NORTHROP

MULTIDISCIPLINARY

Lederer Marketplace Gosford

Engineering Due Diligence Investigation Report

136-146 & 148 Donnison Street, Gosford NSW 2250

PREPARED FOR
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Engineering Due Diligence Investigation Report

Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
08.07.19	1	Preliminary	R. Suckling	D.Holland
12.07.19	A	Final	R. Suckling	D.Holland

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1. Introduction

1.1 Intent & Information

Northrop Consulting Engineers have been engaged to provide engineering due diligence advice for the services & infrastructure for the proposed Lederer Marketplace Development at 136-146 & 148, Donnison Street, Gosford.

The purpose of this investigation is to highlight opportunities, constraints and risks for the proposed development, with a focus on the assessment of the existing services and utilities in response to the SEARs letter prepared by the NSW Planning & Environment department dated 1/2/19. This advice has specifically been prepared to address items 9, 10, 11 and 20 of the SEARs letter.

The information and comments provided herein are based on information provided by Lederer Group, which included a selection of concept architectural plans prepared by Buchan, detailed site survey and concept landscape packages prepared by Arcadia.

We have used the above combined with information obtained from:

- Dial Before You Dig (DBYD);
- Google Maps and Street Viewer; and
- Central Coast Council representatives and development guidelines.

We note the information contained within this report is not intended to present detailed solutions but rather provide solutions commensurate with a conceptual investigation suitable for due diligence assessment by Lederer Group for submission to NSW Planning & Environment. Further investigation and development of detailed design would need to be undertaken to confirm the recommendations and findings of this report.

1.2 Limitations and Exclusions

The limitations and exclusions of this report are as follows:

- The following assessment is based upon Dial Before You Dig documentation and will be confirmed with relevant authorities upon application submission.
- The calculations found in this report are based on our assumptions regarding general requirements for the site based on prior experience and application of relevant Australian Standards.

1.3 Site Description

The subject site consisting of Lot 1, DP540292 and Lot 6, DP598833 is bounded by Henry Parry Drive to the west, William Street to the north, Albany Street to the east and Donnison Street to the south. The site topography is sloping nature with levels ranging on the site from RL21.05 in the east to RL8.75 in the west.

An existing multi-story carparking facility and commercial tenancies currently occupy the site. Figure 1 presents an aerial overview of the site in its current state.

Figure 1 - Site Aerial Image - Obtained from maps.six.nsw.gov.au

1.4 Proposed Development

The proposed development consists of 5 stages with each stage consisting of an individual high-rise tower. The redevelopment includes;

- 5 residential high-rise buildings with a total of 780 units.
- 5 levels of shared basement carparking with a total of 1059 parking spaces.
- 2,375 m^2 of retail and commercial space.
- Common tower and podium areas.

2. Water Cycle Management

2.1 General Strategy

The proposed development will need to meet the design intent for water cycle management as outlined in Section 6.7 of Central Coast Councils Development Control Plan (Gosford). A water cycle management strategy will be required to address the following items:

- Existing Stormwater Infrastructure
- Water Conservation
- Stormwater Retention
- Stormwater Quality
- On-site Detention
- Local Overland Drainage
- Flooding

2.2 Existing Stormwater Infrastructure

Information obtained from DYBD drawings provided by Central Coast Council indicate that existing stormwater drainage is located along Donnison Street & Henry Parry Drive & partially along William Street. The DYBD drawings can be found in Appendix A.

The surrounding drainage lines drain towards the low point in Henry Parry Drive located approximately in the centre of the western boundary of the subject site. The stormwater drainage is then conveyed via a series of below ground drainage culverts. It is anticipated that the stormwater runoff generated on-site will be conveyed to the stormwater system located within Henry Parry Drive. Localised catchments may be directed to the Donnison & William street frontages; however, this will need further detailed assessment to determine the existing capacity of the street drainage system.

In addition to the drainage assets located within the road reserves, an additional drainage line traverses through the centre site from the south-western corner of 37 William St to the street drainage located in Henry Parry Drive of the site via a drainage easement as noted on the detailed site survey. The existing pipe sizes range from dia. 750mm to 900mm according to the information contained within the DBYD drawings, an extract of which is shown in Figure 2.

Figure 2 – Extract from DBYD Drawing provided by Central Coast Council

As the proposed development includes basement levels, the lowest of which is at a level of RL7.00m it is highly unlikely that the existing easement can be traversed within the new development. This is due to a number of constraints including; practicality, maintenance, penetrations through basement shoring walls and approval from Central Coast Council.

There are two possible design options that may be considered for this development. The first option would require alteration to the floor level and layout of the basement such that the lowest basement level is located above the existing drainage infrastructure. As the exact levels of the stormwater system is currently unknown, the ground floor level of the existing structure is a reasonable estimate of a suitable floor level that would avoid the existing services. It is anticipated this option will have significant implications on the proposed development, and as such we proposed the second option as a more feasible alternative.

The second option will involve diverting the stormwater drainage around the site via a new drainage line located along William Street connecting to the existing drainage line within Henry Parry Drive. The existing drainage line in Henry Parry Drive will need to be assessed for its capacity, but it is anticipated that this stormwater line will need to be upgraded to accommodate the increased flow rate. A plan of the proposed diversion can be seen in Appendix B.

The diversion of the stormwater line (and potentially sewer diversion as discussed in Section 3.2) will require alteration to the layout of the basement. The shoring wall for the basement will need to be offset from the boundary to provide adequate clearance for the drainage easement. Due to the proximity of the neighbouring structure, there is a risk of undermining the existing footings or retaining structures. A second shoring wall may be required to be constructed to allow for trenching of services located between the basement wall and the boundary.

The basement wall will need to be offset from the boundary by approximately 5m for the extent of the drainage easement. The exact spatial requirements are subject to change pending further investigation and detailed design.

2.3 Water Conservation

The water conservation objective for the development is to reduce potable water demand by 40%. The redevelopment will incorporate the following water saving measures:

- Using AAA+ efficient taps, hoses and fittings and undertaking regular maintenance of these fixtures;
- The use of 4.5/3 duel flush toilet cisterns;
- Providing water efficient washing machines and dishwashers;
- Landscaping with plant species that require minimal watering and irrigation with appropriate systems to minimise water loss and evaporation. This includes native plant species, using mulch around garden beds, avoiding watering when it's windy, watering during the coolest parts of the day and using drip irrigation;
- Harvested rainwater from the roof of the new buildings is proposed to be collected and reused for toilet flushing, irrigation of landscaping areas, carwash water supply and hardstand wash down.

It is our opinion that the measures outlined above will provide adequate reduction in potable demand to meet the intent of the water conservation target. The development will also be subject to satisfy BASIX commitments to meet water conservation targets.

2.4 Stormwater Retention

Runoff from the roof areas will be captured and harvested by a system of reuse tanks. This process involves the collection, storage and re-use of rainwater from the roof areas of the development for internal and external uses. This may be provided by individual tanks to capture and supply reuse for each tower or via a centralised tank system to capture and supply reuse water for the entire development.

For this type of development, harvested rainwater is typically intended to be used for toilet flushing, washdown of hardstand areas, carwash water supply and irrigation of landscaped areas.

The stormwater retention volume (SRV) has been determined in accordance with Section 6.7.7.2.4 of Chapter 6.7 of Central Coast Council DCP (Gosford, 2013).

The SRV calculation is shown below:

$$SRV = 0.01 \times A \times (0.02 \times F)^2$$

where: *SRV* = *stormwater retention volume (m^3)*

A = *site area (m^2)**

F = *fraction impervious (%)*

$$= 0.01 \times 14\,125 \times (0.02 \times 90)^2$$

$$= 458\ m^3$$

Utilising this method of sizing, a total reuse volume of 458 m^3 is required to be provided for the development. In our experience with similar projects, it is often impractical to provide this volume in a feasible solution, as adequate draw down and reuse efficiency are typically not achieved.

As the design progresses, further consultation with Central Coast Council is required to provide an alternative solution that will meet the design intent of the DCP targets in a more practical approach. This revised volume will be based on a number of contributing factors including; sizing based off providing a mitigation depth volume and a water balance analysis to determine water reuse demand and efficiency.

The minimum sizing of the rainwater reuse tanks is subject to BASIX commitments & approval from Central Coast Council.

2.5 Stormwater Quality

In order to minimise any adverse impacts upon the ecology of downstream watercourses, stormwater treatment devices will need to be incorporated into the design of the development. The adopted nutrient and pollution targets will need to meet the requirements from the Central Coast Council (Gosford) Engineering Guidelines which are summarised in Table 1.

Table 1 – Required Water Nutrient and Pollution Reductions

Pollutant Criteria	Required Reduction Target (%)
Total Suspended Solids (TSS)	80
Total Phosphorous (TP)	45
Total Nitrogen (TN)	45
Gross Pollutants	90

For this type of development, typically proprietary stormwater quality improvement devices (SQIDs) are provided at the stormwater outlet prior to discharge offsite. These proprietary devices can be incorporated within detention tanks or installed as separate proprietary units. The selection of the most appropriate device will be considered in terms of practical constraints, maintenance, operability and aesthetics during later design stages.

2.6 On-Site Detention

In accordance with Central Coast Council Civil Design Guidelines, on-site detention will be required to limit post-development flows from the proposed development site to less than or equal to pre-development flows for all storm events up to and including the 1% AEP storm event.

Preliminary calculations indicate that a total detention volume in the order of 300m^3 will be required. The exact volume will be determined during later design stages by conducting hydraulic modelling of the drainage system considering the design parameters of the detention tank and the final development layout.

The OSD volume can be provided by a single common tank with appropriate outlet controls or via multiple detention tanks located throughout the development. The outlet for each detention tank will be directed towards the existing stormwater infrastructure in Henry Parry Drive.

2.7 Local Overland Drainage

Local overland flow paths will need to be provided with the site to convey surface flows towards the road frontages. The likely stormwater diversion and easement as discussed in Section 2.2 will need to be designed to convey surface runoff for up to the 1% AEP storm events.

Additional flow paths will be required within the development to direct surface runoff from the common areas towards the road frontages in the event of pipe blockages or surcharge of the drainage system. Maximum ponding depths and velocity-depth products will be calculated to ensure safe flow routes for extreme design storm events. The surrounding levels will also be designed to ensure adequate freeboard is provided to retail tenancies and residential lobby entries.

2.8 Flooding

A review of Central Coast Councils online flood mapping indicate that the site is not subject to flooding. Figure 3 presents an overview of the 1% AEP flood extents obtained from Council's online mapping system.

Figure 3 – 1% AEP Flood Extents

It is noted that there are flooding extents within the road reserves adjacent to the site. This will likely result in restrictions to minimum floor levels of ground floor tenancies and driveway entry levels to the lower basements.

3. Hydraulic Services

3.1 Existing Hydraulic Infrastructure

3.1.1 Central Coast Council Sewer Infrastructure

The development has access to the following Central Coast Council sewer mains:

- DN 150 Vitrified Clay (VC) sewer main located within William Street;
- DN 150 Vitrified Clay (VC) sewer main located within Henry Parry Drive;
- DN 150 Vitrified Clay (VC) sewer main traversing the approximate centre of the site;
- DN 150 Polyethylene (PE) sewer main within Donnison Street.

3.1.2 Central Coast Council Potable Water Infrastructure

The development has access to the following Central Coast Council potable water mains:

- DN 375 (MSCL) water main located within William Street. Note: this is a trunk water main and is unlikely to be able to be used to service the development;
- DN 100 Cast Iron Cement Lined (CICL) water main located within William Street;
- DN 150 Cast Iron Cement Lined (CICL) water main located within Albany Street North;
- DN 150 Cast Iron Cement Lined (CICL) water main located within Donnison Street.

3.1.3 Jemena Natural Gas Infrastructure

The development has access to the following Jemena natural gas mains:

- DN 160 Polyethylene 210kPa natural gas main located within Henry Parry Drive.

3.2 Proposed Servicing Strategy

Northrop has performed desktop investigations with regards to the additional loading from the proposed development onto the existing utility infrastructure available for connection to the site. The subject land is capable of being serviced through augmentation and amplification of the existing infrastructure subject to authority approval.

3.2.1 Sewer Infrastructure

3.2.1.1 Sewage Generation

Preliminary sewage generation rates have been estimated in accordance with the Sewerage Code of Australia, WSA-02-2002 (2009) and are presented in Table 2.

Table 2 – Sewage Generation Estimates for Residential Housing

Lot Yield	EP[1]	ADWF (kL/d)[2]	ADWF (L/s)[3]	PDWF 'd' Factor[4]	PDWF (L/s)[5]
780	2,340	421.20	0.0021	2	9.75

Notes:
1. Based on 3.0 EP / ET.
2. Average Dry Weather Flow (ADWF) based on 180 L/EP/day.
3. Based on 0.0021 L/s / EP.
4. Peak Dry Weather Flow (PDWF) from Figure B.1 of SW ed. WSA 02-2002-2.2.
5. ADWF x d Factor.

Table 3 presents a summary of the EP capacity for reticulation sewers.

Table 3 – EP Capacity Limitations for Reticulation Sewers

Pipe Size (DN)	Maximum Allowable EP
150	600
225	1,600
300	3,200

3.2.1.2 Site Servicing

Based on the combined estimated Equivalent Population (EP) loading for the development, the existing DN 150 Central Coast Council sewer mains located within close proximity of the site are unlikely to be able to service the development with only a single connection to the property due to the estimated sewerage generation rates exceeding the capacity of a DN150 sewer main.

There are a number of sewer servicing options that are considered feasible for the development some of which may be required to be combined pending further assessment during detailed design which include:

- service the development through multiple sewer connections to multiple sewer mains;
- upgrade the capacity of the existing sewer main;
- provide on-site temporary storage for peak demand (morning and evening).

Detailed assessments of these options and confirmation of feasibility will be subject to Central Coast Council's assessment and approval through a Section 307 application.

3.2.1.3 Sewer Augmentation

An existing sewer main traverses the site from 37 William Street to Henry Parry Drive. The proposed basement level of RL7.00m will conflict with this existing sewer based on long section information provided by Central Coast Council. The sewer long section information can be found within Appendix A. There are three approaches that may be adopted for this development.

The first option would be to modify the basement layout such that the services are located below the basement slab. Based on current sewer levels obtained from long sections provided by Council this would be approximately RL10.50. This is assuming the stormwater diversion as discussed in section 2.2 is constructed. If the stormwater diversion is not constructed, the basement level would need to be adjusted to suit the stormwater service, the depth of which is unknown. As the levels of the stormwater system are unknown at this stage, the recommendation for the lowest basement level would be to match the floor level of the existing building.

The second option involves traversing the sewer main through the basement within the site. Whilst this option has been adopted on previous sites, it is often difficult to obtain approval from Council for this strategy. This option is likely to significantly compromise on the basement layout & associated structure to maintain the grades, clearances & access requirements for the sewer service.

The third option involves diverting the sewer line around the basement excavation via William Street similar to the proposed stormwater diversions as discussed in Section 2.2.

The information obtained from the sewer long sections indicates that there is likely to be adequate fall to accommodate the additional pipe length as a result of the diversion. However, this does not factor in potential clashes with existing services.

In accordance with Central Coast Councils Building Over or Near Council Sewer and Water Mains guidelines, minimum clearance profiles to obstructions above and surrounding new manhole locations will need to be implemented. A summary of the clearance requirements can be found in Appendix C.

It is recommended that more detailed services information is obtained, including CCTV & potholing to locate the size and depth of all in-ground services potentially affected by the sewer diversion alignment. This will confirm the feasibility of the proposed diversion and assist in developing a detailed design solution at later stages of the project.

3.2.2 Potable Water Infrastructure

3.2.2.1 Potable Water Demand

Preliminary water demand rates have been estimated in accordance with the Water Supply Code of Australia, WSA 03-2011-3.1 (2012) and are summarised in Table 4.

Table 4 – Potable Water Demand Estimates for Residential Housing

Dwellings	PDD (kL/d)[1]	ADD (kL/d)[2]	PSD (L/s)[3]
780	624	328.42	36.12

Notes:
1. Peak Day Demand (PDD) based on > 0.8 kL/dwelling/d for multi-storey > 140 dwellings/net Ha (Table 2.1 SW ed. WSA 03-2011-3.1).
2. Average Day Demand (ADD) based on Max day/Ave day = 1.9.
3. Probable Simultaneous Demand (PSD) based on Table 3.2.3 AS/NZS 3500.1.

3.2.2.2 Site Servicing

Based on the combined estimated Equivalent Population (EP) loading for the development, the existing water mains available for connection to the site do not meet the minimum size required to service the proposed development. Due to the height of a number of the proposed buildings being equal to or greater than 8 stories, a minimum water main size of DN 200 is required to service the development.

An extract from the Water Supply Code of Australia has been provided as shown in Figure 4 to inform the minimum water main size required against a building's rise in stories:

MINIMUM PIPE SIZES FOR PARTICULAR DEVELOPMENTS

ZONING/DEVELOPMENT	MINIMUM PIPE SIZE (DN)	
	Cast iron outside diameter series	ISO series[3]
Low and medium density residential	100 [1]	125 [1]
High density residential (≥ 4 storeys)	150	180
Multiple developments of high density residential (≥ 8 storeys)	200 or 225 [2]	250 or 280 [2]
Industrial and commercial	150	180

Figure 4 – Minimum Pipe Sizes – Extract from WSA 03

There is an existing DN 375 trunk water main located with Henry Parry Drive which may be utilised to facilitate an amplification of the existing DN 100 water main within William Street or the DN 150 water main within Donnison Street to DN 200. Confirmation on the feasibility and extent of any proposed upgrade works to Central Coast Council's infrastructure will be subject to Central Coast Council's assessment and approval through a Section 307 application.

3.2.3 Natural Gas Infrastructure

The existing natural gas mains in close proximity to the site appear to be of an adequate size and pressure to service the proposed development, however, it is possible that these mains are currently at peak capacity and are unable to cater for additional loading without an increase in pipe size.

Final determination of any upgrade works required will be subject to an assessment by Jemena through a connection application process via their online portal, once site demands have been finalised.

4. Electrical Services

4.1 Existing Electrical Infrastructure

4.1.1 Energy Authority High Voltage Infrastructure

The Energy Authority currently serving the site is Ausgrid. Figure 5 presents the existing Ausgrid assets within the vicinity of the subject site.

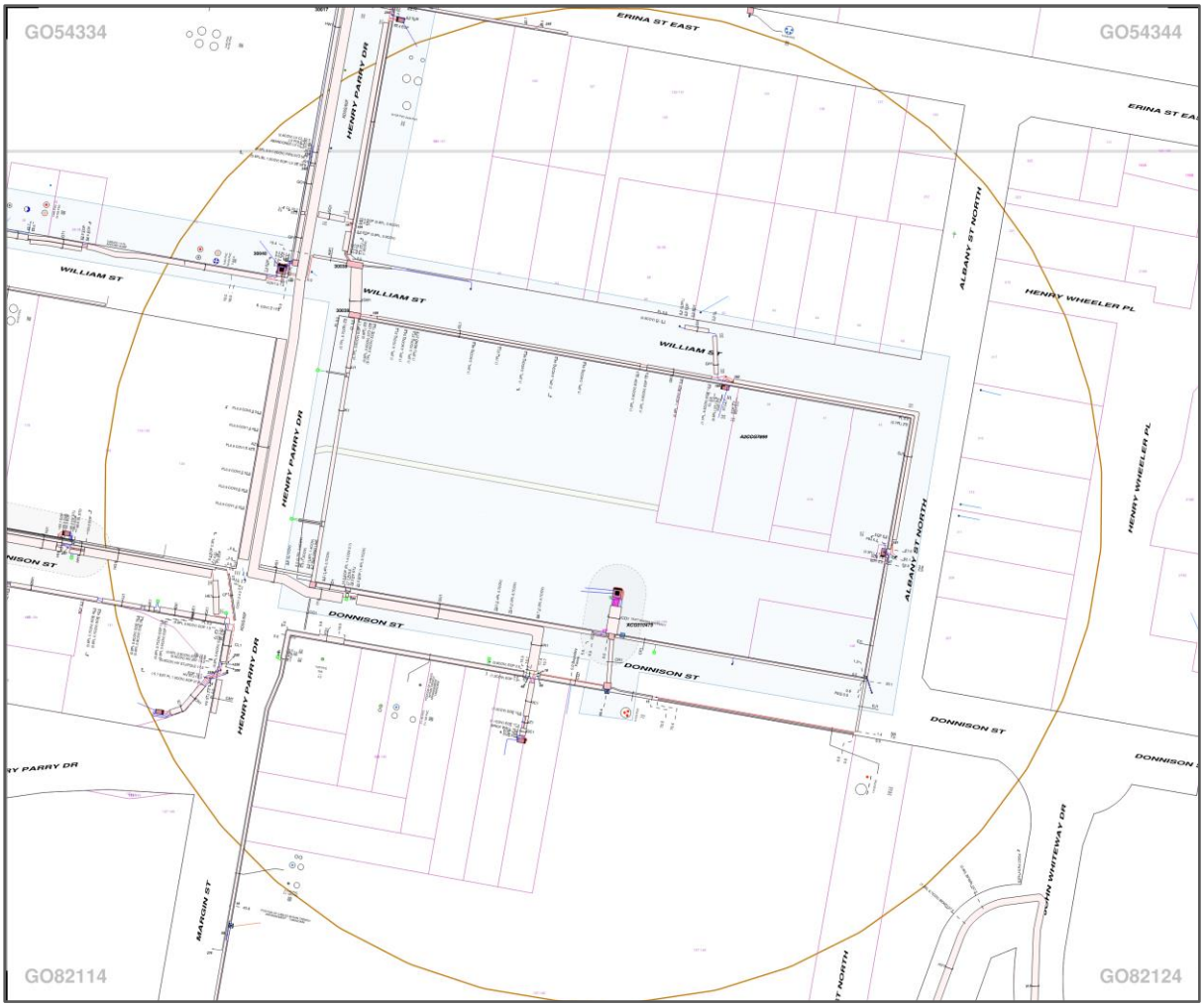


Figure 5 – Existing Ausgrid Assets Surrounding the Site

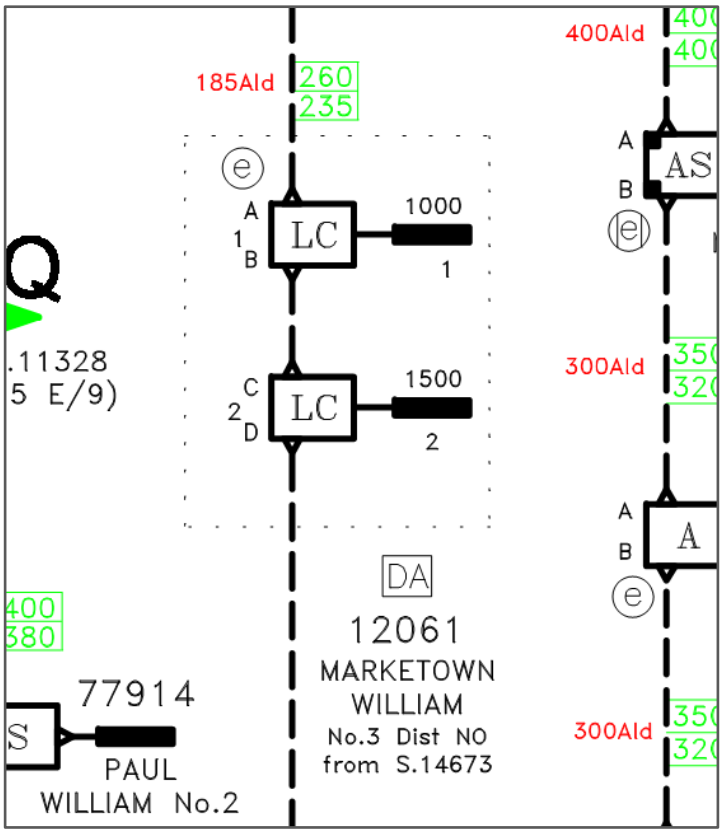


Figure 6 – Existing Ausgrid Assets Surrounding the Site

Figure 6 presents an extract from Ausgrid GIS maps and system diagrams. The site is currently provided with a chamber substation with two transformers serving the existing buildings and back into the street.

The feeder (#21) contains four (4) other transformers in addition to the duplex chamber. Based on desktop review of the other transformers, the current load is relatively low when compared to the total capacity of an 11kV feeder (6,000kVA). It is likely that the feeder will not need to be upgraded to accommodate the new transformers to serve the development, with any existing services from the street network currently fed from S12061 to be migrated to the new transformers. Due to this, and the maximum demand calculated (refer to 4.2.2 for more detail) it is likely the 3x1500kVA transformers in a chamber arrangement will be required, subject to the context of the assessment at the time of connection application submission.

4.1.2 Communications System

Currently, nbn™ is serviceable and infrastructure is available the area as shown in Figure 7. The planned technology is Fixed Line. Fixed-line connections run a physical line directly to the property. The connection technology used will be Fibre to the Premises (FTTP) as indicated on NBN's website.

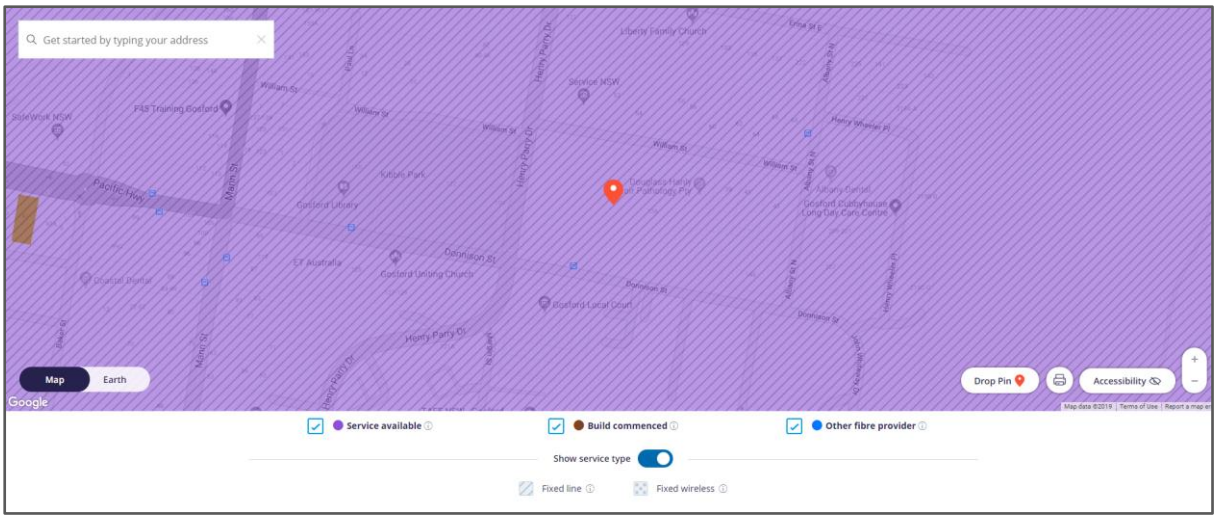


Figure 7 – NBN Availability

An authority application will need to be submitted to get the estimate of works. The works required to enable connection & servicing for the subject site would include, but not be limited to; trenching, cabling and establishing a new telecommunication connection in the site.

4.2 Concept Plan

This section of the report discusses the possible infrastructure of electrical services required in accordance with the concept design and corresponding phasing of the project.

4.2.1 Authority Input

The exact transformer type will selected by the ASP3 designer and Ausgrid requirements at the time of design development.

4.2.2 Electrical Maximum Demand

Estimates based on Table C1, C2 and C3 of AS/NZS 3000:2018, would indicate a maximum demand of approximately 4797A/Phase at 3500kVA for the entire site. The maximum demand calculated for the individual towers are summarised as follows:

- Tower 1 – 887A/Ph
- Tower 2 – 887A/Ph
- Tower 3 – 796A/Ph
- Tower 4 – 953 A/Ph
- Tower 5 – 975A/Ph
- Common Areas – 295A/Ph

Assumptions made for the purpose of maximum demand calculation:

- Air conditioning was included for all units;
- A provision for three lifts per tower has been included;
- Power for a centralised water heater system was provided per tower.

Break up of maximum demand calculations for individual towers according to the masterplan can be found in Appendix E.

4.2.3 Staging of Substations

Subject to advice from Ausgrid's assessment, requirements for staging of substations will need to be determined during ASP3 design at commencement of the project.

Due to the existing services present feeding back into the street it is likely that all substations will need to be constructed at once to enable changeover of services. With supply to other sites being required to be kept energized, there will be an Ausgrid consultation to determine a strategy for migration of these services during initial ASP3 commencement.

4.3 Electrical Services Summary

The current infrastructure can sustain the proposed development with reconfiguration of the existing services able to be managed via programming and timing of works in consultation with the relevant authorities.

The bulk electrical load of the surrounding network is supplied via other 11kV feeders and as such, the existing load on the feeder is not likely to undergo significant increase in the near future. The major loads for the suburb are supplied via other feeders with critical loads of the suburb not reliant on the existing infrastructure at the site.

The Infrastructure Provider of Last Resort being nbn™ for the proposed development removes uncertainty regarding requirements and services to be provided for the site. Existing duct and pit/pipe networks will be leveraged to facilitate telecommunication services to the development, with the final technology utilised to be determined by nbn™ policy at the time of commencement.

5. Excavation, Shoring & Ground Conditions

5.1 Excavation Shoring & Retaining

Preliminary concept drawings for the development show basement levels of RL7.00m and RL8.60m below tower 5 adjacent to Albany Street North. Existing levels along Albany Street North range up to RL21.0m AHD which will result in approximately 12.4-12.7m (plus any additional over excavation required) of retaining for the shoring wall.

Due to the extent of retaining that will be required during basement excavation, it is anticipated that a shoring system utilising temporary ground anchors will used for the excavation. The temporary anchors will need to be installed across the boundary of the subject site within the council road reserve & adjacent lots, and as such, approval will need to be obtained to utilise this construction methodology.

Our previous experience on similar projects indicates that there has been difficulty in obtaining approval from Council for the use of temporary ground anchors, with the process being significantly delayed. We recommend consulting with Council as soon as practical to minimise the risk of a delayed approval process or rejection of this construction methodology.

If time is critical or if approval cannot be obtained for the use of temporary ground anchors, an internal propping construction methodology may be adopted, however given the site layout we anticipate that this will increase the complexity of construction.

5.2 Ground Conditions

Preliminary advice from the Geotechnical Desktop Study Assessment prepared by Coffey (dated 01/12/15) indicates that a shallow ground water may be present within 2m below surface levels. The expected inflow rates are anticipated to be relatively low for the upper clayey soil profiles but significantly higher if the excavation intercepts the sandy layers present deep within the assumed soil profile.

It is anticipated that the basement may be design as a ‘drained’ structure, however this will be dependant on additional geotechnical investigations. Additional geotechnical assessments will be required to accurately assess the potential ground water inflows & impacts of the basement on the surrounding groundwater table.

Additional testing will also be required to assess the quality/chemistry of groundwater inflow to determine the appropriate treatment & disposal method to sewer or stormwater as appropriate. This testing will be required regardless of if the basement is ‘drained’ or ‘tanked’ as temporary dewatering will still be required to enable excavation & basement construction.

Consultation with relevant government agencies will also need to occur to determine and obtain any approvals/license for dewatering. Pending further ground water investigations, it is expected a dewatering licence will be required for the short-term construction period and possibly the long-term disposal should a drained basement be constructed.

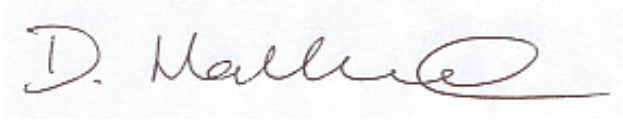
6. Conclusion

An engineering due diligence investigation was undertaken in relation to the civil, hydraulic and electrical services & utilities outlining the risks, constraints and opportunities for the proposed development at 136-146 & 148 Donnison Street, Gosford. This advice has been prepared in response to the SEARs letter prepared by the NSW Planning & Environment department dated 1/2/19. This advice has specifically addressed items 9, 10, 11 and 20 of the SEARs letter.

As part of the assessment, preliminary calculations & advice were prepared based on the concept masterplan design and the information contained within this report will enable future discussions with the relevant service authority.

As the project design in progressed, it is recommended that further consultation with the relevant agencies is undertaken to confirm the capacity of the existing services as discussed within this report and confirm any upgrades required to facilitate the development. The advice obtained from consultation with the service authorities will minimise the risk of design changes occurring at a later stage of the project.

We trust that this meets your requirements, and should you have any queries, please feel free to contact the undersigned on (02) 4365 1668.



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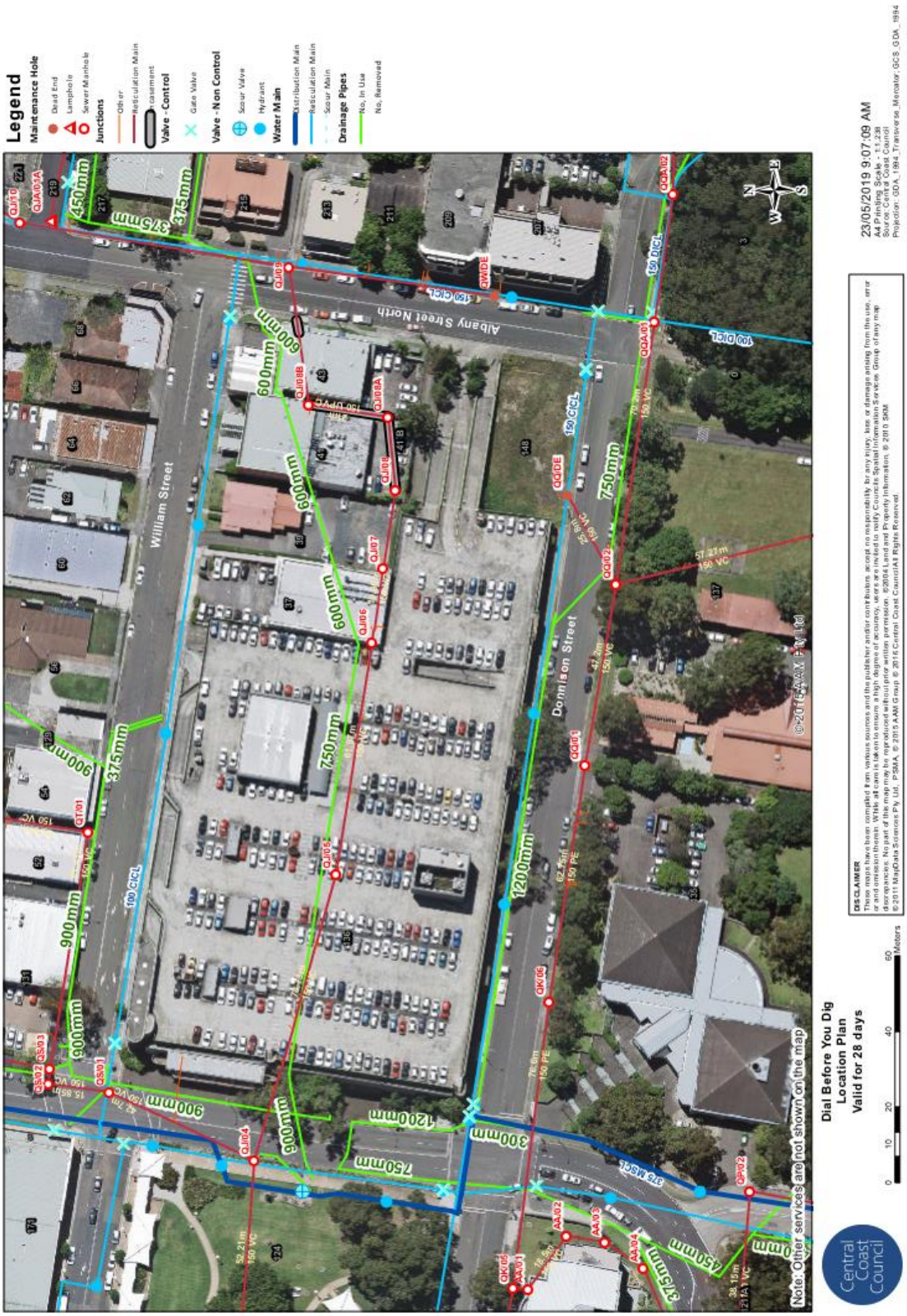
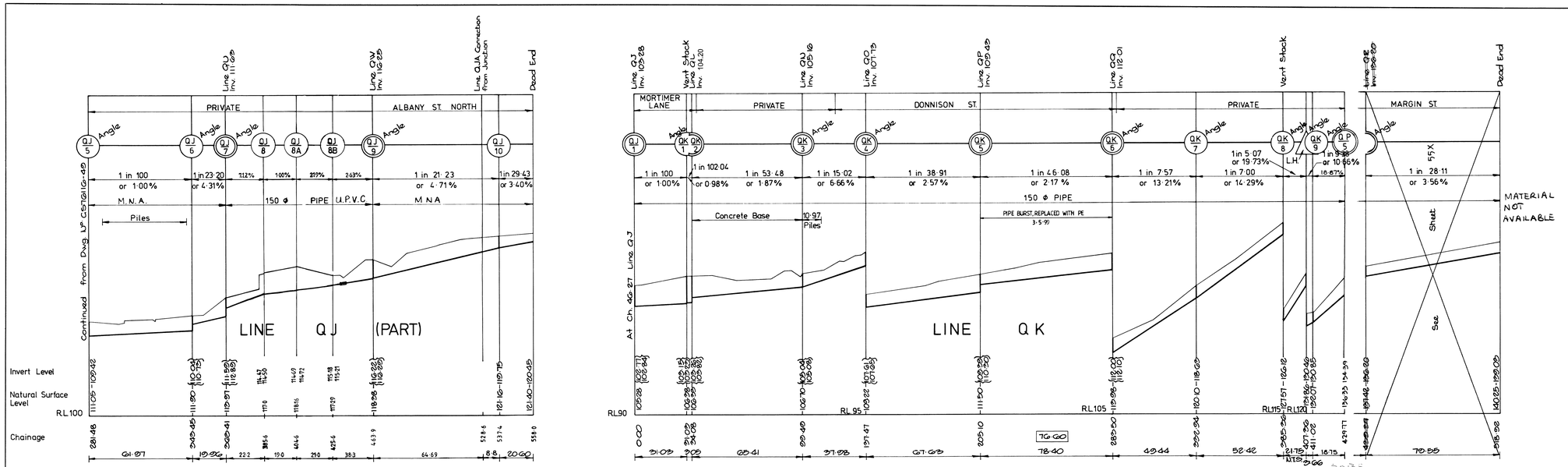
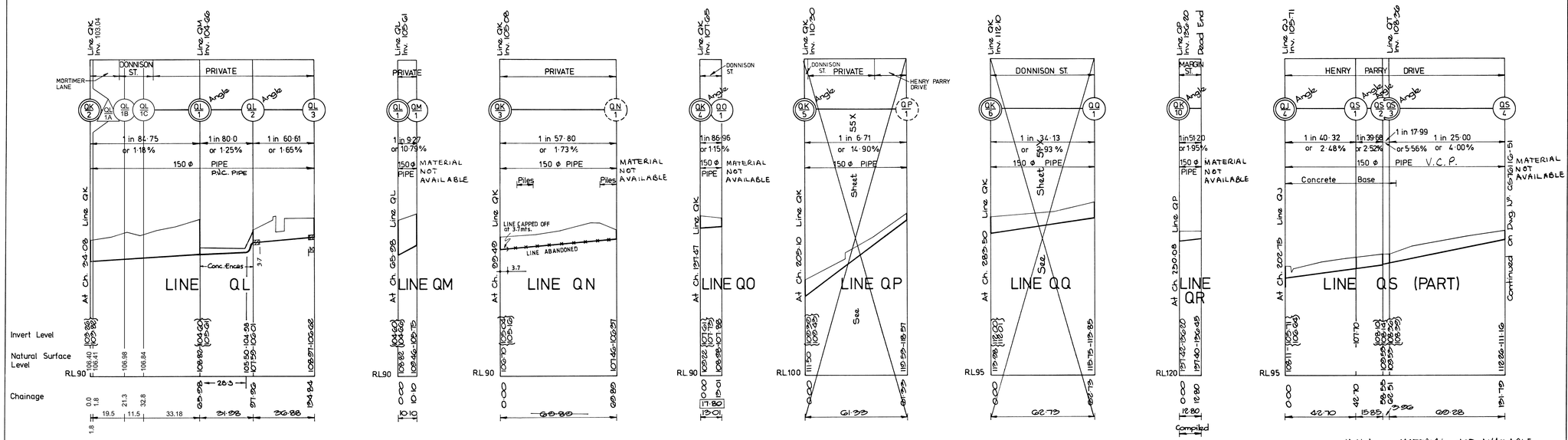
APPENDIX A: DBYD Drawings

A.1 Central Coast Council Infrastructure







VERT. 0 1 2 3 4 5 10 15 20m 1·200

HORIZ. 0 10 20 40 60 80 100m 1·1000

GOSFORD - WYONG REGION DATUM

76·60 Indicates Chainage Measured In Field.

G.N. 1 Manhole Not Found.

WORK AS EXECUTED

THE ORIGINAL WORK AS EXECUTED DRAWINGS SUPPLIED BY GOSFORD SHIRE COUNCIL HAVE BEEN CHECKED, METRICATED AND AMENDED FROM INFORMATION PREVIOUSLY NOT PLOTTED AND FROM ADDITIONAL FIELDWORK SO THAT THIS DRAWING REPRESENTS THE WORK AS EXECUTED.

A.K. Rauch 16-2-77

ALL LEVELS ARE IN METRES.
ALL OTHER DIMENSIONS ARE IN METRES
UNLESS STATED OTHERWISE

M.N.A. — MATERIAL NOT AVAILABLE

NO.	DETAILS OF AMENDMENTS	APPROVED	DATE

DEPARTMENT OF PUBLIC WORKS N.S.W.
W.K. PILZ DIRECTOR OF PUBLIC WORKS
W.J. HILTON CHIEF ENGINEER

GOSFORD REGIONAL SEWERAGE

LONGITUDINAL SECTIONS
LINES QJ (PART), QK, QL, QM, QN, QO, ~~QP~~, ~~QQ~~, QR, QS. (PART)

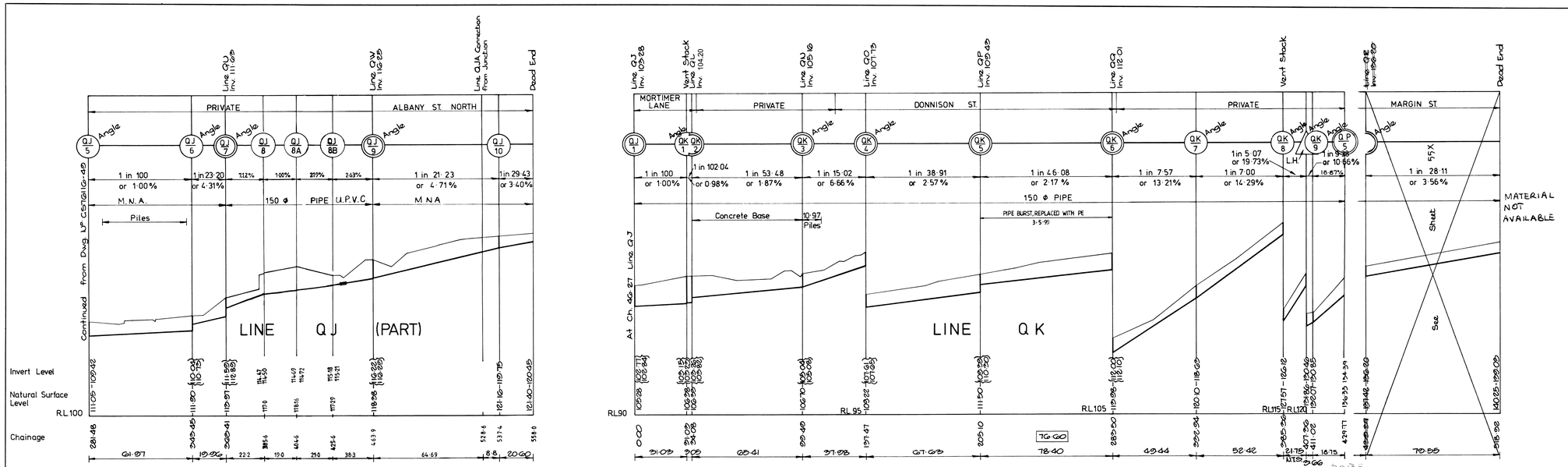
AREA G6/6 GOSFORD

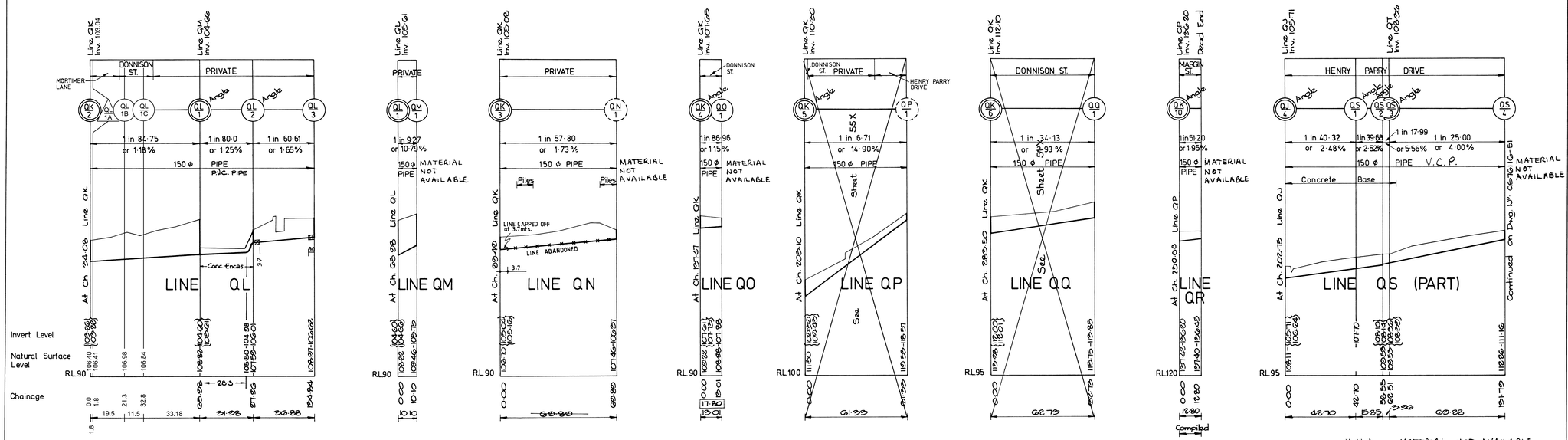
DRAWING GS 76116-50X
FILE SGE/6033/ /

SINCLAIR KNIGHT & PARTNERS PTY LTD
1 CHANDOS STREET ST LEONARDS NSW 2065 AUSTRALIA PH 439-2866

DESIGNED	CHECKED	APPROVED
Y.B.	H.J.M.	
TRACED	No. IN SET	DRAWING
L.C.	64	1780-50

G6/6





VERT. 0 1 2 3 4 5 10 15 20m 1·200

HORIZ. 0 10 20 40 60 80 100m 1·1000

GOSFORD - WYONG REGION DATUM

76·60 Indicates Chainage Measured In Field.

G.N. 1 Manhole Not Found.

WORK AS EXECUTED

THE ORIGINAL WORK AS EXECUTED DRAWINGS SUPPLIED BY GOSFORD SHIRE COUNCIL HAVE BEEN CHECKED, METRICATED AND AMENDED FROM INFORMATION PREVIOUSLY NOT PLOTTED AND FROM ADDITIONAL FIELDWORK SO THAT THIS DRAWING REPRESENTS THE WORK AS EXECUTED.

A.K. Rauch 16-2-77

ALL LEVELS ARE IN METRES.
ALL OTHER DIMENSIONS ARE IN METRES
UNLESS STATED OTHERWISE

M.N.A. — MATERIAL NOT AVAILABLE

NO.	DETAILS OF AMENDMENTS	APPROVED	DATE

DEPARTMENT OF PUBLIC WORKS N.S.W.
W.K. PILZ DIRECTOR OF PUBLIC WORKS
W.J. HILTON CHIEF ENGINEER

GOSFORD REGIONAL SEWERAGE

LONGITUDINAL SECTIONS
LINES QJ (PART), QK, QL, QM, QN, QO, ~~QP~~, ~~QQ~~, QR, QS. (PART)

AREA G6/6 GOSFORD

DRAWING GS 76116-50X
FILE SGE/6033/ /

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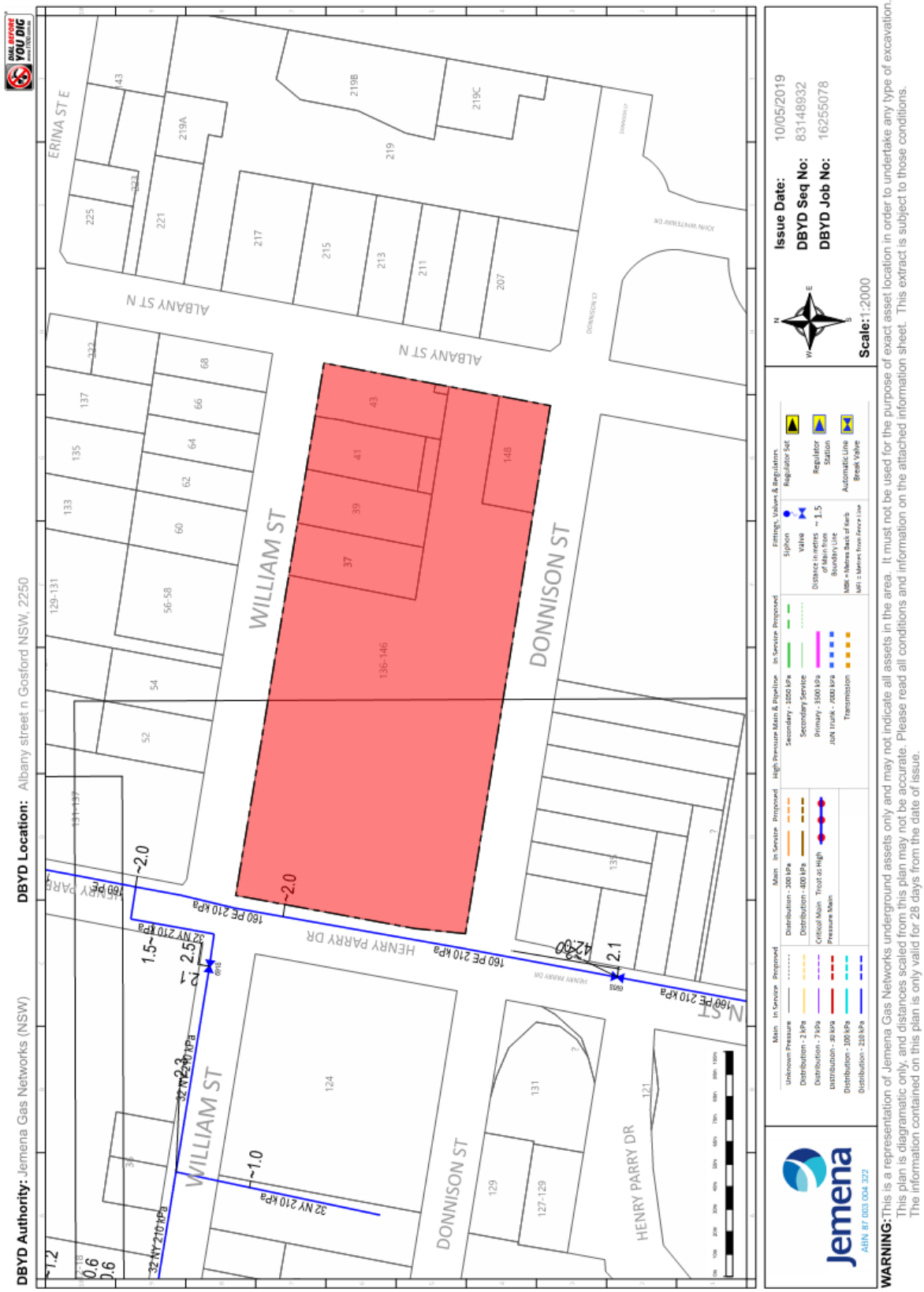
1 CHANDOS STREET ST LEONARDS NSW 2065 AUSTRALIA PH 439-2866

DESIGNED	CHECKED	APPROVED
Y.B.	H.J.M.	
TRACED	No. IN SET	DRAWING
L.C.	64	1780-50

G6/6

A.2 Jemena Infrastructure



A.3 Telecommunication Infrastructure

Figure A.1 – NBN Existing Infrastructure

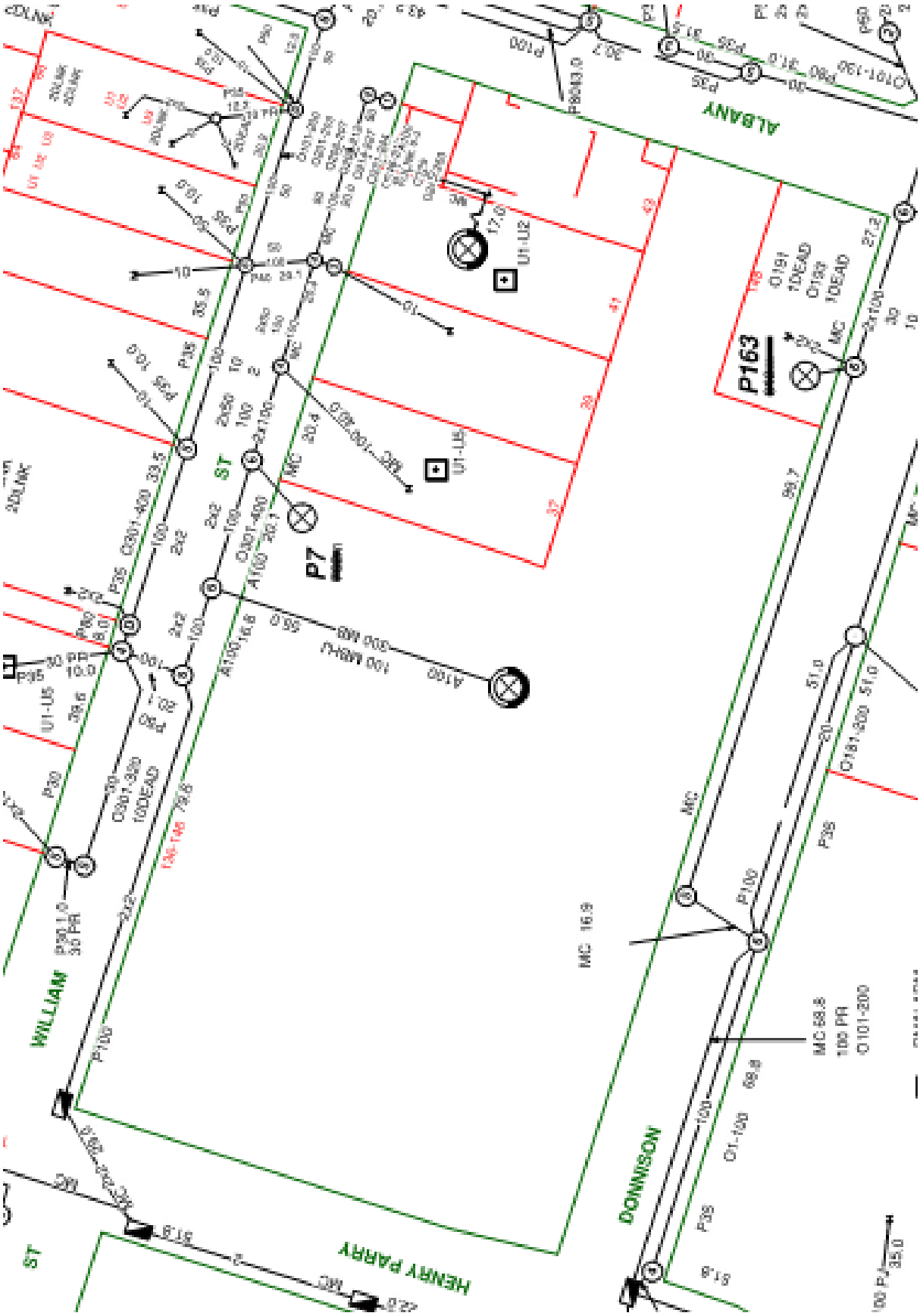


Figure A.2 – Existing Telstra Infrastructure

APPENDIX B: Proposed Stormwater and Sewer Diversion

NOTE:
BOUNDARIES ARE APPROXIMATE ONLY.
THERE HAS BEEN NO INVESTIGATION OF LOT STATUS.
THERE HAS BEEN NO INVESTIGATION OF ROAD WIDENING.

CONNECT TO EXISTING SEWER LINE. ADDITIONAL UPGRADES SEWER MAIN UPGRADES MAY BE REQUIRED.

NOTE: PIPE SIZES SHOWN ARE INDICATIVE AND ARE SUBJECT TO DETAILED DESIGN.

EXACT LOCATION OF SEWER TO BE DETERMINED AT DETAILED DESIGN PHASE

RECONSTRUCT EXISTING KERB INLET PIT.

RECONSTRUCT EXISTING KERB INLET PIT.

CONSTRUCT NEW KERB INLET PIT WITHIN WILLIAM STREET.

UPGRADE EXISTING STORMWATER LINE

DENOTES EXISTING STORMWATER DRAINAGE LINE TO BE RETAINED

EXISTING SEWER TO BE ABANDONED.

INTERCEPT EXISTING STORMWATER LINE AND CONSTRUCT NEW JUNCTION PIT.

EXISTING STORMWATER DRAINAGE LINE & EASEMENT TO BE ABANDONDED.

INTERCEPT EXISTING SEWER LINE AND CONSTRUCT NEW MANHOLE

DENOTES EXISTING SEWER LINE SERVICING UPSTREAM LOTS TO BE RETAINED

WILLIAM STREET

DONNISON STREET

PARRY DRIVE

'PARK PLAZA' MASONRY & GLASS BUILDING

'GOSFORD MARKETPLACE' 2 & 3 STOREY BRICK & MASONRY COMMERCIAL BUILDING

CHRISTIAN SCIENCE CHURCH BRICK BUILDING

SINGLE STOREY MASONRY BUILDING

BRICK & W/BOARD BUILDING

BRICK COTTAGE

2 STOREY MASONRY BUILDING

2 STOREY BRICK BUILDING

BRICK BUILDING

4 STOREY BRICK BUILDING METAL ROOF

WEATHERBOARD BUILDING No. 39 DOUGLASS HANLY MOIR PATHOLOGY

BRICK BUILDING No. 41

SUBSTATION No. 2061

6
DP 598833
(1.337ha)
TOTAL AREA=1.419ha (LOT 6 & LOT 1)

7
DP 6039
SECTION 2

8
DP 6039
SECTION 2

1
DP 53277

1
DP 540292
(822m²)
VACANT

SP 53277

CAUTION
APPROX. LOCATION OF UNDER GROUND POWER CABLES

WARNING
MAJOR TELSTRA & OPTICAL FIBRE CABLES IN VICINITY

CABLING AVAILABLE & APPEARS TO BE WITHIN TELSTRA CONDUITS

NOTE: OPTUS CABLING FRONTS HENRY PARRY DRIVE

PROJECT:	LEADERER MARKETPLACE GOSFORD
JOB NUMBER:	NL191126
TITLE:	CIVIL INFRASTRUCTURE PROPOSAL
PAGE No:	CSK1
DATE:	01/07/19
DRAWN:	ROBERT SUCKLING

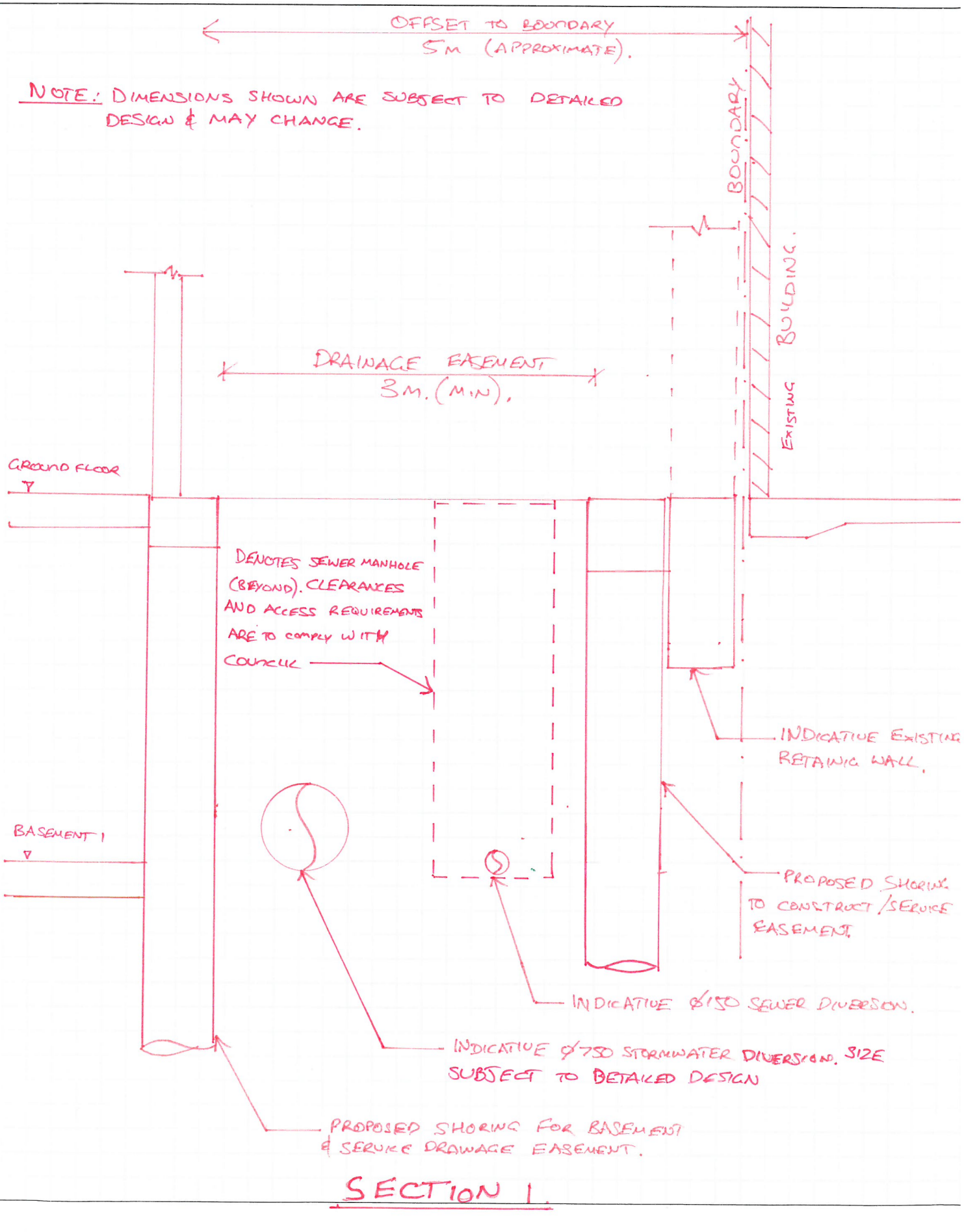
NORTHROP
Central Coast
Suite 4, 257-259 Central Coast Hwy, Erina NSW 2250
Ph (02) 4365 1668 Fax (02) 4367 6555
Email centralcoast@northrop.com.au ABN 81 094 433 100

PROJECT:
LEADERER MARKETOWN
GOSFORD
SECTION 1.

JOB No: NL191126
PAGE No: CSK2
DESIGNED: R.S.
DATE: 01/07/19

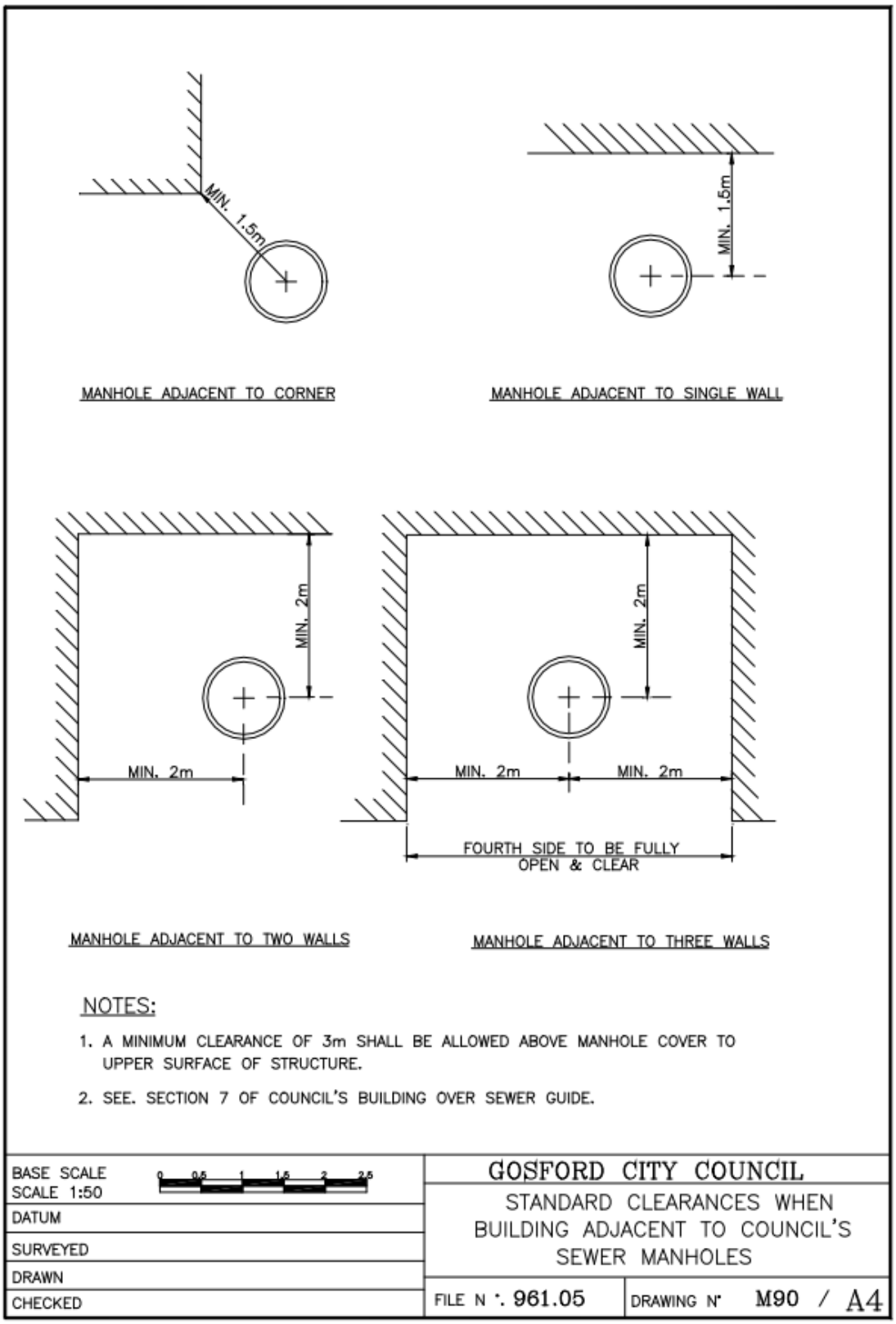
NORTHROP

Northrop Consulting Engineers Pty Ltd ABN 81 094 433 100



SECTION 1.

APPENDIX C: Clearances to Sewer Manholes



APPENDIX D: Ausgrid L-type Kiosk Substation Design Requirements

Ausgrid's requirements must be adhered to by the architect and design team when developing the final location of the substation. Spatial requirements for Ausgrid "L" type kiosk substations are as follows:

- Substation easement size is 5.3m x 3.3m and it has to be open to the sky. No projections over the proposed easement are allowed.
- No utility or other services can exist under the substation easement.
- No water tanks can be located within 5m of the substation.
- Substation housing is required to be minimum 3m away from the neighbouring boundary. (Ausgrid has a general requirement for kiosk substations to be effectively segregated from neighbouring areas and buildings which are subjected to fire risk).
- Any portion of a building other than a BCA class 10a structure constructed from non-combustible materials, which is not sheltered by a non-ignitable blast-resisting barrier and is within 3 metres in any direction from the housing of a kiosk substation, is required to have a Fire Resistance Level (FRL) of not less than 120/120/120 and 2 kPa blast resistance. The structure must be certified by a structural engineer.
- Openable or fixed windows or glass blockwork or similar, irrespective of their fire rating, are not permitted within 3 metres in any direction from the housing of a kiosk substation, unless they are sheltered by a non-ignitable blast resisting barrier.
- Any meter, regulator or exposed pipe work associated with the reticulation of gas which is within 3 metres in any direction from the housing of a kiosk substation and which does not have a Fire Resistance Level of 120/120/120 must be sheltered by a non-ignitable blast resisting barrier.
- A minimum of 6 metres clearance from the substation housing to any openings and ventilation must be allowed for (this includes neighbouring buildings).
- A kiosk substation should be installed at the same level of the footpath. If a retaining structure is required it must be certified by a structural engineer. However, the footing of the retaining structure must not encroach the substation easement.
- Hand rails may be required around the substation easement if the easement is at a higher position than ground level.
- All water must be drained away from the substation easement.
- A substation must be a minimum of 10 metres from the fire hydrant booster. Note: Fire safety regulations also require similar clearance of the fire pump room to the proposed substation (if fire pump room is within 10m of substation, fire authority approval may be required).
- No telecommunications pit (new or existing) can be located within 5 metres of the proposed substation.
- A telecommunications main distribution frame (MDF) is required to be 15 metres away from the substation.
- Kiosk substations should not be installed in an area subject to declared 1 in 100 years (or less) flood.

- 24hrs access with 4 metre right of way for Ausgrid access must be provided. Parking at the frontage of the substation is restricted at all times.
- A 2-metre easement for Ausgrid network cables is required for the cable runs inside private property.
- A 27-ton truck and crane are required to install and remove the kiosk and equipment. The access route to the substation within private premises must be constructed to withstand the load of the truck and crane under all weather conditions.

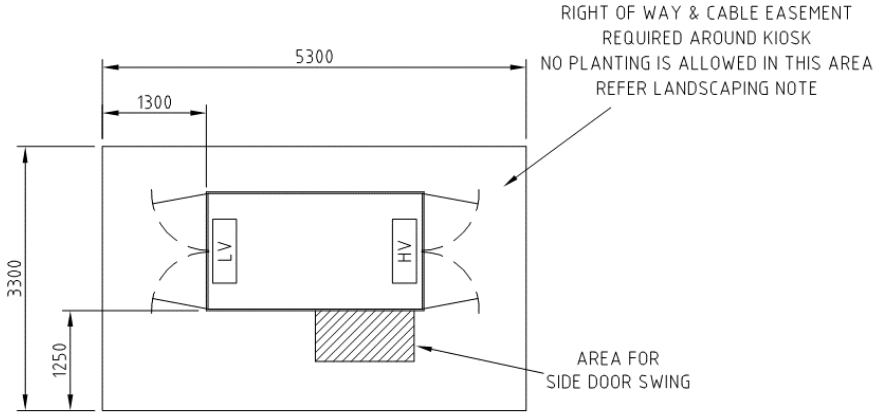


Figure D.1 – Diagram of Ausgrid "L" Type Kiosk Substation Layout

APPENDIX E: Maximum Demand Calculations

DOMESTIC MAXIMUM DEMAND CALCULATION

PROJECT REFERENCE: Tower 1 REVISION: A
PROJECT: Gosford Alive DATE: 30-05-19

CALCULATED IN ACCORDANCE WITH AS/NZS 3000:2018 TABLE C1

Total Number of Units: 152
Number of Units per Phase: 51

Living Units

Load Group	Sub Category	Description		Quantity/ Load	Units (kW, A)	Load (A / Phase)
A.	i)	Internal Lighting				25.5
	ii)	External Lighting				0
B.	i)	10A GPOs				146.9
	ii)	15A GPOs			GPOs	0
	iii)	20A GPOs			GPOs	0
C.		Cooking Appliance			A	143
D.		Air Conditioning Cooling Equipment		2.4	kW	402.6315789
		Air Conditioning Heating Equipment			A	0
E.		Instantaneous Water Heaters	N/A		A	None
F.		Storage Water Heaters	N/A		A	None
G.		Spa & Swimming Pool Heaters	N/A		A	None

Total AS3000 Maximum Demand for All Living Units	717.83 Amps/Phase

Communal Loads

Floor	Sub Location	Description	Area	VA/m2	Load (A / Phase)
					-
Lifts	Table C2	3 Lifts per Tower			150.00
		Centralised Water Heater System			20.00
					-
					-
					-
					-
					-
					-
					-
					-

Total AS3000 Maximum Demand for Communal Areas	170.00 Amps/Phase

Total AS3000 Maximum Demand for Living Units + Communal Areas	887.83 Amps/Phase

Figure E.1 – Tower 1 Max Demand

DOMESTIC MAXIMUM DEMAND CALCULATION

PROJECT REFERENCE: Tower 2
PROJECT: Gosford Alive
REVISION: A
DATE: 30-05-19

CALCULATED IN ACCORDANCE WITH AS/NZS 3000:2018 TABLE C1

Total Number of Units: 152
Number of Units per Phase: 51

Living Units

Load Group	Sub Category	Description		Quantity/ Load	Units (kW, A)	Load (A / Phase)
A.	i)	Internal Lighting				25.5
	ii)	External Lighting				0
B.	i)	10A GPOs				146.9
	ii)	15A GPOs			GPOs	0
	iii)	20A GPOs			GPOs	0
C.		Cooking Appliance			A	143
D.		Air Conditioning Cooling Equipment		2.4	kW	402.6315789
		Air Conditioning Heating Equipment			A	0
E.		Instantaneous Water Heaters	N/A		A	None
F.		Storage Water Heaters	N/A		A	None
G.		Spa & Swimming Pool Heaters	N/A		A	None

Total AS3000 Maximum Demand for All Living Units	717.83 Amps/Phase

Communal Loads

Floor	Sub Location	Description	Area	VA/m2	Load (A / Phase)
					-
Lifts	Table C2	2 Lifts per Tower			150.00
		Centralised Water Heater System			20.00
					-
					-
					-
					-
					-
					-
					-
					-
					-

Total AS3000 Maximum Demand for Communal Areas	170.00 Amps/Phase

Total AS3000 Maximum Demand for Living Units + Communal Areas	887.83 Amps/Phase

Figure E.2 – Tower 2 Max Demand

DOMESTIC MAXIMUM DEMAND CALCULATION

PROJECT REFERENCE: Tower 3 REVISION: A
PROJECT: Gosford Alive DATE: 30-05-19

CALCULATED IN ACCORDANCE WITH AS/NZS 3000:2018 TABLE C1

Total Number of Units: 132
Number of Units per Phase: 44

Living Units

Load Group	Sub Category	Description		Quantity/ Load	Units (kW, A)	Load (A / Phase)
A.	i)	Internal Lighting				22
	ii)	External Lighting				0
B.	i)	10A GPOs				133.6
	ii)	15A GPOs			GPOs	0
	iii)	20A GPOs			GPOs	0
C.		Cooking Appliance			A	123
D.		Air Conditioning Cooling Equipment		2.4	kW	347.3684211
		Air Conditioning Heating Equipment			A	0
E.		Instantaneous Water Heaters	N/A		A	None
F.		Storage Water Heaters	N/A		A	None
G.		Spa & Swimming Pool Heaters	N/A		A	None

Total AS3000 Maximum Demand for All Living Units	626.17 Amps/Phase

Communal Loads

Floor	Sub Location	Description	Area	VA/m2	Load (A / Phase)
					-
Lifts	Table C2	2 Lifts per Tower			150.00
		Centralised Water Heater System			20.00
					-
					-
					-
					-
					-
					-
					-
					-
					-

Total AS3000 Maximum Demand for Communal Areas	170.00 Amps/Phase
Total AS3000 Maximum Demand for Living Units + Communal Areas	796.17 Amps/Phase

Figure E.3 – Tower 3 Max Demand

DOMESTIC MAXIMUM DEMAND CALCULATION

PROJECT REFERENCE: Tower 4
PROJECT: Gosford Alive

REVISION: A
DATE: 30-05-19

CALCULATED IN ACCORDANCE WITH AS/NZS 3000:2018 TABLE C1

Total Number of Units: 166
Number of Units per Phase: 56

Living Units

Load Group	Sub Category	Description		Quantity/ Load	Units (kW, A)	Load (A / Phase)
A.	i)	Internal Lighting				28
	ii)	External Lighting				0
B.	i)	10A GPOs				156.4
	ii)	15A GPOs			GPOs	0
	iii)	20A GPOs			GPOs	0
C.		Cooking Appliance			A	157
D.		Air Conditioning Cooling Equipment		2.4	kW	442.1052632
		Air Conditioning Heating Equipment			A	0
E.		Instantaneous Water Heaters	N/A		A	None
F.		Storage Water Heaters	N/A		A	None
G.		Spa & Swimming Pool Heaters	N/A		A	None

Total AS3000 Maximum Demand for All Living Units	783.31 Amps/Phase

Communal Loads

Floor	Sub Location	Description	Area	VA/m2	Load (A / Phase)
					-
Lifts	Table C2	2 Lifts per Tower			150.00
		Centralised Water Heater System			20.00
					-
					-
					-
					-
					-
					-
					-
					-
					-

Total AS3000 Maximum Demand for Communal Areas	170.00 Amps/Phase

Total AS3000 Maximum Demand for Living Units + Communal Areas	953.31 Amps/Phase

Figure E.4 – Tower 4 Max Demand

DOMESTIC MAXIMUM DEMAND CALCULATION

PROJECT REFERENCE: Tower 5 REVISION: A
PROJECT: Gosford Alive DATE: 30-05-19

CALCULATED IN ACCORDANCE WITH AS/NZS 3000:2018 TABLE C1

Total Number of Units: 179
Number of Units per Phase: 60

Living Units

Load Group	Sub Category	Description		Quantity/ Load	Units (kW, A)	Load (A / Phase)
A.	i)	Internal Lighting				30
	ii)	External Lighting				0
B.	i)	10A GPOs				164
	ii)	15A GPOs			GPOs	0
	iii)	20A GPOs			GPOs	0
C.		Cooking Appliance			A	168
D.		Air Conditioning Cooling Equipment		2.4	kW	473.6842105
		Air Conditioning Heating Equipment			A	0
E.		Instantaneous Water Heaters	N/A		A	None
F.		Storage Water Heaters	N/A		A	None
G.		Spa & Swimming Pool Heaters	N/A		A	None

Total AS3000 Maximum Demand for All Living Units	835.68 Amps/Phase

Communal Loads

Floor	Sub Location	Description	Area	VA/m2	Load (A / Phase)
					-
Lifts	Table C2	2 Lifts per Tower			119.86
		Centralised Water Heater System			20.00
					-
					-
					-
					-
					-
					-
					-
					-
					-

Total AS3000 Maximum Demand for Communal Areas	139.86 Amps/Phase
Total AS3000 Maximum Demand for Living Units + Communal Areas	975.54 Amps/Phase

Figure E.5 – Tower 5 Max Demand

NON-DOMESTIC MAXIMUM DEMAND CALCULATION

Gosford Alive - Towers

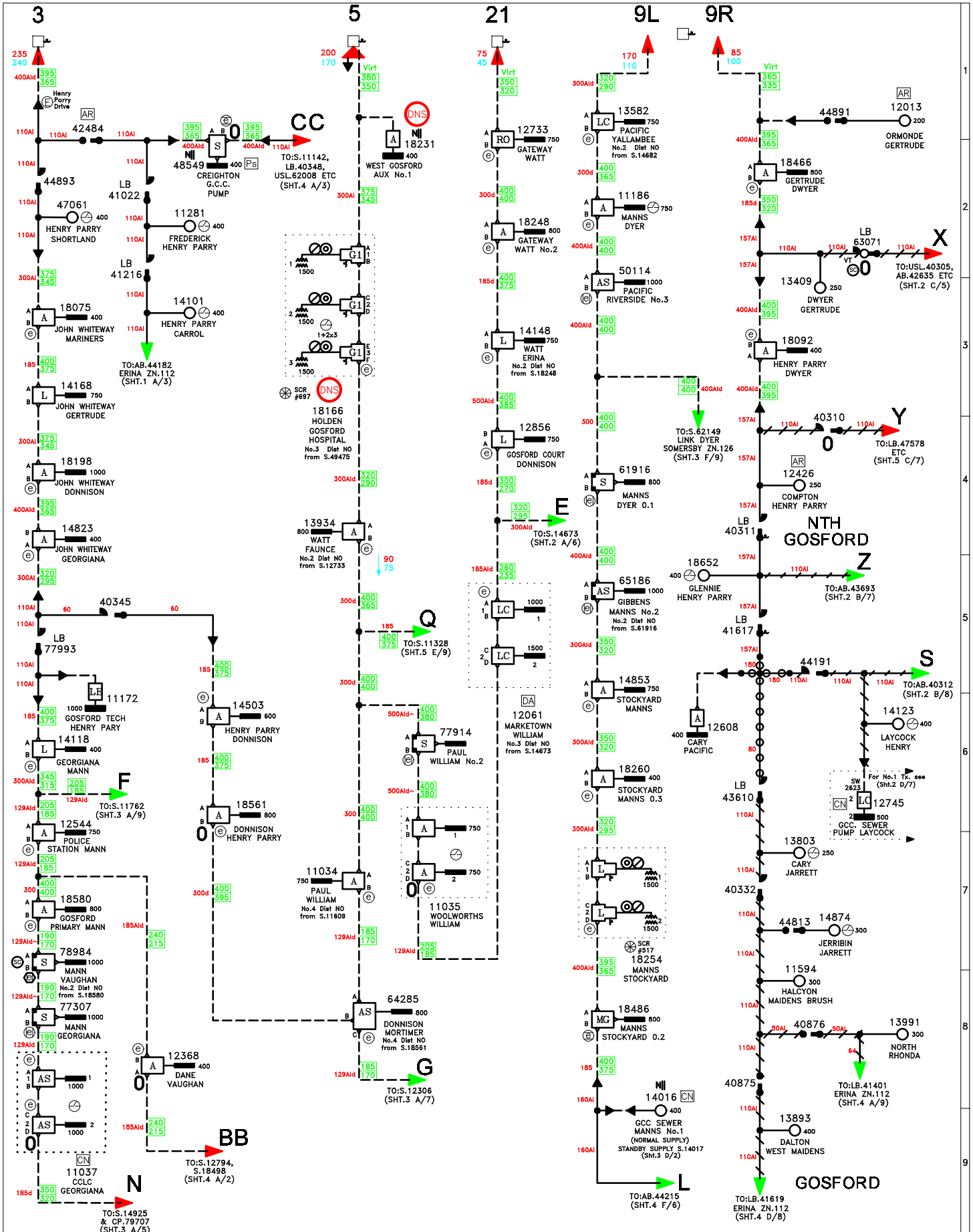
CALCULATION IN ACCORDANCE WITH AS/NZS 3000 - 2007 TABLE C3

Job No:	
Date:	31-05-19 16:36
Scope:	Common Areas and Car Park

Dist. Group	Load Description	Area (m^2)	Load per m^2 (VA)	Load for whole area (VA)	Load (A/Phase)
Towers	Circulation- Corridor	95	15	1425	2.1
Towers	Circulation	285	15	4275	6.2
Towers	Circulation- Lobbies	200	30	6000	8.7
Podium	Retail, Commercial	1235	30	37050	53.5
Podium	Retail, Commercial	1140	30	34200	49.4
Car Park	Car Park	16164.576	5	80822.88	116.7
	Totals	**19119.6**	**125.0**	**163772.9**	**236.4**
				Spare Capacity	25%
	AS3000 Maximum Demand (Non-Domestic, Design Spare Capacity)				**295.5 Amps/ Phase**

Figure E.6 – Common Area Max Demand

APPENDIX F: AUSGRID Gosford System Diagram



A	B	C	D	E	F			

Ausgrid
FOR OFFICIAL USE ONLY

WEST GOSFORD ZONE No.119 (1 of 6)

DAY / NIGHT } 2018/19 PEAK SUMMER LOADS

AMENDED	08/07/19
RATINGS	19/5/08
CHECKED	