

BOWRAL AND DISTRICT HOSPITAL DEVELOPMENT

STATE SIGNIFICANT DEVELOPMENT APPLICATION REPORT – CIVIL ENGINEERING



Prepared for: Health Infrastructure NSW
By: enstruct group pty ltd
Revision:D
May 2018

BOWRAL AND DISTRICT HOSPITAL
DEVELOPMENT

STATE SIGNIFICANT DEVELOPMRNT APPLICATION
REPORT – CIVIL ENGINEERING

ISSUE AUTHORISATION

PROJECT: Bowral and District Hospital Redevelopment
Project No: 5266

Rev	Date	Purpose of Issue / Nature of Revision	Prepared by	Reviewed by	Issue Authorise by
A	08/12/17	Draft Report for Review	WW	QEJ	QEJ
B	12/12/17	Report for Review	WW	QEJ	QEJ
C	17/04/18	Issued for SSDA	WW	QEJ	QEJ
D	15/05/18	Updated for SSDA	WW	QEJ	QEJ

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Executive Summary

The purpose of this report is to present the Civil Engineering design associated with the State Significant Development Application (SSDA) for the Bowral and District Hospital Redevelopment.

This report assesses the environmental impact from the Civil Engineering aspects of the proposed development and aims to satisfy all requirements of the Secretary's Environmental Assessment Requirements (SEARs) issued on the 30th January 2018 (Application Number 8980).

Existing Site Conditions

The total site area is approximately 32,910 m², however the proposed development will only affect the north section of the site. The area of the site to be development is approximately 12,300 m² and the catchment is approximately 34% impervious in its existing state.

A kerb inlet pit is located adjacent to the north-east corner of the site in Bowral Street. Council's kerb inlet is connected to a 525 mm Ø stormwater pipe conveying stormwater flows eastward along Bowral Street.

Project Overview

A new hospital building is proposed in the north section of the site in place of the existing public car parking area. The proposed new building will also require a section of the CID building to be demolished.

The proposed development will involve an enabling works stage consisting of a new Emergency Department drop off ramp and a redevelopment of the Mona Road parking area and a main works stage consisting of the new building and an access road with parking off Bowral Street.

Flooding Considerations

As part of the initial site analysis, flooding was considered to mitigate flood risk on site and to ensure no adverse effect was generated by the development on surrounding catchments.

To mitigate the risk of flooding on site and to prevent the proposed development from having an adverse effect on surrounding catchments, the 'Low Flood Risk Precinct' area of the site will not contain any development and the existing ground levels will remain unaltered.

In addition, an independent flood mitigation letter has been issued as part of the approvals process.

Stormwater Diversion

A survey of the existing site conducted by Linker Surveying dated 21/06/2016 (survey reference 160516) shows that stormwater networks exist under the location of the proposed new building and under the location of the proposed access ramp for the interim ED drop-off area.

The existing stormwater networks convey flows from the existing buildings and hardstanding areas south (upstream) of the proposed development. As part of the main works stage these stormwater networks will be diverted to ensure no additional flooding occurs on site or on downstream catchments due to the proposed development.

Enabling Works

The existing access road and adjacent parking areas off Bowral Street will be removed as part of the enabling works stage and a new ED access road will be constructed to the west of the existing road. The new access road will ramp up to the level of the existing ED building and the interim ambulance drop off area will be constructed as a raised structure. The first section of the ED ramp will be constructed on-grade with 3 retaining walls. The stormwater drainage network for the new ED drop off area will be connected to the existing stormwater network on site.

As part of the enabling works there will be a provision of new parking spaces along the Mona Road access driveway. A new stormwater network will be constructed for the Mona Road catchment area as there is negligible existing stormwater infrastructure in this area. The stormwater network will include providing a new kerb inlet pit in the north of Mona Road to allow for a connection to the existing council stormwater network in Bowral Street.

Main Works Stormwater Drainage

For the main works stage of the project a new stormwater network will be constructed around the proposed building to collect all downpipes from the roof and overland flow adjacent to the building. On-site stormwater detention (OSD) is required to restrict post-development peak discharge rates to pre-development peak discharge rates for storm events up to and including the 100-year ARI event.

The volume of storage required to restrict the post-developed peak discharge rates of the entire developed site area (including the bypass areas) to the permissible site discharge is 160 m³.

Water Sensitive Urban Design

The WSUD Strategy proposed for the development utilises a treatment train approach, consisting of the following: a rain garden, catch pit inserts and stormfilter cartridges which will achieve a Neutral or Beneficial Effect (NorBe) in accordance with Water NSW's (formally Sydney Catchment Authority, SCA) Guidelines on water quality within the Sydney Drinking Water Catchment.

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1 Introduction

enstruct group have been engaged by Health Infrastructure NSW as civil and structural engineering consultants for the proposed development at Bowral and District Hospital.

The purpose of this report is to present the Civil Engineering design for the Bowral and District Hospital Redevelopment, in alignment with the requirements of local authorities and best practice guidelines.

2 Existing Site

The existing Bowral and District Hospital site is bounded by Ascot Road to the south, Mona Road to the east, Bowral Street to the north, Sheffield Road to the west and Southern Highlands Private Hospital in the north-west corner.

The site generally falls from south-west at the corner of Sheffield Road and Ascot Road to north-east at the corner of Bowral Street and Mona Road. The site falls approximately 6.4 m from RL 685.30 mAHD to RL 678.90 mAHD at an average gradient of 2.2%.

A kerb inlet pit is located adjacent to the north-east corner of the site in Bowral Street. Council's kerb inlet is connected to a 525 mm Ø stormwater pipe conveying stormwater flows eastward along Bowral Street. The invert level of the downstream stormwater pipe is IL 677.59 mAHD.

The total site area is approximately 33,700 m², however the proposed development will only affect the north-east corner of the site. Area of the site to be development is approximately 12,300 m² and the catchment is approximately 34% impervious in its existing state.

3 Project Overview

3.1 Redevelopment Proposal

A new hospital building is proposed at the north end of the site in place of the existing public car parking area. The proposed new building will also require a section of the CID building to be demolished.

The proposed new building is an L-shaped building adjacent to the entrance of the existing Emergency Department. During construction of the new building, the Emergency Department (ED) will become inaccessible from the existing Bowral Street access road north of the site.

The proposed development will involve an enabling works stage consisting of a new ED access road and a redevelopment of the Mona Road parking area and a main works stage consisting of the new building.

3.2 Proposed New Building Location

An existing site layout with an overlay of the proposed new building has been produced by architects McConnel Smith and Jones (MSJ) Architects. Figure 3.1 shows the location of the proposed new building and the demolition of part of the CID building.

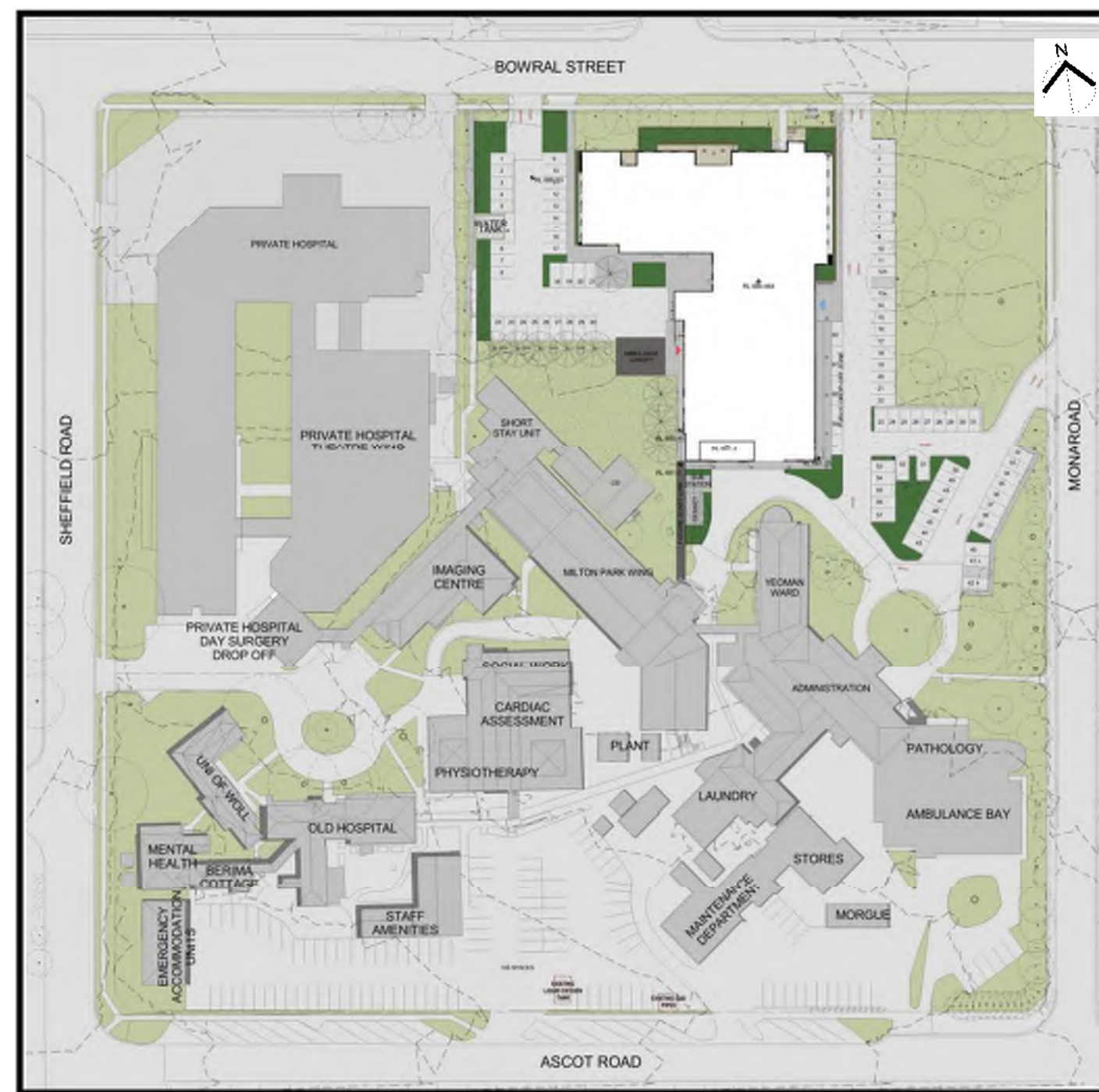


Figure 3.1 Proposed Location of New Building (Source: MSJ Architects)

4 Enabling Works

4.1 Interim Emergency Department Drop Off

The existing access road and adjacent parking areas off Bowral Street will be removed as part of the enabling works stage and a new ED access road will be constructed to the west of the existing road. The new access road will ramp up to the level of the existing ED building and the interim ambulance drop off area will be constructed as a raised structure. The first section of the ED ramp will be constructed on-grade with 3 retaining walls as shown in Figure 4.1.

The retaining walls either side of the ramp will be extended above the pavement to act as barriers for the ramp. There are 5 new parking spaces proposed adjacent to the ED access ramp. Where the existing ED ramp is to be demolished a new retaining wall with a maximum retaining height of 2.0m will be constructed adjacent to the existing pedestrian access ramp.

The stormwater drainage network for the new ED drop off area will be connected to the existing stormwater network on site as shown in Figure 4.1.

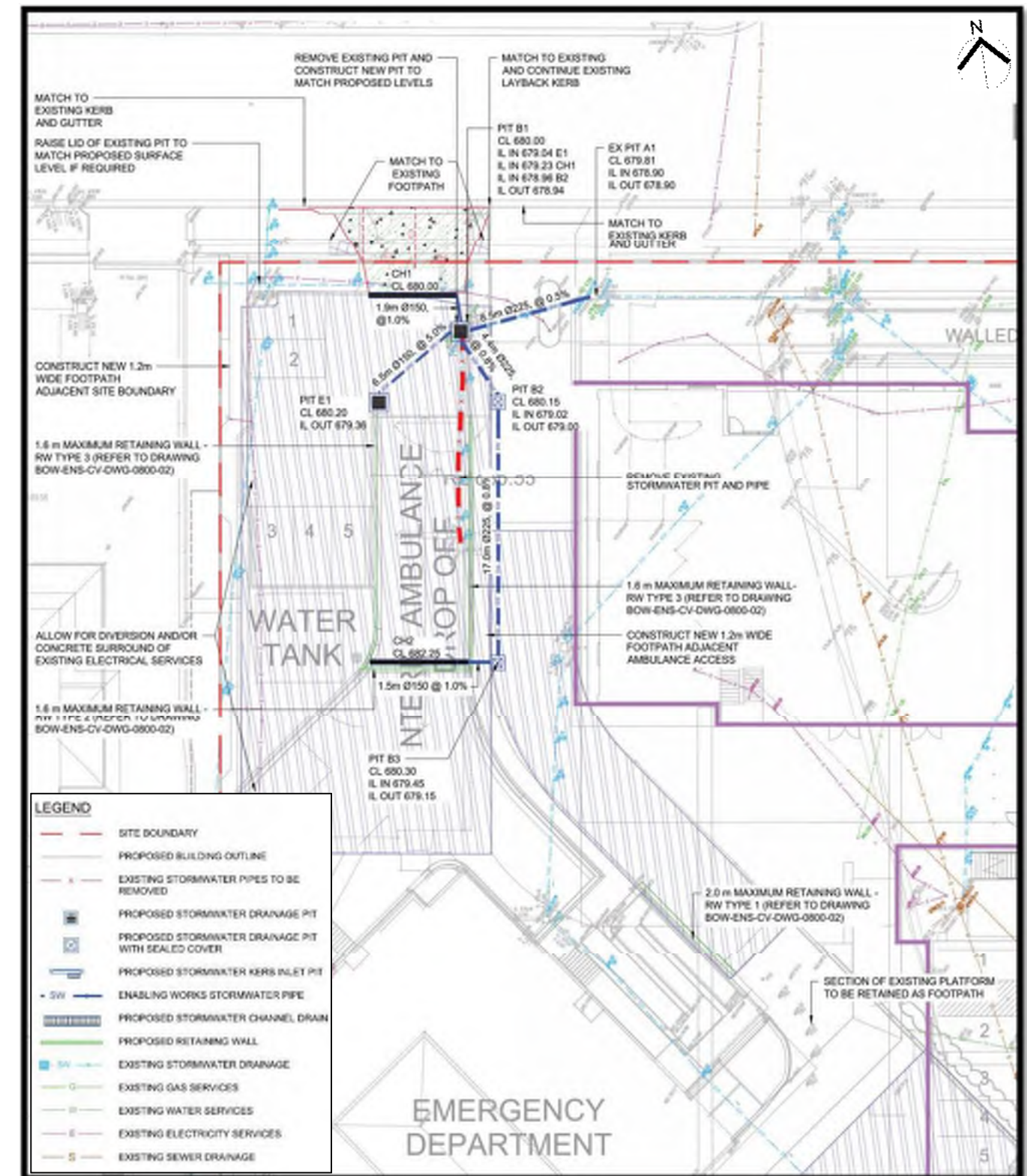


Figure 4.1 Enabling Works ED Drop Off

4.2 Mona Road Parking

The proposed development will restrict public access from Bowral Street and will remove several public parking spaces. As part of the enabling works there will be a provision of new parking spaces along the Mona Road access driveway.

The majority of public traffic will enter the site via the existing Mona Road access driveway which will be reconfigured to generate a turning circle and new parking spaces. Figure 4.2 shows the site access and parking arrangement for early works.

A new stormwater network will be constructed for the Mona Road catchment area as there is negligible existing stormwater infrastructure in this area. The stormwater network will include providing a new kerb inlet pit in the north of Mona Road to allow for a connection to the existing council stormwater network in Bowral Street.

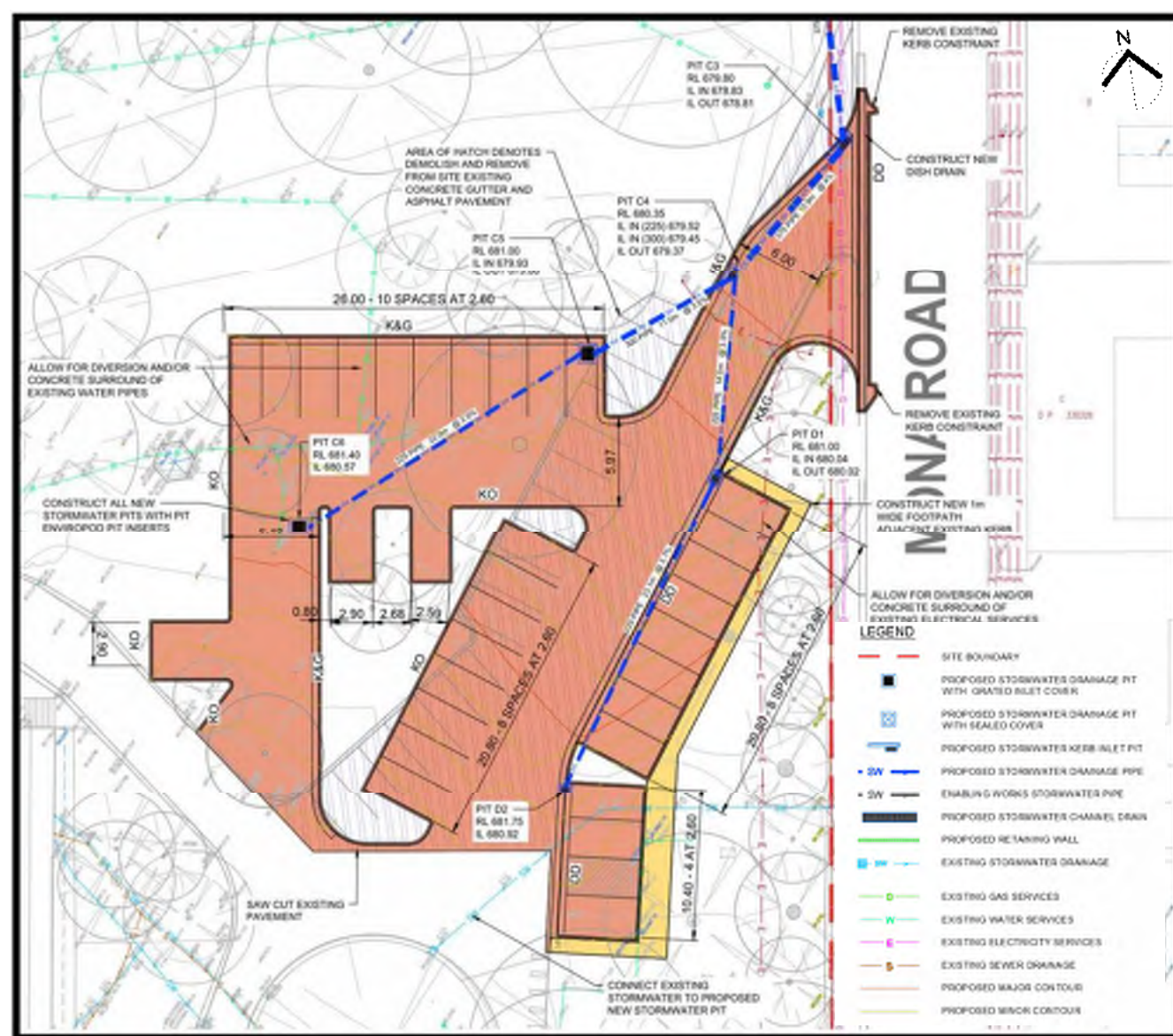


Figure 4.1 Enabling Works Mona Road Parking

5 Flooding Considerations

As part of the initial site analysis, flooding has been considered to mitigate flood risk on site and to ensure no adverse effect was generated by the development on surrounding catchments.

Using Wingecarribee Shire Council's 2009 flood study as referenced in the enstruct Concept Design report the extent of flooding produced by the 100-year design flood event does not affect the site. The extent of flooding produced by the probable maximum flood (PMF) design flood event slightly affects the north-east corner of the site.

The flood maps show that a small portion of the north-east corner of the site is classified as a 'Low Flood Risk Precinct'. The classification of a 'Low Flood Risk Precinct' is "Land with a low probability of flooding lying above a level 0.5 m above the 100 year ARI flood and below the probable maximum flood (PMF)".

5.1 Flood Management Plan

To mitigate the risk of flooding on site and to prevent the proposed development from having an adverse effect on surrounding catchments, the 'Low Flood Risk Precinct' area of the site will not contain any development and the existing ground levels will remain unaltered.

In addition, an independent flood mitigation letter has been issued as part of the approvals process.

6 Stormwater Drainage Diversion

A survey of the existing site conducted by Linker Surveying dated 21/06/2016 (survey reference 160516) shows that stormwater networks exist under the location of the proposed new building and under the location of the proposed access ramp for the interim ED drop-off area.

The existing stormwater networks convey flows from the existing buildings and hardstanding areas south (upstream) of the proposed development. As part of the main works stage these stormwater networks will be diverted to ensure no additional flooding occurs on site or on downstream catchments due to the proposed development.

The existing stormwater networks to the south-east of the proposed building will be diverted east and will be connected to the new stormwater network constructed in the enabling works stage for the upgraded Mona Road parking area. Figure 6.1 shows how this stormwater network re-joins the council stormwater network located in Bowral Street, where the existing network previously drained to.

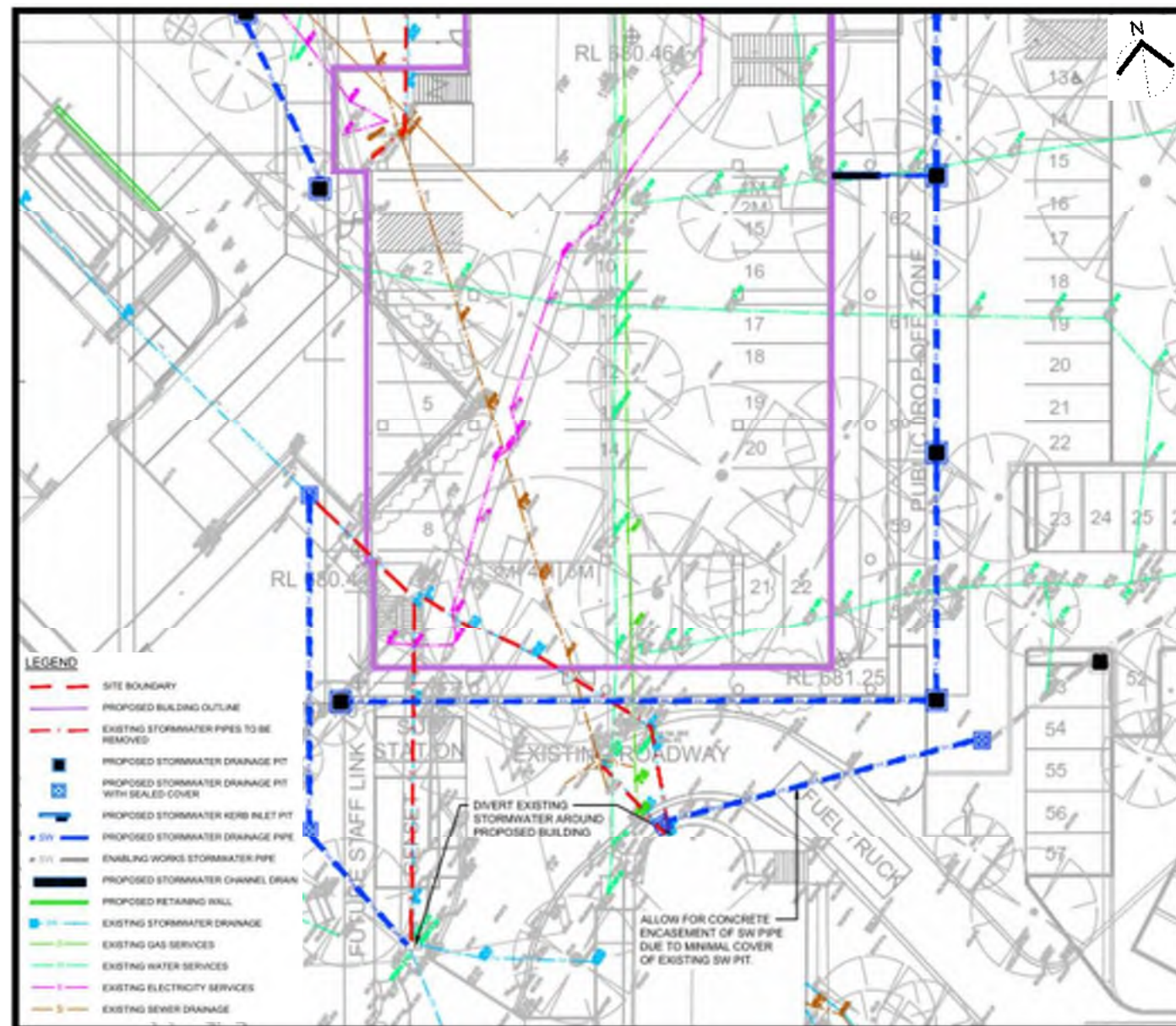


Figure 6.1 Mona Road Stormwater Diversion

The existing stormwater network to the west of the proposed building will be diverted around the new building and will be reconnected to the existing stormwater network located within the site boundary to generate as little disturbance to the existing trees which align Bowral Street as possible. The existing network then discharges to Bowral Street where the diverted pipe previously discharged to as shown in Figure 6.2.

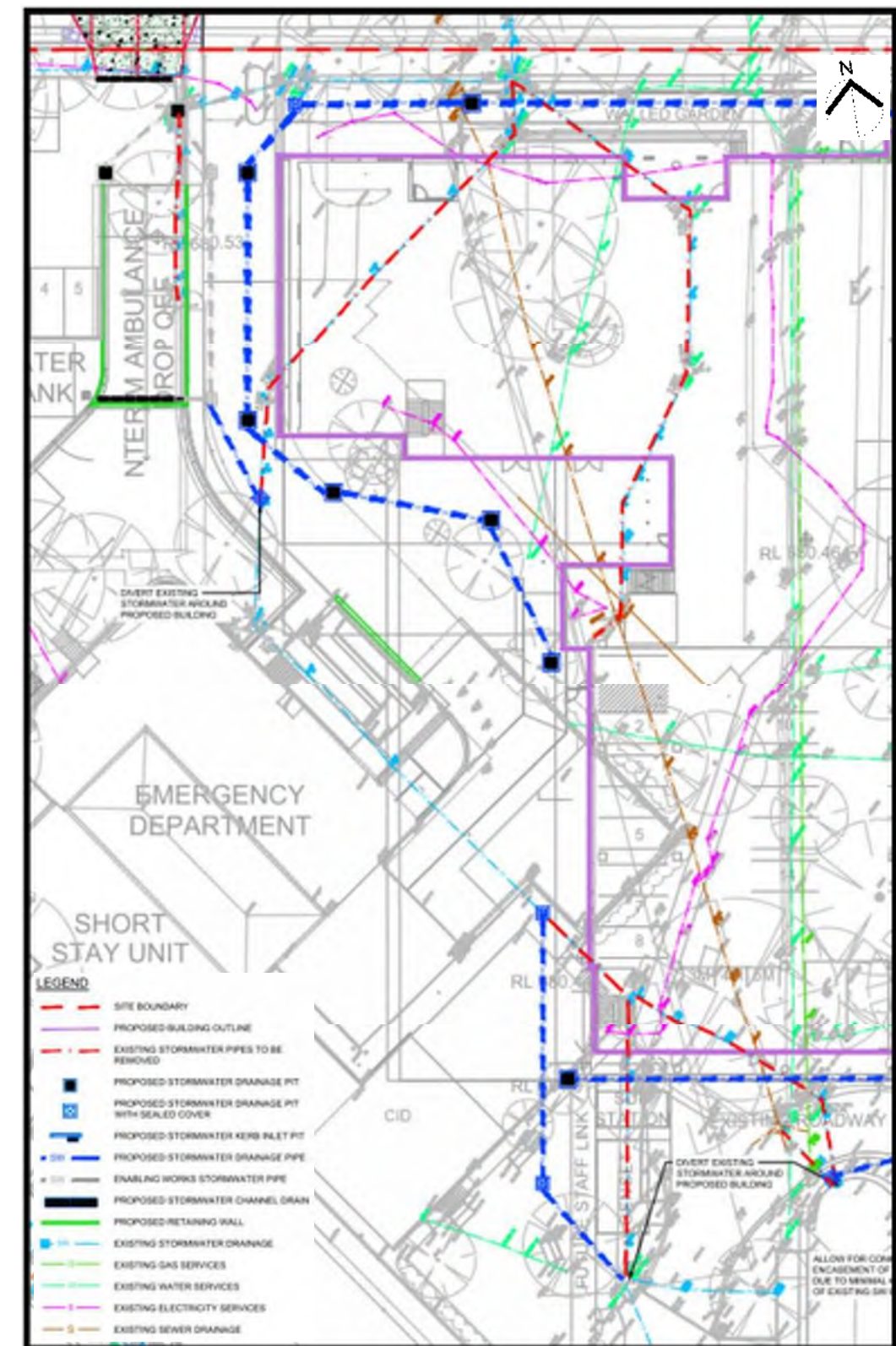


Figure 6.2 ED Ramp Stormwater Diversion

7 Main Works Stormwater Design

For the main works stage of the project a new stormwater network will be constructed around the proposed building to collect all downpipes from the roof and overland flow adjacent to the building. On-site stormwater detention (OSD) is required to restrict post-development peak discharge rates to pre-development peak discharge rates for storm events up to and including the 100-year ARI event.

Due to the natural topography of the site and because the north-east corner of the site is to remain undeveloped, the north gardens will bypass the OSD system and will discharge to council's stormwater drainage network in Bowral Street. Due to the natural topography of the site and the staging of the project the Mona Road parking area of the site will also bypass the OSD system.

A hydraulic model was developed using DRAINS software for this project. The parameters and output from the DRAINS model are presented in Appendix B.

The remaining catchment of the developed site area will be attenuated in an OSD tank located below the new access road and proposed building as shown in Figure 7.1. The volume of storage required to restrict the post-developed peak discharge rates of the entire developed site area (including the bypass areas) to the permissible site discharge is 160 m³.

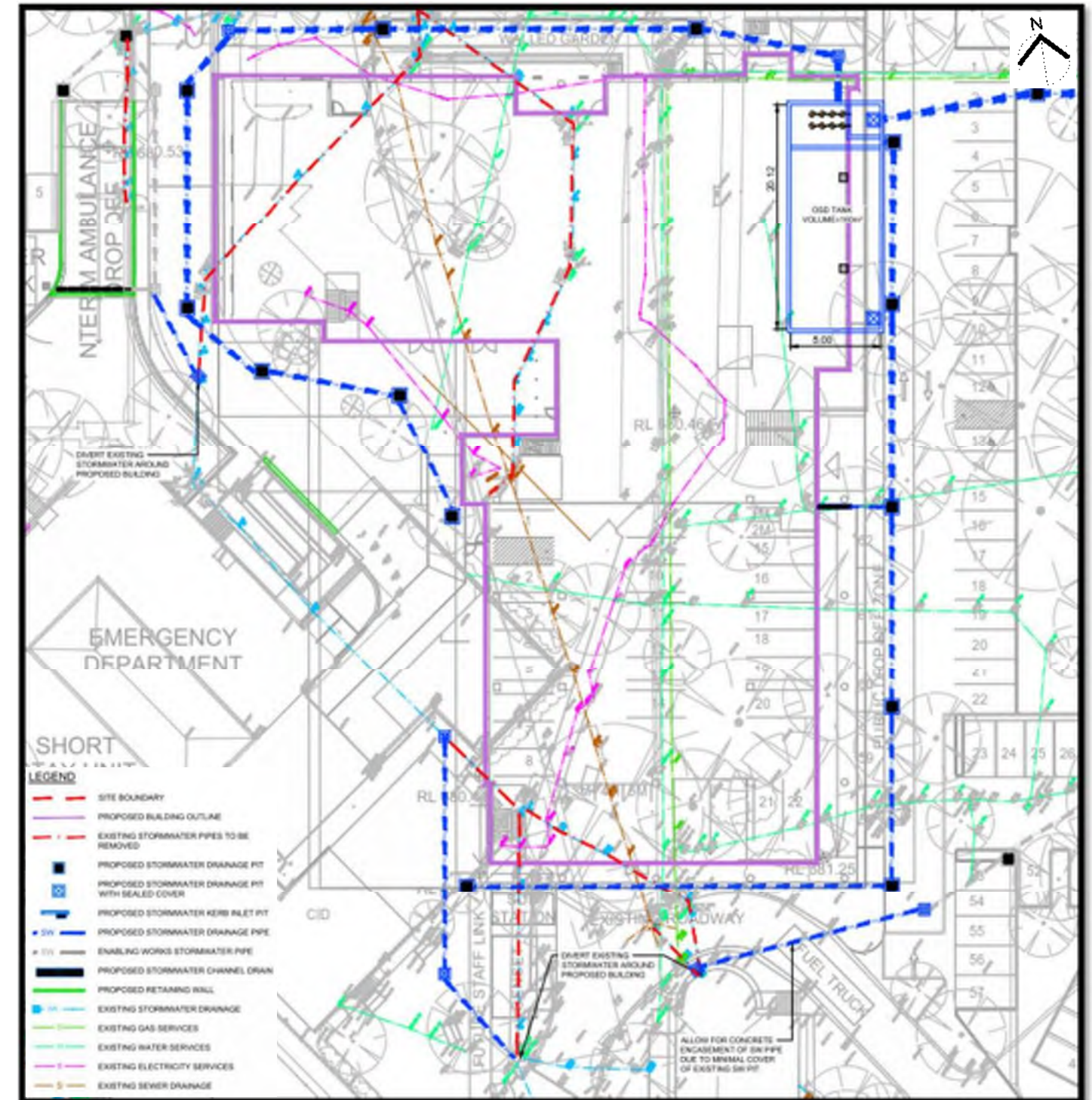


Figure 7.1 ED Drop-off Stormwater Connection

8 Water Sensitive Urban Design

The proposed development is located within the drinking water catchment of Wingecarribee River. To ensure water quality continues to be protected, stormwater discharging from the site must be proven to have a neutral or beneficial effect (NorBE).

The WSUD Strategy proposed for the development utilises a treatment train approach, consisting of the following: a rain garden, catch pit inserts and stormfilter cartridges.

8.1 Pit Inserts

Pit inserts, also known as litter baskets, are considered as an at-source primary treatment solution. It is an efficient and cost-effective pre-screening primary treatment system that captures and retains gross pollutants at drainage entry points. Pit inserts, consisting of a capture basket and a filter mesh liner, are usually fitted below the road invert or surface of the pit and hence are visually unobtrusive.

Pit inserts can be customised to fit almost any stormwater inlet pit and the mesh liner opening could vary depending on the targeted capture of solids, sediment and attached pollutants. Cleaning of the pit inserts is undertaken either manually or using a small vacuum truck. The cleaning frequency depends on the catchment type, size and expected pollutant loading.

Pit inserts have been proposed for the pits along the roads to treat runoff from the landscaped and impervious areas fronting the development.

8.2 Rain Garden

A rain garden system is an industry standard WSUD approach that improves the quality of stormwater by filtering water through a biologically influenced media. A typical rain garden system consists of a vegetated surface overlaying a porous filter medium with a drainage pipe at the bottom. Stormwater is directed into the rain garden via overland flow and a surcharge pit, flows through dense vegetation and temporarily ponds on the surface before slowly filtering down through the filter media. Treated flows are then collected by the lower drainage system for conveyance to downstream waterways or storages.

An overflow pit will be provided within the rain garden to take excess flows and bypass them into the drainage system.

8.3 Mechanical Filtration

Mechanical filtration devices can be used as a substitute where bioretention systems (e.g. bioretention swales and raingardens) or rainwater tanks are not possible or need augmentation. As a best management practice treatment option, such engineered devices are designed to remove a range of target pollutants including fine solids, soluble heavy metals, oils and nutrients.

Apart from meeting stringent regulatory requirements, these filtration systems (e.g. Stormwater 360's StormFilter) are usually installed below ground allowing savings in land space and hence increase development yield and more efficient maintenance and management. An 8-cartridge filtration system located within the OSD tank is proposed to treat the runoff from the building.

8.4 Music Modelling

A detailed water quality analysis has been undertaken to develop the WSUD strategy for the proposed development to have a Neutral or Beneficial Effect (NorBE). The water quality modelling for this study has been undertaken using the industry standard software model MUSIC (Model for Urban Stormwater Improvement Conceptualisation) Version 6.2.

Figure 8.1 contains a schematic diagram of the proposed water quality treatment train layout, while Figure 8.2 shows the results of the MUSIC water quality model for the site.

The WSUD strategy will be further developed with the landscape architect to achieve site aspirations and water quality targets.

The soil / groundwater parameters and the pollutant loading rates adopted for the site for Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN) used in the MUSIC model are consistent with the values recommended by Sydney Catchment Authority Standard.

The Rainfall data used for the MUSIC model is from Zone 3 according with Water NSW, formally Sydney Catchment Authority (SCA).

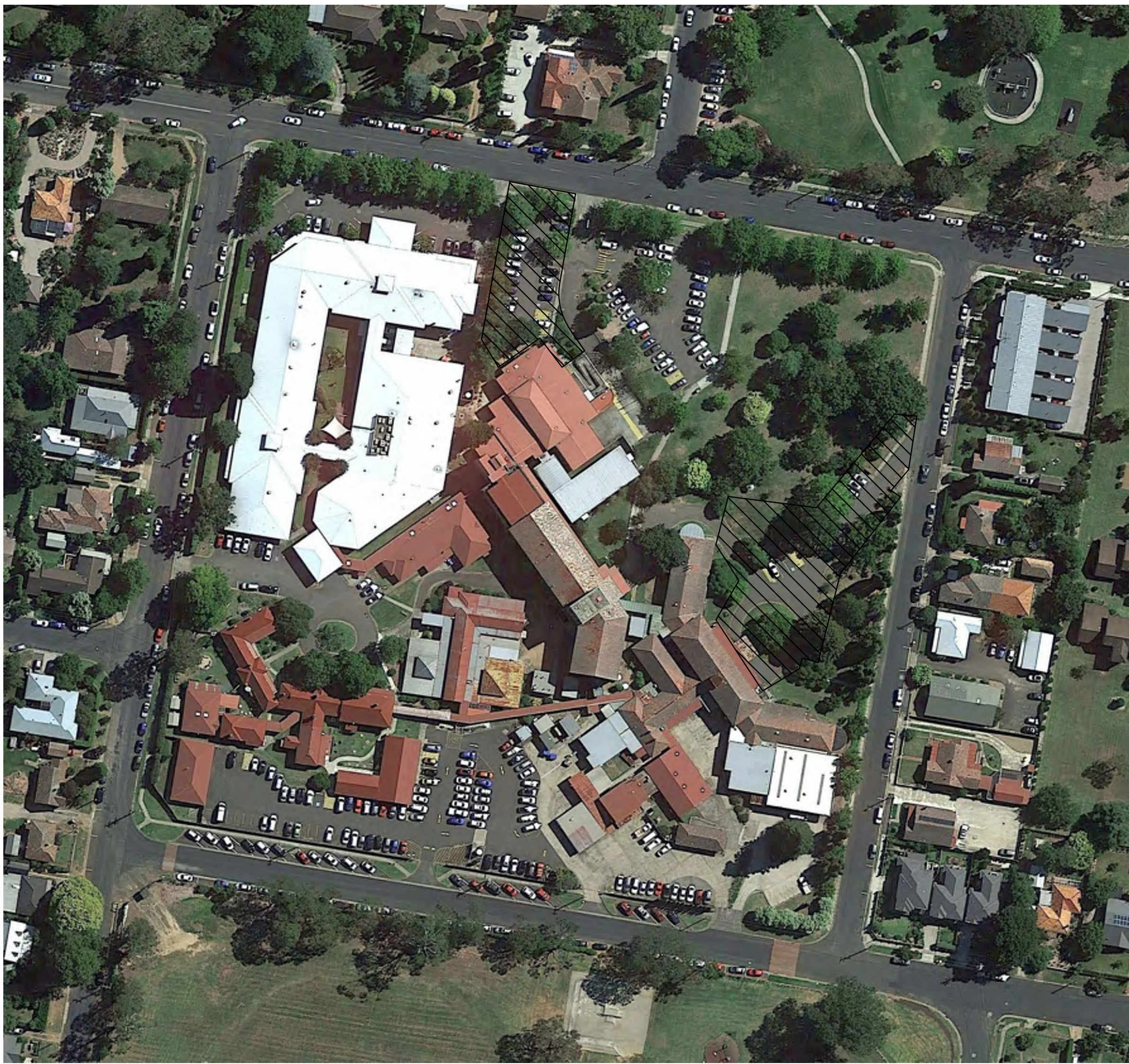
APPENDIX A

CIVIL ENGINEERING DRAWINGS

BOWRAL DISTRICT HOSPITAL REDEVELOPMENT

ENABLING WORKS

enstruct



CIVIL ENGINEERING DRAWING LIST:

BOW-ENS-CV-DWG-0000-E	COVER SHEET - DRAWING LIST
BOW-ENS-CV-DWG-0001-A	GENERAL NOTES
BOW-ENS-CV-DWG-0200-H	SITE WORKS & STORMWATER MANAGEMENT PLAN
BOW-ENS-CV-DWG-0210-F	STORMWATER PIT SCHEDULE
BOW-ENS-CV-DWG-0300-C	BULK EARTHWORKS PLAN
BOW-ENS-CV-DWG-0400-A	SEDIMENT AND EROSION CONTROL PLAN - SHEET 1
BOW-ENS-CV-DWG-0450-A	SEDIMENT AND EROSION CONTROL DETAILS
BOW-ENS-CV-DWG-0500-C	PAVEMENT PLAN AND DETAILS - SHEET 1
BOW-ENS-CV-DWG-0501-C	PAVEMENT PLAN AND DETAILS - SHEET 2
BOW-ENS-CV-DWG-0600-B	ROADS SET OUT PLAN
BOW-ENS-CV-DWG-0800-C	SITE WORKS DETAILS
BOW-ENS-CV-DWG-0810-A	TYPICAL STORMWATER DRAINAGE DETAILS - SHEET 1
BOW-ENS-CV-DWG-0811-B	TYPICAL STORMWATER DRAINAGE DETAILS - SHEET 2
BOW-ENS-CV-DWG-0820-A	TYPICAL ROAD DETAILS
BOW-ENS-CV-DWG-0830-A	RAINGARDEN DETAILS

- | | | | |
|-------|-----------------------|---------|-------------------------|
| ALT - | ALTERNATE | LV - | LENGTH VARIES |
| T - | TOP | AB - | ALTERNATE BARS REVERSED |
| B - | BOTTOM | NSOE - | NOT SHOWN ON ELEVATION |
| NF - | NEAR FACE | NSOP - | NOT SHOWN ON PLAN |
| FF - | FAR FACE | NTS - | NOT TO SCALE |
| EF - | EACH FACE | ADD - | ADDITIONAL BARS |
| C - | CENTRALLY LOCATED | TSB - | THREADED STARTER BAR |
| ES - | EQUAL SPACES | UNO - | UNLESS NOTED OTHERWISE |
| EW - | EACH WAY | MC - | MASS CONCRETE |
| GL - | GROUND LEVEL | C/S - | BRICKWORK COURSES |
| RL - | REDUCED LEVEL | US - | UNDERSIDE |
| FFL - | FINISHED FLOOR LEVEL | PL - | PLATE |
| SSL - | STRUCTURAL SLAB LEVEL | BW - | BOTH WAYS |
| RC - | REINFORCED CONCRETE | FW - | FILLET WELD |
| IL - | INVERT LEVEL | KO - | KERB ONLY |
| TYP - | TYPICAL | KT - | ROLL KERB |
| CL - | CENTRE LINE | KK - | KERB WITH TOE |
| STA - | STAGGERED BARS | FK - | FLUSH KERB |
| NOM - | NOMINAL | K&G - | KERB AND GUTTER |
| MAX - | MAXIMUM | A.H.D - | AUSTRALIAN HEIGHT DATUM |
| MIN - | MINIMUM | ha - | HECTARE |
| CJ - | CONSTRUCTION JOINT | BDY - | BOUNDARY |
| LJ - | LONGITUDINAL JOINT | DD - | DISH DRAIN |
| CT - | CONTRACTION JOINT | | |

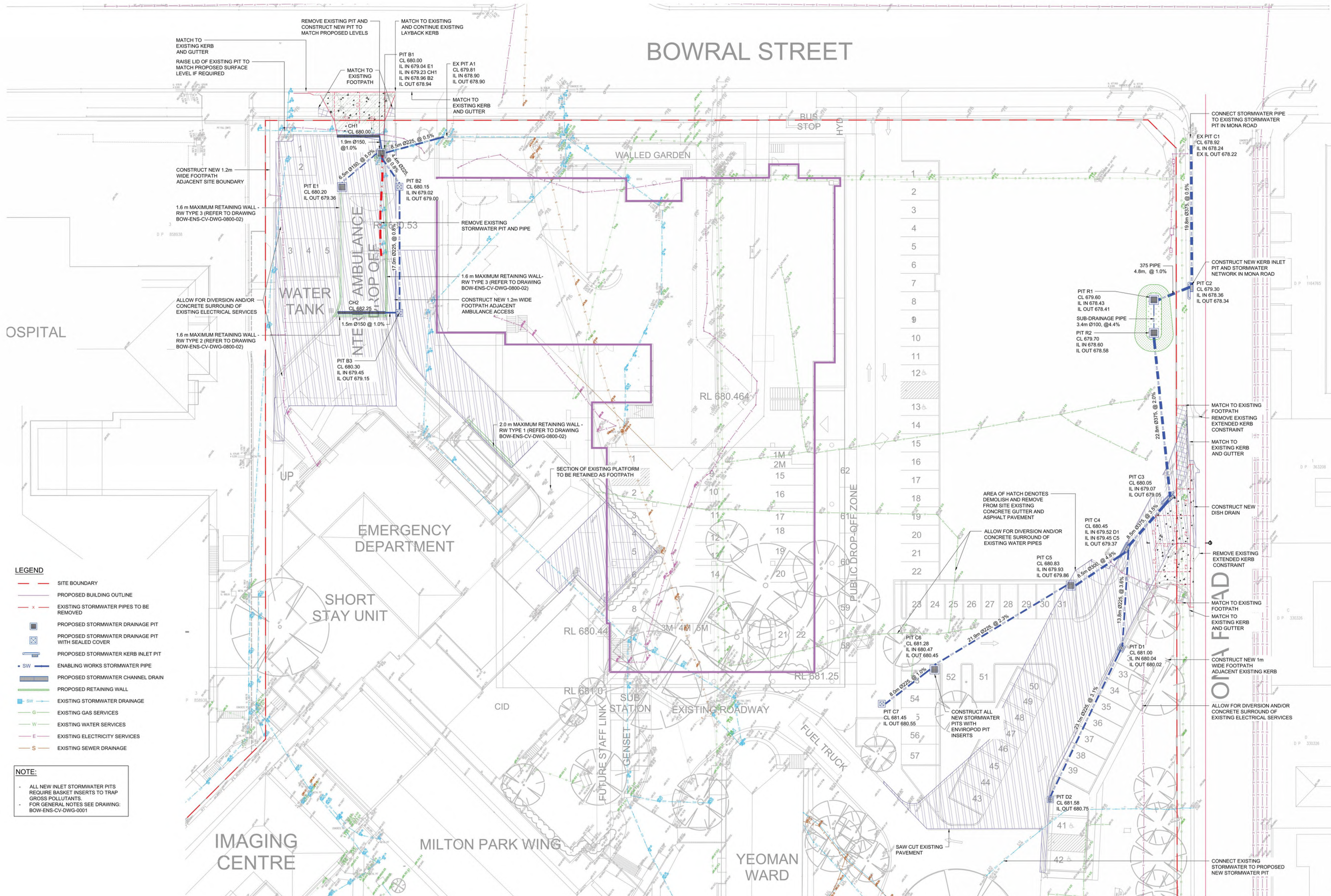
- | <u>SURVEY</u> | |
|---------------|--|
| 1. | DETAILED GROUND SURVEY WITHIN THE SITE AND BOUNDARIES WERE SUPPLIED BY PROJECT SURVEYORS, LINKER SURVEYING, REFERENCE NUMBER 160516, DATED 23.06.16. |
| 2. | THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. ENSTRUCT GROUP DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE. |
| 3. | SURVEY MARKS SHALL BE MAINTAINED AT ALL TIMES. WHERE RETENTION IS NOT POSSIBLE THE ENGINEER SHALL BE NOTIFIED AND CONSENT PRIOR TO THEIR REMOVAL. |
| 4. | SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT ENSTRUCT GROUP. |
| 5. | ALL WORKS TO BE SET OUT BY A REGISTERED SURVEYOR. |

1. ALL TREES AND SHRUBS (UNLESS NOTED TO BE PROTECTED ON THE LANDSCAPE PLANS), RUBBLE, EXISTING PAVEMENT AND EXISTING STRUCTURES WITHIN THE SITE SHALL BE REMOVED AND REUSED OR RECYCLED WHERE POSSIBLE. WHERE NOT POSSIBLE, THIS MATERIAL SHALL BE REMOVED FROM SITE AND DISPOSED OF AS PART OF THE CONTRACT.
2. ANY TREES WITHIN THE WORKS AREA WHICH, IN THE OPINION OF THE CONTRACT ADMINISTRATOR, ARE UNSOUND OR WOULD CONSTITUTE A DANGER, SHALL BE CUT DOWN AND REMOVED (EXCEPT THOSE IDENTIFIED AS BEING PROTECTED). ALL STUMPS OF TREES CUT DOWN WITHIN THE BOUNDS OF THE CONSTRUCTION AREA WHICH ARE LARGER THAN 250mm IN GIRTH, SHALL BE COMPLETELY REMOVED.
3. ALL ROOTS SHALL BE REMOVED FOR A DEPTH OF 1m. CAVITIES FORMED BY THE REMOVAL OF ROOTS SHALL BE BACKFILLED AND COMPACTED.
4. AFTER CLEARING AND GRUBBING ARE COMPLETE, THE CONTRACTOR SHALL STRIP AND STOCKPILE TOPSOIL FROM THE CLEARED AREA (INCLUDING AREAS THAT HAVE BEEN CLEARED AND GRUBBED). REMOVAL OF TOPSOIL FROM ANY SECTION OF THE WORKS SHALL ONLY COMMENCE AFTER SEDIMENT AND EROSION CONTROLS HAVE BEEN IMPLEMENTED.
5. TOPSOIL SHALL BE STRIPPED FROM WITHIN THE FORMATION AREAS OF ROADS, PATHWAYS, BUILDING PADS AND MISCELLANEOUS PAVEMENTS, INCLUSIVE OF BATTERS, AND IS TO BE CONSERVED FOR THE TOP-DRESSING OF FORMED FOOTWAYS, BERMS AND BATTERS TO THE SPECIFIED DEPTH, OR WHERE NO DEPTH IS SPECIFIED TO A MINIMUM DEPTH OF 150mm OR AS DETERMINED ON-SITE.
6. EXCAVATED FILL MATERIAL NOT SUITABLE FOR REUSE ON-SITE MUST BE REMOVED OFF-SITE OR OTHERWISE USED IN LANDSCAPING AREAS WHERE AGREED IN ADVANCE WITH ENGINEER.
7. EROSION AND SEDIMENT CONTROL MUST BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL CITY COUNCIL DCP, DA AND CC CONDITIONS, AND BE INSTALLED TO THE SATISFACTION OF THE ENGINEER.
8. THE CONTRACTOR SHALL TAKE ALL NECESSARY STEPS TO LIMIT THE CREATION OF DUST NUISANCE, WHICH MIGHT ARISE DURING THE EXECUTION OF THE WORKS.
9. FILL MATERIAL MUST BE PLACED IN MAXIMUM LAYERS OF 200mm (LOOSE) OR AS OTHERWISE GIVEN IN THE SPECIFICATION AND COMPACTED TO THE LEVELS AS SPECIFIED ON THE DRAWINGS.
10. COMPACTED FILL MUST BE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF AS3798 AND AS GIVEN IN THE CIVIL SPECIFICATION.
11. BEFORE PLACING FILL, PROOF ROLL EXPOSED SUBGRADE WITH AN 12 TONNE (MIN) DEADWEIGHT SMOOTH DROW VIBRATORY ROLLER TO DIRECT THEN REMOVE SOFT SPOTS (AREAS WITH MORE THAN 2mm MOVEMENT UNDER ROLLER. PROOF ROLLING SHALL COMPRISE 6 PASSES OF A MINIMUM.
12. FREQUENCY OF COMPACTION TESTING SHALL BE NOT LESS THAN :
 - (A) 1 TEST PER 200m³ OF FILL PLACED PER 200mm THICK LAYER OF FILL
 - (B) 3 TESTS PER LAYER
 - (C) 1 TEST PER 2000m³ OF EXPOSED SUBGRADETESTING SHALL BE "LEVEL1" TESTING IN ACCORDANCE WITH AS 3798 (2007) AT CONTRACTOR EXPENSE.
13. NO FILLING SHALL TAKE PLACE TO EXPOSED SUBGRADE UNTIL THE AREA HAS BEEN PROOF ROLLED IN THE PRESENCE OF GEOTECHNICAL ENGINEER AND APPROVAL GIVEN IN WRITING THAT FILLING CAN PROCEED.
14. THE CONTRACTOR SHALL ALLOW FOR AND COORDINATE ALL MONITORING AND MAINTENANCE REQUIREMENTS IN RELATION TO SOIL AND GROUNDWATER CONDITIONS DURING CONSTRUCTION.
15. ALL LAND DISTRIBUTED BY EARTHWORKS SHALL BE HYDROMULCHED, OR SIMILARLY TREATED TO ESTABLISH GRASS COVER, SEED MIXTURES ARE TO BE APPROVED BY COUNCIL PRIOR TO SPRAYING ALL GRASSED AREAS SHALL BE REGULARLY WATERED AND MAINTAINED UNTIL EXPIRATION OF THE MAINTENANCE PERIOD.

UTILITIES

9. REINFORCEMENT SHALL NOT BE BENT OR HEATED ON-SITE WITHOUT THE ENGINEER'S PRIOR APPROVAL.
10. CONCRETE TO BE MECHANICALLY VIBRATED TO ACHIEVE A DENSE HOMOGENOUS MASS COMPLETELY FILLING THE FORMWORK, THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS.
11. SURFACE FINISH TO BE BROOMED UNLESS SHOWN OTHERWISE.
12. DECORATIVE FINISHES, COLORS OR PATTERNS TO BE APPLIED AS SHOWN ON THE ARCHITECT'S PLAN.

REVISIONS			ARCHITECT			CLIENT			PROJECT MANAGER			CONSULTANT			PROJECT			DRAWING NUMBER			REV			ISSUE DATE		
NO.	DATE	SUBJECT							 enstruct group pty ltd Level 4, 2 Glen Street Mitsions Point NSW 2061 Australia Telephone (02) 8904 1444 Facsimile (02) 8904 1555 http://www.enstruct.com.au			BOWRAL DISTRICT HOSPITAL REDEVELOPMENT - ENABLING WORKS 97-103 Bowral St, Bowral NSW 2576			BOW-ENS-CV-DWG-0001 GENERAL NOTES			A 			SEPT 17					



PIT ID	PIT TYPE ID	COVER LEVEL (mAHD)	INCOMING PIPE IL (mAHD)	OUTGOING PIPE IL (mAHD)	OUTGOING PIPE GRADE (%)	DEPTH TO PIT IL (m)	OUTGOING PIPE DIA (mm)	INTERNAL PIT SIZE (mm)	MINIMUM GRATE SIZE (mm)	GRATE CLASS	NOTES
EX A1		679.81	678.90	678.90	2.50	0.91	225	UNKNOWN	UNKNOWN	UNKNOWN	GRATED COVER
B1		680.00	678.96 (225Ø)	678.94	0.50	1.06	225	UNKNOWN	UNKNOWN	UNKNOWN	GRATED COVER
			679.04 (150Ø)								
			679.23 (150Ø)								
B2	SDP	680.15	679.02	679.00	0.80	1.15	225	600x600	600x600	C	SEALED COVER
B3	SDP	680.30	679.45	679.15	0.80	1.15	225	600x600	600x600	C	SEALED COVER
E1	SDP	680.20		679.36	5.00	0.84	150	900x900	900x900	C	GRATED COVER
CH1	CHANNEL	680.00		679.25	1.00	0.75	150		300 WIDE	C	CHANNEL DRAIN
CH2	CHANNEL	682.25		679.44	1.00	2.81	150		300 WIDE	C	CHANNEL DRAIN
EX C1		678.92	678.24	678.22	UNKNOWN	0.70	375	2.4m LINTEL	UNKNOWN	UNKNOWN	KERB INLET PIT
C2	KIP(OG)	679.30	678.36	678.34	0.50	0.96	375	1.8m LINTEL	900x400	C	KERB INLET PIT
R1	SDP	679.60	678.43	678.41	1.00	1.19	375	900x900	900x900	B	OVERFLOW PIT
R2	SDP	679.70	678.60	678.58	4.40	1.12	100	900x900	900x900	B	SURCHARGE PIT
C3	KIP(OG)	680.05	679.07	679.05	2.00	1.00	375	1.8m LINTEL	900x400	C	KERB INLET PIT
C4	KIP(OG)	680.45	679.52	679.37	3.50	1.08	375	1.8m LINTEL	900x400	C	KERB INLET PIT
			679.45								
C5	SDP	680.83	679.93	679.86	4.80	0.97	300	900x900	900x900	C	GRATED COVER
C6	SDP	681.28	680.47	680.45	2.30	0.83	225	900x900	900x900	C	GRATED COVER
C7	JP	681.45		680.55	1.00	0.90	225	600X600	SEALED	C	SEALED COVER
D1	DDP	681.00	680.04	680.02	3.60	0.98	225	900x900	900x900	C	DISH DRAIN PIT
D2	DDP	681.58		680.75	3.10	0.83	225	900x900	900x900	C	DISH DRAIN PIT