCE: GE18/144, DATED AUGUST 2018.
- G6 ALL DIMENSIONS AND REDUCED LEVELS MUST BE VERIFIED ON SITE BEFORE THE COMMENCEMENT OF ANY WORK.
- G7 THE APPROVAL OF A SUBSTITUTION SHALL BE SOUGHT FROM THE SUPERINTENDENT BUT IS NOT AN AUTHORISATION OF A COST VARIATION. THE SUPERINTENDENT MUST APPROVE ANY COST VARIATION INVOLVED BEFORE ANY WORK STARTS.
- G8 ALL LEVELS SHOWN ARE TO THE AUSTRALIAN HEIGHT DATUM.
- G9 SERVICE INFORMATION SHOWN IS APPROXIMATE ONLY. PRIOR TO COMMENCEMENT OF ANY WORKS, THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND SERVICES AND COMPLY WITH ALL REQUIREMENTS OF THOSE AUTHORITIES.
- G10 EXISTING SURFACE CONTOURS, WHERE SHOWN, ARE INTERPOLATED AND MAY NOT BE ACCURATE.
- G11 UNLESS NOTED OTHERWISE, ALL VEGETATION SHALL BE STRIPPED TO A MINIMUM DEPTH OF 150mm UNDER ALL PROPOSED PAVEMENT AND BUILDING AREAS.
- G12 MAKE SMOOTH CONNECTION WITH ALL EXISTING WORKS.

SITEWORKS NOTES

- S1 PRIOR TO THE PLACEMENT OF ANY PAVEMENTS, BUILDINGS OR DRAINS THE EXPOSED SUBGRADE SHALL BE COMPACTED TO A MINIMUM OF 98% STANDARD COMPACTION IN ACCORDANCE WITH TEST 'E11' OF A.S. 1289 FOR THE TOP 300mm. ANY SOFT SPOTS SHALL BE REMOVED AND REPLACED WITH GRANULAR FILL TO THE ENGINEERS APPROVAL AND COMPACTED IN ACCORDANCE WITH THE COMPACTION REQUIREMENTS SET OUT BELOW. ON HIGHLY REACTIVE CLAY AREAS SITE EXCAVATED MATERIAL MAY BE USED WITH THE PRIOR AUTHORISATION OF THE ENGINEER.
- S2 ALL FILL AND PAVEMENT MATERIALS SHALL BE COMPACTED IN ACCORDANCE WITH GEOTECHNICAL REPORT BY MORRISON GEOTECHNIC PTY LTD REFERENCE: GE18/144 DATED AUGUST 2018 MOISTURE CONTENT TO BE MAINTAINED AT +/- 2% OMC. MINIMUM COMPACTION REQUIREMENTS ARE DETAILED BELOW FOR ALL REQUIREMENTS ARE TO VERIFIED BY A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER:
- LANDSCAPED AREAS 95% STD.
 - FILL UNDER ANY FOOTINGS AND FLOOR SLABS FOR ANY STRUCTURE TO SUBGRADE LEVEL:
 - FINE CRUSHED ROCK 98% STD.
 - SELECTED FILL WITHOUT CONSPICUOUS CLAY CONTENT 98% STD.
 - BUILDING BASECOURSE 98% MOD
 - FILL UNDER ROAD PAVEMENTS:
 - TO WITHIN 500mm OF FINISHED SUBGRADE LEVEL 98% STD.
 - UP TO FINISHED SUBGRADE LEVEL 98% STD.
 - ROAD PAVEMENT MATERIALS:
 - SUB BASE 98% MOD.
 - BASE COURSE 98% MOD.
- THE MAXIMUM COMPACTION IS TO BE NO GREAT THAN 4% ON TOP OF THE ABOVE MENTION VALUES.
- S3 GRADE EVENLY BETWEEN FINISHED SURFACE SPOT LEVELS. FINISHED SURFACE CONTOURS ARE SHOWN FOR CLARITY. WHERE FINISHED SURFACE LEVELS ARE NOT SHOWN, THE SURFACE SHALL BE GRADED SMOOTHLY SO THAT IT WILL DRAIN AND MATCH ADJACENT SURFACES OR STRUCTURES.
- S4 ALL DIMENSIONS GIVEN ARE TO FACE OF KERB, CENTER OF PIPE OR EXTERIOR FACE OF BUILDING UNLESS NOTED OTHERWISE.
- S5 ANY STRUCTURES, PAVEMENTS OR SURFACES DAMAGED, DIRTIED OR MADE UNSERVICABLE DUE TO CONSTRUCTION WORK SHALL BE REINSTATED TO THE SATISFACTION OF THE ENGINEER.
- S6 ANY FILL REQUIRED SHALL BE APPROVED BY THE ENGINEER / GEOTECHNICAL CONSULTANT
- S7 CONTRACTOR IS TO ENSURE THAT ALL EXCAVATIONS ARE MAINTAINED IN A DRY CONDITION WITH NO WATER ALLOWED TO REMAIN IN THE EXCAVATIONS.
- S8 ALL FINISHES AND COLOURS TO BE IN ACCORDANCE WITH ARCHITECTURAL SPECIFICATIONS.
- S9 REFER TO STRUCTURAL DRAWINGS FOR CONCRETE, REINFORCEMENT AND RETAINING WALL DETAILS.
- S10 GENERALLY FOR TRENCHING WORKS THE CONTRACTOR MUST:
A) COMPLY WITH THE GENERAL PROVISIONS OF PART 3.1 "MANAGING RISKS TO HEALTH AND SAFETY" OF NSW WORK AND HEALTH AND SAFETY REGULATION 2011
B) COMPLY PART 6.3 DIVISION 3 "EXCAVATION WORK" OF NSW WORK HEALTH AND SAFETY REGULATION NSW 2011
- S11 PRIOR TO THE EXCAVATION OF ANY TRENCH DEEPER THAN 15 METRES THE CONTRACTOR MUST:
A) NOTIFY THE OCCUPATIONAL HEALTH AND SAFETY AUTHORITY ON THE APPROPRIATE FORM.

STORMWATER DRAINAGE NOTES

- SW1 UNLESS NOTED OTHERWISE BY HYDRAULIC ENGINEERS DRAWINGS, ALL DOWNPIPES & GRATED INLETS SHALL BE CONNECTED TO PITS OR MAIN STORMWATER DRAINS WITH 150 DIA. UPVC PIPES LAID AT A MINIMUM GRADE OF 1 IN 100. FOR SYPHONIC ROOF DRAINAGE SYSTEMS ALL DOWNPIPES CONNECTION DRAIN SIZES TO BE CONNECTED INTO MAIN STORMWATER DRAINS SHALL BE IN ACCORDANCE WITH HYDRAULIC ENGINEERS DRAWINGS.
- SW2 ALL MAIN STORMWATER DRAINS SHALL BE CONSTRUCTED USING MATERIALS AS SPECIFIED ON THE DRAWINGS IN ACCORDANCE WITH THE APPROPRIATE A.S. IF NOT SPECIFIED THEN CLASS 2 RRJ RCP SHALL BE USED FOR DIAMETERS > 225mm. SEWER CLASS SEH UPVC IN ACCORDANCE WITH AS1260 SHALL BE USED FOR Ø225mm OR SMALLER.
- SW3 ALL PIPEWORK TO BE INSTALLED IN ACCORDANCE WITH AS3725 FOR RCP AND AS2032 FOR PVC. ALL BEDDING TO BE TYPE H2 UNLESS NOTED OTHERWISE.
- SW4 FOR ALL PITS > 12m DEEP, STEP IRONS SHALL BE INSTALLED.
- SW5 PRECAST PITS MAY BE USED EXTERNAL TO THE BUILDING SUBJECT TO APPROVAL BY BONACCI GROUP.
- SW6 ENLARGERS, CONNECTIONS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
- SW7 WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED UPVC SEWER GRADE PIPE IS TO BE USED.
- SW8 GRATES AND COVERS SHALL CONFORM WITH AS 3996 AND AS 1428.1 FOR ACCESS REQUIREMENTS.
- SW9 CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES ARE NOT TO BE REDUCED WITHOUT APPROVAL.
- SW10 AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS, ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS.
- SW11 ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT/ENGINEER FOR FURTHER DIRECTIONS.

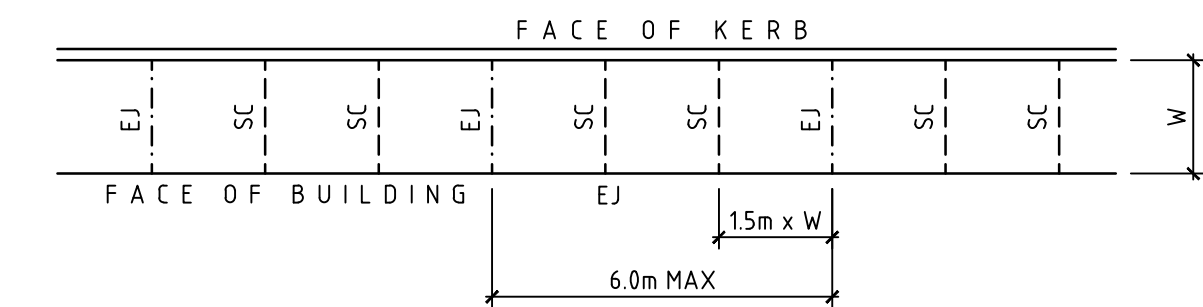
KERBING NOTES

- K1 ALL CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 32 MPa U.N.O.
- K2 ALL KERBS, GUTTERS, DISH DRAINS AND CROSSINGS TO BE CONSTRUCTED ON 75mm GRANULAR BASECOURSE COMPACTED TO A MINIMUM 98% MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS1289 5.2.1.
- K3 EXPANSION JOINTS (EJ) TO BE FORMED FROM 10mm COMPRESSIBLE CORK FILLER BOARD FOR THE FULL DEPTH OF THE SECTION AND CUT TO PROFILE. EXPANSION JOINTS TO BE LOCATED AT DRAINAGE PITS, ON TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX 12m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE EXPANSION JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLAB.
- K4 WEAKENED PLANE JOINTS TO BE MIN 3mm WIDE AND LOCATED AT 3m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE WEAKENED PLANE JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLAB.
- K5 BROOMED FINISH TO ALL RAMPED AND VEHICULAR CROSSINGS. ALL OTHER KERBING OR DISH DRAINS TO BE STEEL FLOAT FINISHED.
- K6 IN THE REPLACEMENT OF KERBS:-
- EXISTING ROAD PAVEMENT IS TO BE SAWCUT 900mm U.N.O. FROM THE LIP OF GUTTER. UPON COMPLETION OF THE NEW KERB AND GUTTER, NEW BASECOURSE AND SURFACE TO BE LAID 600mm WIDE U.N.O.
- EXISTING KERBS ARE TO BE COMPLETELY REMOVED WHERE NEW KERBS ARE SHOWN.

JOINTING NOTES

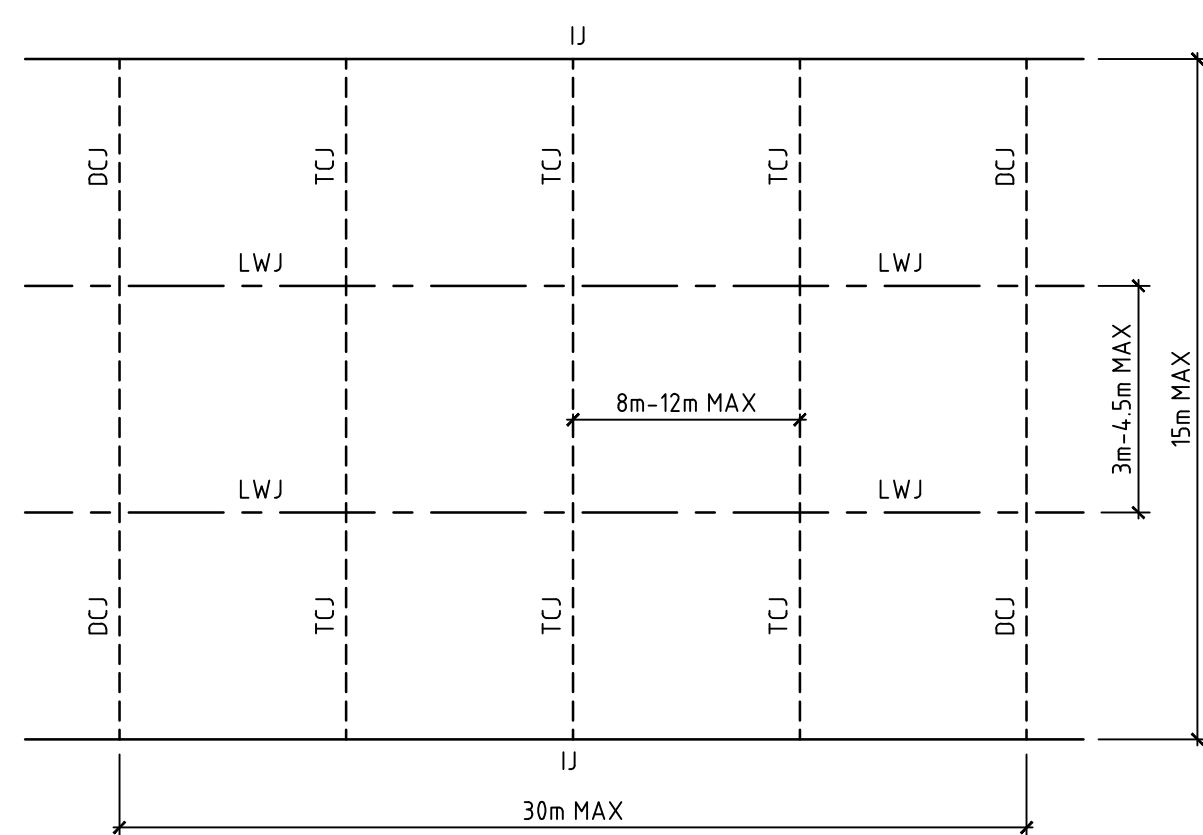
PEDESTRIAN FOOTPATH JOINTS

- J1 EXPANSION JOINTS (EJ) ARE TO BE LOCATED WHERE POSSIBLE AT TANGENT POINTS OF CURVES AND ELSEWHERE AT 6m CENTRES.
- J2 SAWCUT JOINTS (SC) ARE TO BE LOCATED AT A MAX 15m x WIDTH OF PAVEMENT. THE TIMING OF THE SAWCUT IS TO BE CONFIRMED BY THE CONTRACTOR ON SITE. SITE CONDITIONS WILL DETERMINE HOW MANY HOURS AFTER THE CONCRETE POUR BEFORE THE SAW CUTS ARE COMMENCED.
- J3 WHERE POSSIBLE JOINTS SHOULD BE LOCATED TO MATCH KERBING AND / OR ADJACENT PAVEMENT JOINTS.
- J4 PROVIDE 10mm WIDE FULL DEPTH EXPANSION JOINTS (EJ) BETWEEN BUILDINGS AND ALL CONCRETE OR UNIT PAVERS
- J5 ALL PEDESTRIAN FOOTPATH JOINTINGS AS FOLLOWS (U.N.O.).



VEHICULAR PAVEMENT JOINTS

- J6 ALL VEHICULAR PAVEMENTS TO BE JOINTED AS SHOWN ON DRAWINGS.
- J7 LONGITUDINAL WARPING JOINTS (LWJ) SHOULD GENERALLY BE LOCATED AT A MAXIMUM OF 3m TO 4.5m MAX CENTERS. ALL LWJ's SHOULD BE TIED UP TO A MAXIMUM TOTAL WIDTH OF 30m.
- J8 TRANSVERSE CONTRACTION JOINTS (TCJ) SHOULD GENERALLY BE LOCATED AT A MAXIMUM OF 8m TO 12m MAX CENTERS. TCJ's CAN BE SPACED AT SUITABLE INTERVALS UP TO A RECOMMENDED MAXIMUM LENGTH OF 15m.
- J9 TRANSVERSE DOWELLED CONSTRUCTION JOINTS (DCJ) TO BE PROVIDED FOR PLANNED INTERRUPTIONS SUCH AS AT THE END OF EACH DAY'S OPERATIONS (POUR BREAK), AT BLOCK OUTS FOR BRIDGES AND INTERSECTIONS OR FOR UNEXPECTED DELAYS WHEN THE SUSPENSION OF OPERATIONS IS LIKELY TO CREATE A JOINT.
- J10 ISOLATION JOINTS WITH SUB-GRADE BEAM (IJ) TO BE PROVIDED AT INTERSECTIONS OR AT THE JUNCTION OF A POUR BREAK.
- J11 ALL VEHICULAR PAVEMENTS TO BE JOINTED IN ACCORDANCE WITH AUSTRROADS AGPT02-12 GUIDE TO PAVEMENT TECHNOLOGY PART 2 STRUCTURAL PAVEMENT DESIGN AND SUPPLEMENT AP-T36-06 PAVEMENT DESIGN FOR LIGHT TRAFFIC
- J12 VEHICULAR PAVEMENT JOINTING AS FOLLOWS (U.N.O.)



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P4	ISSUED FOR EARLY AND ENABLING WORKS	16.10.18	PN	-
P3	ISSUED FOR EARLY WORKS DA	04.10.18	PN	-
P2	ISSUED FOR EARLY WORKS DA	06.09.18	PA	-
P1	ISSUED FOR EARLY WORKS DA	03.09.18	PA	-

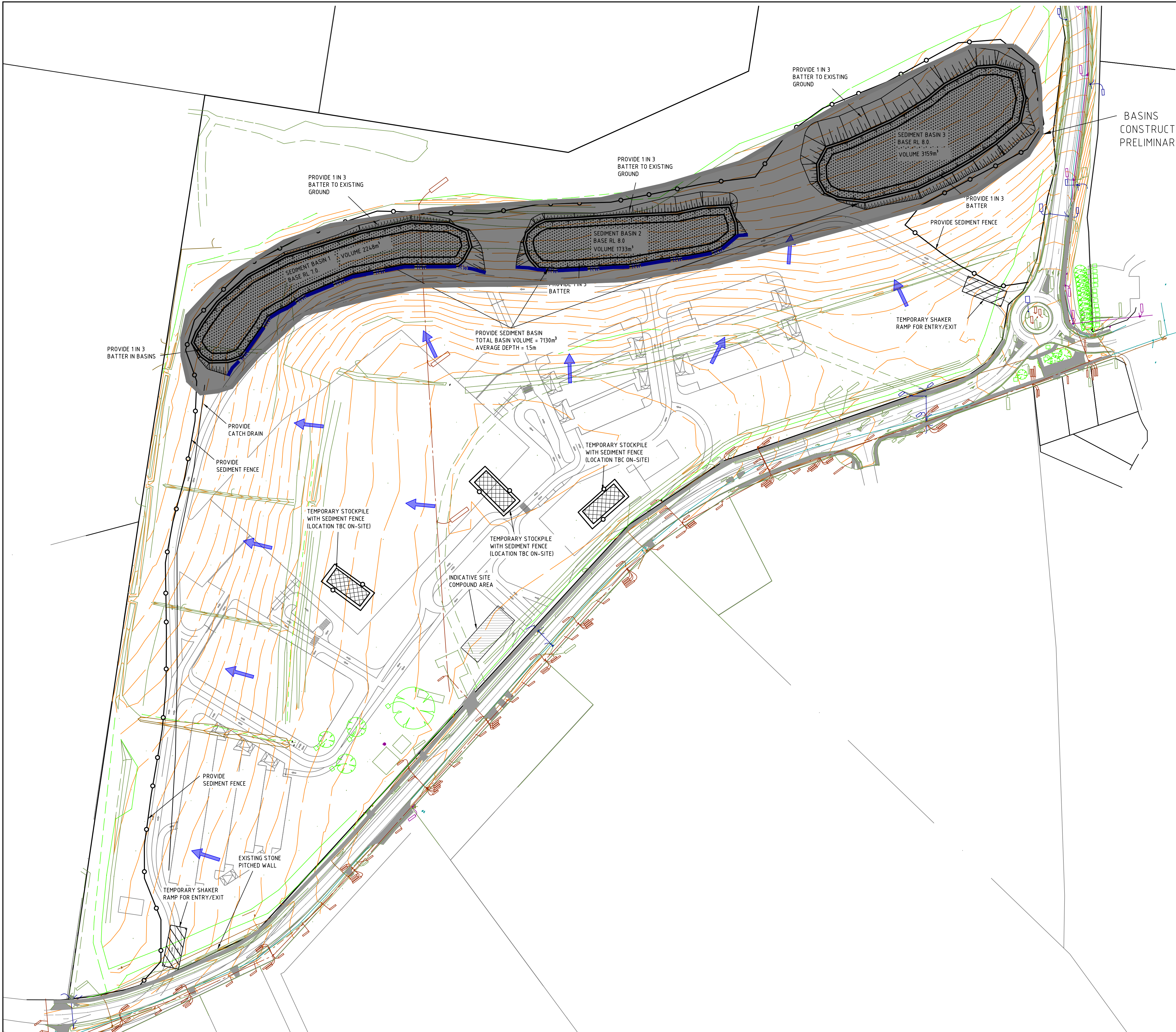
Rev	Description	Date	By	App	Rev	Description	Date	By	App
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Project Name	TWEED VALLEY HOSPITAL DEVELOPMENT, KINGSCLIFF, NSW			DEVELOPMENT APPLICATION		
	Designed	CS	Drawn	PA	Project Director Approved	Date
Drawing Title	Scale	-	Date	03.09.18	Project Ref	Drawing No
	Sheet	A1	Date	03.09.18	20 10748 01	C001
DRAWING REGISTER AND CONSTRUCTION NOTES			Rev	P4		

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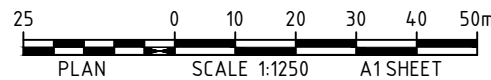
LEGEND

- SITE BOUNDARY
- SEDIMENT FENCE
- TEMPORARY SHAKER RAMP FOR ENTRY/EXIT
- SEDIMENT BASIN (LOCATION TBC ON-SITE)
- TEMPORARY STOCKPILE (LOCATION TBC ON-SITE)
- OVERLAND FLOW
- RETAINING WALL
- EXISTING SEWER
- EXISTING OVERHEAD LINES
- EXISTING TELSTRA
- EXISTING STORMWATER
- EXISTING WATER

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P4	ISSUED FOR EARLY AND ENABLING WORKS	16/10/18	PN	-
P3	ISSUED FOR EARLY WORKS DA	04/10/18	PN	-
P2	ISSUED FOR EARLY WORKS DA	06/10/18	PA	-
P1	ISSUED FOR EARLY WORKS DA	03/09/18	PA	-

Rev	Description	Date	By	App	Rev	Description	Date	By	App



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Project Name
**TWEED VALLEY HOSPITAL
DEVELOPMENT, KINGSCLIFF,
NSW**

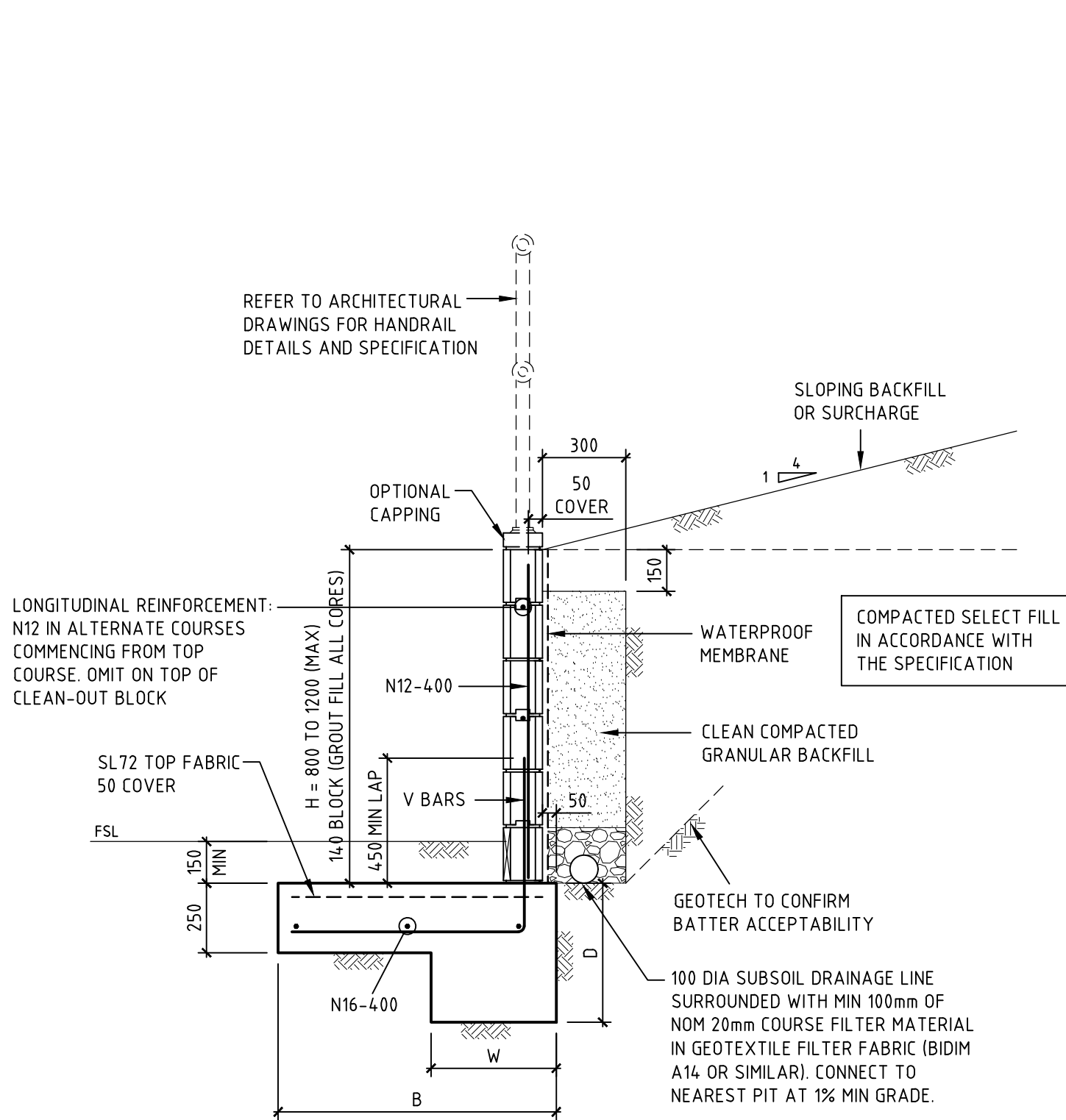
Drawing Title
**SOIL AND WATER MANAGEMENT
PLAN**

DESIGNED APPLICATION			
Designed	PA	Project Director Approved	Date
Drawn	PA		
Scale	1:1250	Project Ref	Drawing No
Date	03.09.18		Rev
Sheet	A1	20 10748 01	C005 P4

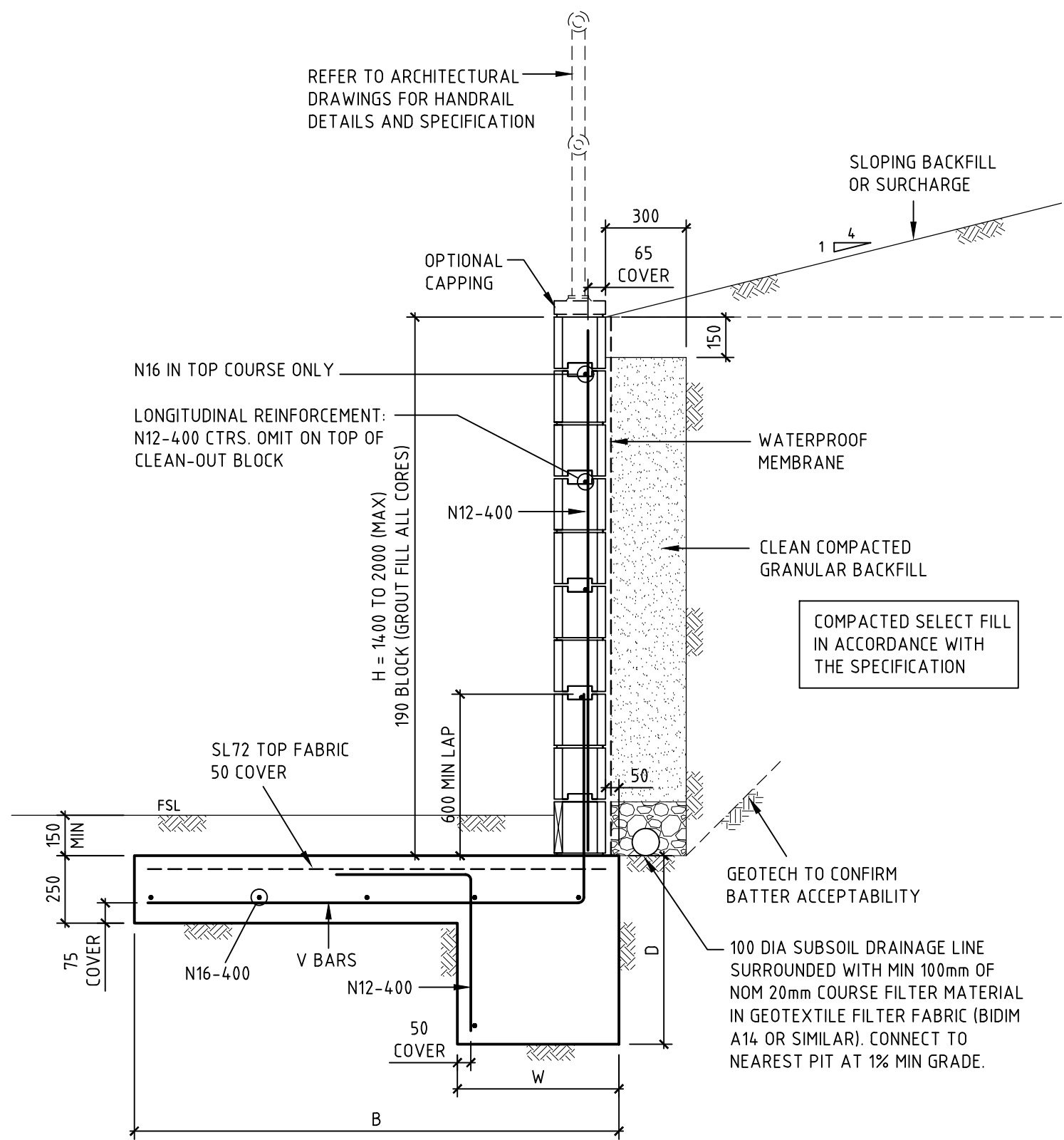




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BLOCK RETAINING WALL (MAX 1200 HIGH)
SCALE 1:20



BLOCK RETAINING WALL (MAX 2000 HIGH)
SCALE 1:20

BLOCK RETAINING WALL BASE TYPE 2

WALL HEIGHT			REINFORCEMENT		BASE DIMENSIONS				
					HEEL WIDTH (mm) W	LEVEL BACKFILL		MAX 1:4 SLOPING BACKFILL	
TOTAL HEIGHT (mm) H	HEIGHT OF BLOCKWORK			X-BARS AND V-BARS		BASE WIDTH (mm) B	HEEL DEPTH (mm) D	BASE WIDTH (mm) B	HEEL DEPTH (mm) D
	150 SERIES	200 SERIES	300 SERIES						
800	800	-	-	N12-400	-	450	600	800	500
1000	1000	-	-	N12-400	-	450	800	1000	500
1200	1200	-	-	N12-400	-	450	1000	1200	600
1400	-	1400	-	N16-400	-	450	1200	1400	600
1600	-	1600	-	N16-400	-	450	1400	1600	700
1800	-	1800	-	N16-400	-	450	1600	1800	800
2000	-	2000	-	N16-200	-	600	1800	2000	800
2200	-	1400	800	N16-400	N16-400	600	2000	2200	900
2400	-	1600	800	N16-400	N16-400	600	2200	2400	1000
2600	-	1600	1000	N20-400	N20-400	900	2400	2600	1000
2800	-	1800	1000	N20-400	N20-400	900	2600	2800	1100
3000	-	2000	1000	N16-200	N16-200	900	2800	3000	1200
3200	-	2000	1200	N20-200	N16-200	900	3000	3200	1300
3400	-	2000	1400	N20-200	N16-200	900	3200	3400	1500

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Rev Description Date By App

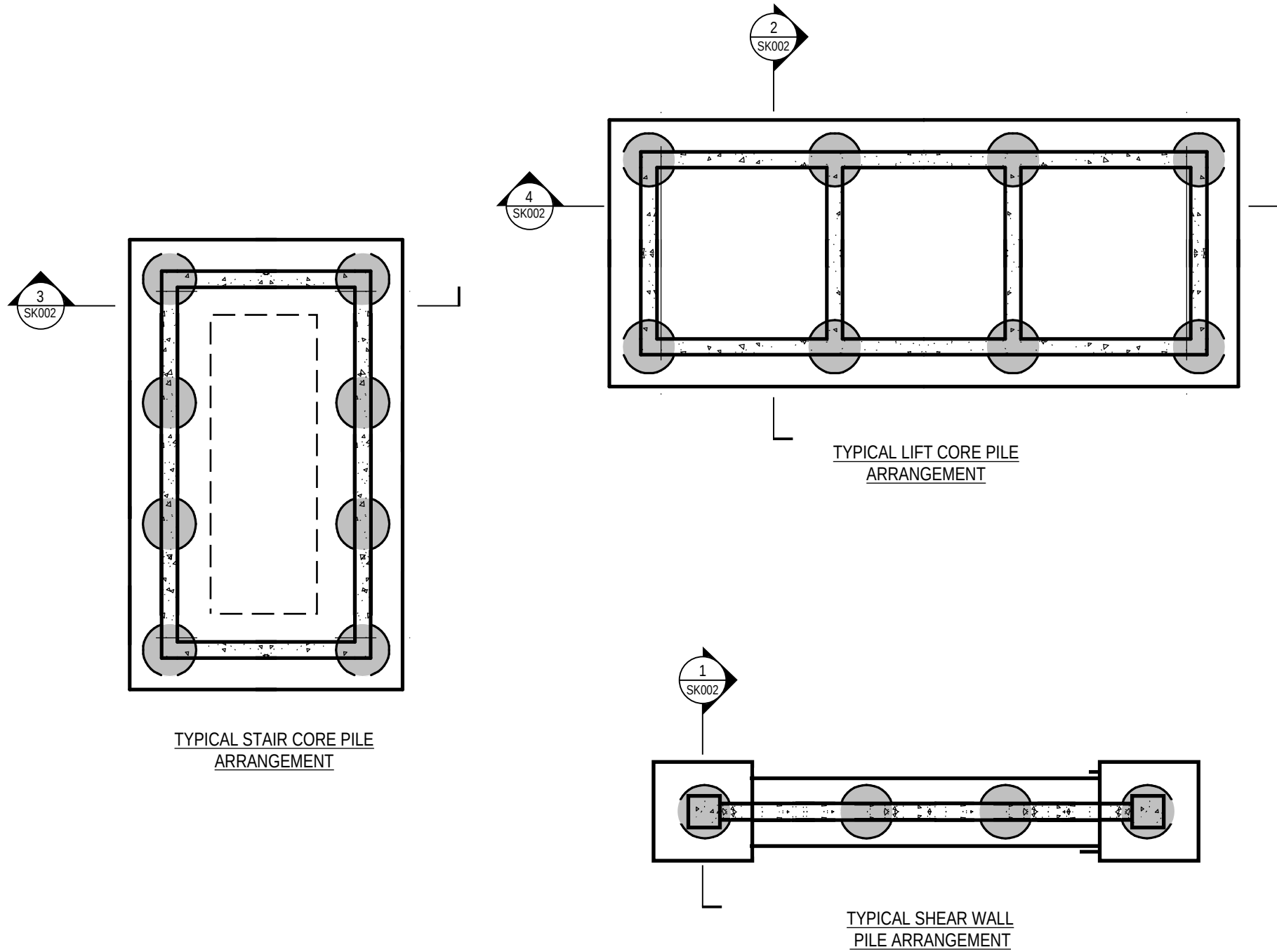
Rev Description Date By App

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Project Name
TWEED VALLEY HOSPITAL
DEVELOPMENT, KINGSCLIFF,
NSW
Drawing Title
RETAINING WALL
DETAIL

DEVELOPMENT APPLICATION

Designed PA
Drawn PN
Scale -
Date 03.09.18
Sheet A1
Project Director Approved Date
Project Ref 20 10748 01
Drawing No C056
Rev P1



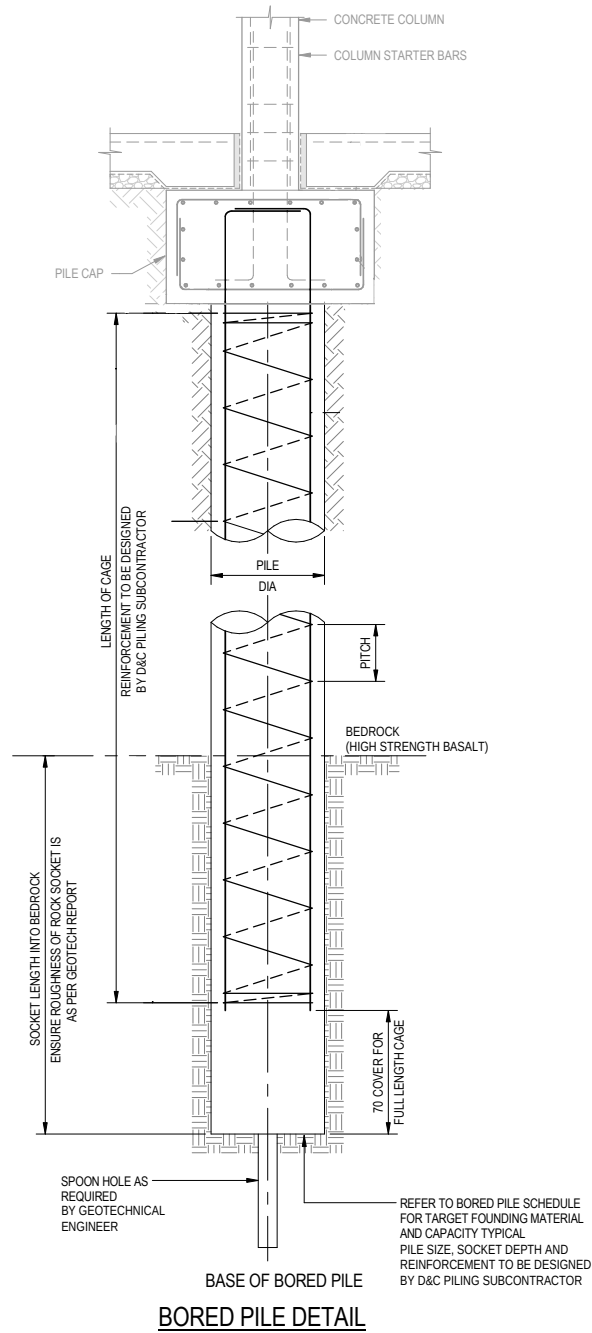
BORED PILE SCHEDULE			
PILE	NO OF SUSPENDED SLABS SUPPORTED	ULTIMATE LIMIT STATE VERTICAL LOAD (kN)	NOMINAL DIAMETER (mm)
P1	3	3600	1000
P2	4	4800	1000
P3	5	6000	1000
P4	6	7200	1000
P5	7	8400	1000
P6	8	9600	1000
P7	9	10800	1000

NOTES

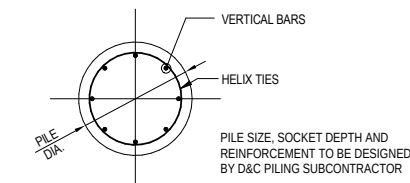
- PILES TO BE DESIGNED BY D&C PILING SUBCONTRACTOR IN ACCORDANCE WITH AS2159
- SUBJECT TO FINAL DESIGN, PILE DIAMETERS MAY VARY FROM 600MM TO 1200MM
- PILES UNDER CORES, LIFT SHAFTS AND SHEAR WALLS TO BE DESIGNED TO RESIST THE LATERAL LOADS NOMINATED ON THE STRUCTURAL DRAWINGS

BORED PILES

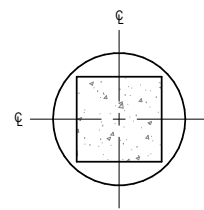
- BP1 REFER TO THE GEOTECHNICAL REPORT FOR A DESCRIPTION OF THE ANTICIPATED SITE CONDITIONS. THE PILING CONTRACTOR IS TO STUDY THE REPORT AND MAKE HIS OWN EVALUATION OF THE SITE CONDITIONS. ANY ADDITIONAL COSTS INCURRED SHALL BE BORNE BY THE PILING CONTRACTOR.
- BP2 THE BORED PILES ARE PROPORTIONED FOR THE SCHEDULED LOADS WITH ALLOWABLE SOCKET SKIN FRICTION AND END BEARING CAPACITY AS INDICATED IN THE REPORT. THE DEPTHS AND LENGTHS NOMINATED IN THE SCHEDULE ARE INDICATIVE ONLY. THEY MAY NEED TO BE VARIED DEPENDING ON THE SITE CONDITIONS ENCOUNTERED. THE PILING CONTRACTOR NEEDS TO INCORPORATE ANY DESIGN CHANGES REQUIRED.
- BP3 THE BORED PILES SHALL BE INSTALLED TO A MAXIMUM TOLERANCE OF $\pm 75\text{mm}$ FROM THAT REQUIRED IN PLAN AND INCLINED AT NOT MORE THAN 1 IN 75 FROM THE VERTICAL OR SPECIFIED RAKE.
- BP4 ALL WORKMANSHIP AND MATERIAL SHALL BE IN ACCORDANCE WITH AS 2159.
- BP5 THE BORED PILES SHALL BE LOCATED CONCENTRIC WITH THE COLUMNS AND WALLS UNLESS NOTED OTHERWISE.
- BP6 DRILL AND INSTALL THE BORED PILES IN THE LOCATIONS SHOWN ON THE DRAWINGS AND THE ABOVE REQUIREMENTS.
- BP7 BEFORE ANY CONCRETE IS POURED, ALL ROCK SOCKETS SHALL BE DEWATERED AND INSPECTED BY THE GEOTECHNICAL ENGINEER, WHO SHALL BE EMPLOYED BY THE BUILDER, TO VERIFY THE SOIL PARAMETERS. THE SOCKET BASE AND WALLS MUST BE CLEAN AND FREE FROM CLAY.
- BP8 IF THE CONCRETE NEEDS TO BE TREMIED, SUPER PLASTICIZER MUST BE ADDED TO THE MIX AND THE CONCRETE GRADE INCREASED BY 30%. REFER TO THE SPECIFICATIONS FOR THE INSPECTION OF THE HOLE PRIOR TO CONCRETING.
- BP9 THE PILING CONTRACTOR SHALL ALLOW FOR THE COST INTEGRITY TESTING OF ALL BORED PILES.
- BP10 ANY ALTERNATIVE DESIGN SHALL MEET THE ABOVE REQUIREMENTS AND THE SCHEDULED LOADS. THE PILING CONTRACTOR SHALL OBTAIN CERTIFICATION FOR THE CALCULATIONS OF THE ALTERNATIVE SYSTEM. THE DETAILS AND CALCULATIONS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE PERFORMANCE OF THE ALTERNATIVE BORED PILES.



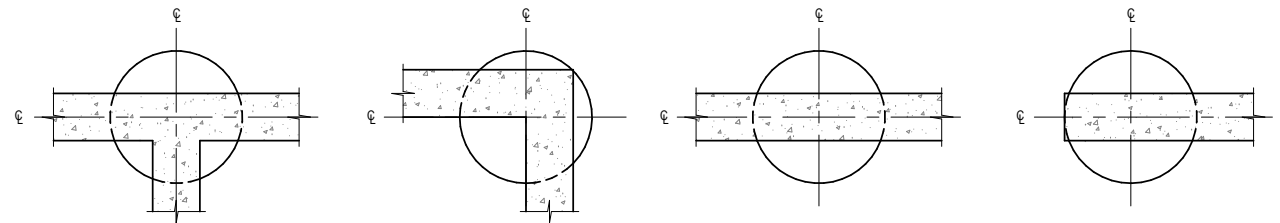
SECTION 1
SK001



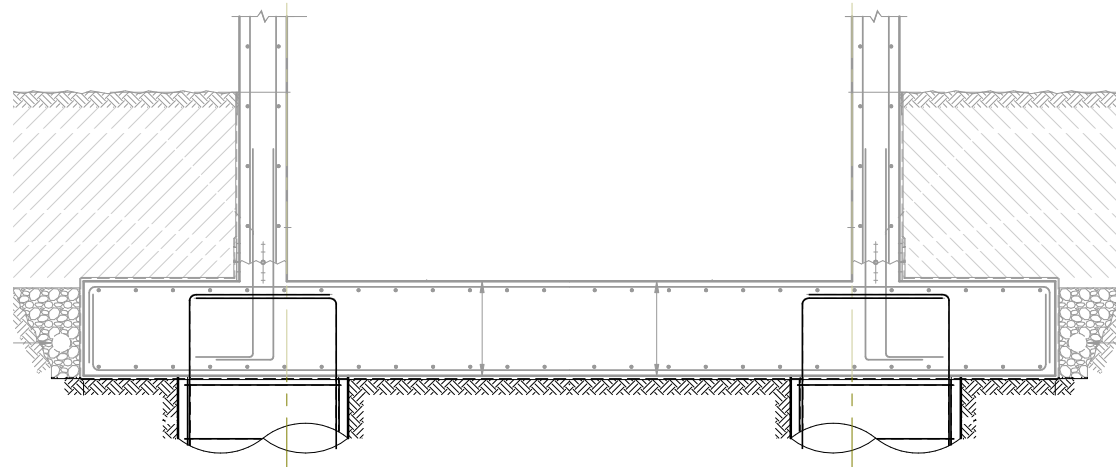
BORED PILE SECTION



TYPICAL PILE LOCATIONS AT COLUMNS
ALL PILES TO BE CENTRED ON COLUMN/WALLS OVER UNLESS OTHERWISE DENOTED ON PLAN

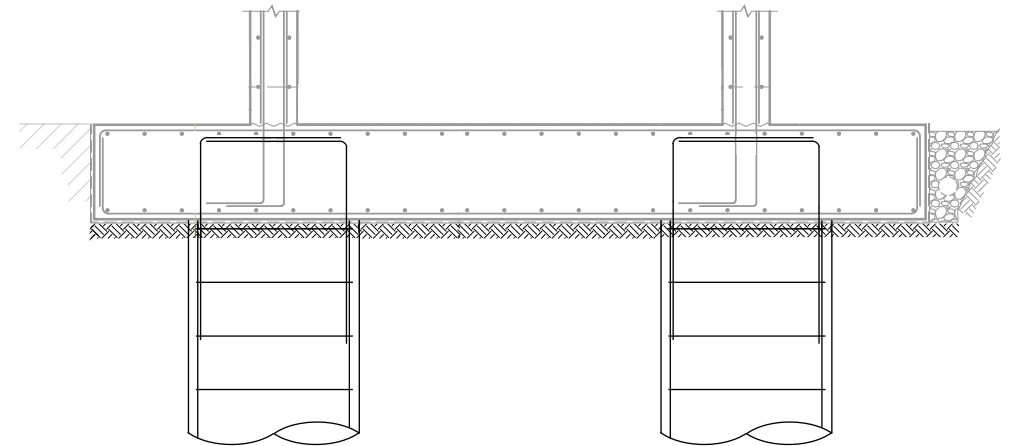


TYPICAL PILE LOCATIONS AT COLUMNS/WALLS
ALL PILES TO BE CENTRED ON COLUMN/WALLS OVER UNLESS OTHERWISE DENOTED ON PLAN



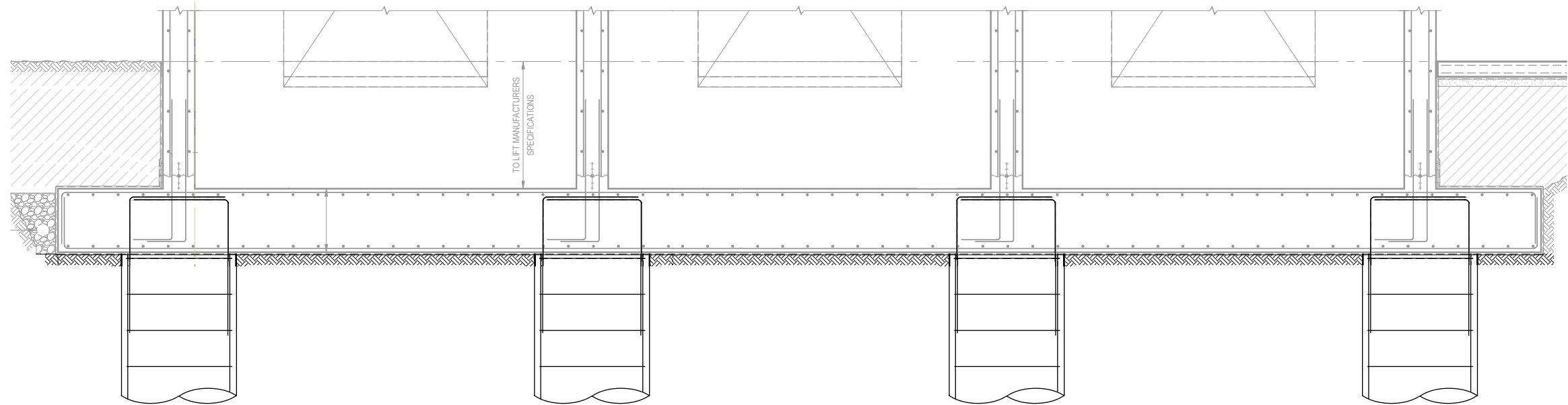
TYPICAL SECTION THROUGH LIFT PIT BASE

SECTION 2
SK001



TYPICAL SECTION THROUGH STAIR CORE BASE

SECTION 3
SK001



TYPICAL LONG SECTION THROUGH LIFT PIT BASE

SECTION 4
SK001

