APPENDIX A – RESPONSE TO INFORMATION REQUEST

Table 1: Response to LMCC Comments

LMCC Comment	Response
1. Scenic Value: Having regard to Section 2.2 (Scenic Values) of Development Control Plan (DCP) 2014, Council's Landscape Architect, Robyn Pollock, has reviewed the proposed development and submitted Visual Impact Assessment (VIA) and advised the development is zoned B2 (Local Centre) where the legibility of the development within the residential setting is an important consideration. There is information omitted from the photomontages that do not give a full indication of the visual impact. The concerns are: a) The photo montages do not show future development fronting Portland Drive - the proposed development impacts along this road is indeterminate. b) The pylon signage located in the VIA dominates the two prominent corners and there is no accompanying information regarding size, materials etc. c) The pylon sign shown along the southern George Booth Drive frontage is not assessed for visual impact and is not supported. d) The far western 'future development site' will require significant retaining to achieve buildability on this site. The visual impact of these retaining walls is to be included in the VIA. e) e) The retaining proposed adjoining Tramway Drive proposes 1000mm planted edge to screen a 2500mm plus wall. This is too narrow to support vegetation and not supported.	Provided in **Appendix F** is an addendum to the Visual Impact Statement prepared by BN Group. Relevant to the specific comments by Council, the following response is provided: a) The architectural plans provided within **Appendix D** show the elevation of T22 which is proposed to present to the corner of Portland Drive and Northridge Drive (refer to eastern and northern elevations). As identified within **Sections 6.1** and **5.4.1** of the SoEE, the subject site contains a zoning anomaly, with two (2) small portions of the site along its eastern edge (approximately 15m wide) being zoned R3 Medium Density Residential which currently prohibits commercial development. Therefore at this time and until the zoning anomaly is rectified, any commercial development would be required to be set back approximately 15m from Portland Drive, which is not a desirable urban form outcome. The portions of the site affected by the zoning anomaly are contained within proposed Lots 3 and 4. For the purposes of the current DA, proposed Lots 3 and 4 are to be landscaped (refer to the landscaping plans provided within **Appendix G** of this submission). Future development of proposed Lots 3 and 4 is subject to a separate Development Application. The design of Lots 3 and 4 provides flexibility in respect of the zoning anomaly, noting that at the time a future application is made, it is possible that the zoning anomaly will have been rectified (noting that Council are currently progressing a rezoning application that will resolve this issue). Notwithstanding, if the anomaly has not been rectified, the application will be subject to separate assessment against Council's DCP. It is considered that proposed Lots 3 and 4 are of a suitable size and shape to facilitate future development design that will contribute to the Woolworths shopping centre as well as provide appropriate street edge treatment along

LMCC Comment	Response
	Portland Drive. b) Details of proposed pylon signage are provided on the 'Signage Details' plan provided within **Appendix D** of this submission. As requested by Council staff, the pylon signs have been reduced in height to 10m high. It is considered that the pylon signage is of an appropriate scale commensurate with the overall proposed Cameron Park Village development. c) Both pylon signs at the George Booth Drive frontage (at the south east and south western corners of the site) are illustrated in 'View 1 Proposed George Booth Drive looking East' (p14) of the VIA. It is considered that the proposed signage is consistent with the scale of the proposed development. d) This matter is addressed within the addendum to the Visual Impact Statement provided within **Appendix F** of this submission. The end user of the far western future development site is not known at this time and the site could be developed in a range of ways that may or may not require significant retaining to Tramway Drive. Accordingly, the future development site is proposed to be landscaped which will remain in place until a future development application is lodged. At that time the visual impact of any retaining will be considered. Until that time it is considered that the landscaping proposed is suitable in terms of visual impact considerations. e) This matter is addressed within the revised engineering and landscaping plans provided within **Appendices E** and **G** of this submission. The 1000mm planted edge has been increased in size to 3500mm, which is considered adequate to support vegetation planting.
2. Cut and Fill: In regards to Section 2.4 (Cut and Fill) of DCP 2014, Council's Chief Development Engineer, Greg Field, has reviewed the proposed development and advised the site has been significantly reshaped as a part of the subdivision process to form a relatively flat site. The development will require further earthworks to shape the site to suit	Provided in **Appendix E** of this submission are revised Concept Civil Engineering plans (ADW Johnson). Retaining walls have been located on private property clear of the road reserve.

LMCC Comment	Response
the proposal. In this regard, large retaining walls are proposed on the western edge of the development. It appears that retaining walls are proposed within the road verge of Tramway Drive. Further detail on the proposed location of these retaining walls in relation to the constructed road and the road verge is required to be submitted. Note: All retaining walls need to be located on private property and be clear of the full road reserve.	
3. Stormwater Management: Having regard to Section 2.8 (Stormwater Management) of DCP 2014, Council's Chief Development Engineer has reviewed the submitted Stormwater Management Plan and advised that additional information is required as follows: a) A concept stormwater layout should be provided for the supermarket and specialty shops. b) Further details and tank sizes for the proposed stormwater harvesting is required. c) Access arrangements for the maintenance of the GPT's needs to be provided. d) Sections through the detention basin are required. e) Music modelling shall be provided to demonstrate the water quality controls required for the catchment draining to Portland Drive. f) Show the location of overland flow paths for storms in excess of the capacity of the piped drainage system.	Provided in **Appendix E** of this submission is a Stormwater Management Report and revised Concept Civil Engineering plans (ADW Johnson) which addresses each of the items raised.
4. European Heritage: In regard to Section 2.15 (European Heritage) of DCP 2014, Council's Development Planner – Heritage Focus, Patricia Kinney, has reviewed the proposed development and submitted Statement of Heritage Impact (SHI) and raised the following concerns: a) The impact of the proposed pylon signs has not been addressed in the SHI. b) The proposed sign on the corner of George Booth Drive and Portland Drive should be moved further away from the heritage item. c) Details of the proposed link and how it will connect to the cycleway	Provided in **Appendix H** of this submission is a revised Statement of Heritage Impact (SoHI) (EJE Heritage) that has been updated to address each of the items raised by Council. In response to each of the specific matters raised by Council, the following is noted: (a) The pylon signs have been addressed in the revised SoHI addendum document. The proposed pylon signs have been reduced in height from 12m to 10m. The report advises that the proposed signs do not encroach on the curtilage

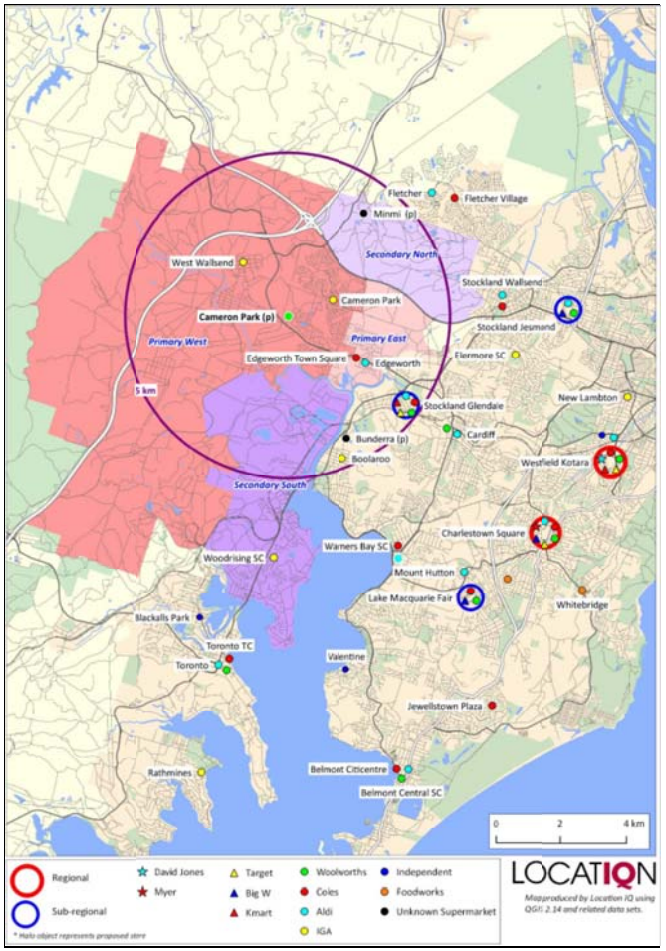
LMCC Comment	Response
needs to be provided. d) Clarification is sought regarding the construction of the cycleway/shared pathway on the tramway easement. e) e) A full copy of the heritage referral can be viewed via DA Tracking.	of the former West Wallsend tramway alignment and do not affect any of the remnant banks or infrastructure associated with the item. The report confirms that the signs will have negligible impact upon the heritage significance of the item. The report advises that the purpose of the signs is to mark the position of the proposal to signify its function as the commercial centre of the Cameron Park community. The signs need to be able to perform that function while being visible and legible to motorists travelling along George Booth Drive. These factors are what govern the size and position of these signs. The pylon signs will display information not just for Woolworths and BWS but also include other tenancies within the development which reinforces the commercial function of the development and contributes to the social significance of the former tramway making a destination along the course of its route. Additionally, the report advises that given the large size of the overall cycleway network, the signs will be visible from only a very minor portion of this network. The experience for travellers along the future pathway will be fleeting as they make their journey along the path. (b) The proposed sign on the corner of George Booth Drive and Portland Drive has been maintained in its proposed position. This is the obvious location for a sign, the sign will promote the Woolworths development in an appropriate location that is visible to passing traffic along George Booth Drive. This sign has been addressed within the revised Statement of Heritage Impact as being suitable in the proposed location. The report confirms that the future cycleway (following the steam tramline alignment) runs adjacent to this proposed pylon sign and is required to be at this location to follow the route of the tramway line but also 'connect to the new signalised intersection' as conditioned in the previously approved DA (2433/2004) for the broader subdivision. The proposed pylon sign at this location does not encroach on the curtilage of the item and does not affect any of the remnant banks or associated infrastructure with them. The pylon sign will become only a marker point for the location of the proposal, not an intrusive object that may block views for those traversing the route of the tram line. There will be negligible

LMCC Comment	Response
	impact upon the aesthetic significance of the item, no impact upon the remnant fabric of the item and will enhance the historic and social significance of the item by marking a commercial destination along the route of the cycleway / former tram line. (c) Details of the link connection to the cycleway are provided within the revised architectural plans in **Appendix D** of this submission. The revised Statement of Heritage Impact confirms that the proposed detail and finishes for the connections between the cycleway and the proposed development are shown to match the recommendations in width and finish so as to fully integrate the cycleway with the proposed development and ensure that it becomes a natural destination along the route of the cycleway. Overall, the proposed linkage to the cycleway is supported. (d) Construction of the cycleway / shared pathway within the former West Wallsend tramway alignment was approved under the broader subdivision development (DA 2433/2004). This approval provided for the management of the tramway, which included the preparation of the West Wallsend Heritage Tramway Plan of Management. The proposal has been designed sensitively to complement and enhance the significance of the item, in particular through the provision of linkages from the pathway to the shopping centre. Construction of the cycleway will be consistent with the Plan of Management and it is considered reasonable that any further detail can be confirmed with Council prior to the release of a Construction Certificate. If Council considers it necessary, the proponent is willing to accept a condition of consent requiring construction of the cycleway (limited to the extent of the subject site Lot 901 DP 1222132) in association with the proposed works. (e) Noted.
5. Economic Impact: In regard to Section 2.19 (Economic Impact) of DCP 2014, Council's Strategic Planner, Hannah Benson, has reviewed the proposed development and raised the following concerns:	The majority of the subject site is zoned B2 Local Centre Zone. The subject site was created as part of the broader Cameron Grove subdivision to facilitate commercial development to support the emerging local community. The objectives of the zone are as follows:

LMCC Comment	Response
a) Consistency with objectives of the B2 – Local Centre Zone: The proposal needs to demonstrate that it meets all of the zone objectives by providing a variety of uses and a people centric design so that the Cameron Park town centre meets the economic and social needs of the local community.	• *To provide a range of retail, business, entertainment and community uses that serve the needs of people who live in, work in and visit the local area;* • *To encourage employment opportunities in accessible locations;* • *To maximise public transport patronage and encourage walking and cycling;* • *To create spaces that are accessible and are a central focus for the community; and* • *To provide for housing as part of mixed use developments.* The proposal is consistent with the objectives of the zone, as follows: • The proposed development will provide a local shopping centre that will accommodate a range of retail and business opportunities as well as community space that will serve the needs of the people who live in, work in and visit the local Cameron Park area. • The proposal will provide employment opportunities for the local community during construction and for ongoing operation. • The development forms part of the Cameron Grove residential subdivision, and has public transport facilities available to the site (noting that there are existing bus stops directly at the front of the site off Portland Drive with pedestrian linkages into the site. The proposal has been designed to promote walking and cycling connectivity with the surrounding developing areas with numerous pedestrian access points into and through the site off Northridge Drive, Portland Drive and from the future cycleway (approved as part of DA 2433/2004 for the adaptive reuse of the former West Wallsend Steam Tram Line alignment) which extends through the southern portion of the site. • It is noted that the site is located on the outer edge of the Northlakes Urban Release Area which discourages active transport. Notwithstanding it is considered that the proposal is of a suitable design that promotes accessibility and a central focus for the Cameron Park local community. It is noted that the proposal includes linkages to the future cycleway and surrounding pedestrian network, the bus stop on Portland Drive as well as public outdoor areas and seating areas, in particular around T22 and along the primary link through the site adjacent to Tenancies 9-17 and T18. • The proposed development does not preclude future opportunity to include

LMCC Comment	Response
	residential development should this become desirable a future point. The zoning anomaly (R3 Medium Density Residential) that affects two small portions along the eastern edge of the site is currently being rectified through a rezoning application being progressed by Council. The R3 zoning does not affect any of the development as proposed. Provided in **Appendix J1** is an Economic Impact Assessment that demonstrates the proposal satisfies the economic needs of the community. A Social Impact Assessment was provided within the SoEE (refer to **Section 6.12** and **Appendix K** of the SoEE) which confirms that the proposal satisfies the social needs of the community.
b) Lifestyle 2030: Lifestyle 2030 clearly provides that Town Centres need to provide a mix of uses to meet the economic and social needs of the community.	The overall aims of Lifestyle 2030 were addressed within **Section 5.4.5** of the SoEE. It is considered that the proposed development remains entirely consistent with the aims of the strategy. Lifestyle 2030 does not identify the subject site as a 'Town Centre'. The 'Urban Structure' and 'Urban Change & Urban Investigation' maps provided within Lifestyle 2030 show a potential 'Emerging Town Centre' approximately 1.2km east of the subject site. Lifestyle 2030 provides that for Town Centres such as Belmont, Cardiff, Mount Hutton, Swansea, Toronto, Warners Bay and 'potential emerging town centres' that 'master plans, area plans and structure plans will guide development in the town centres'. It is noted that there are no master plans, area plans or structure plans that apply to the subject site. It is also noted that at the time of the previous approval (DA 2207/2007) the Pambulong Forest Area Plan formed part of Council's DCP. This has since been repealed establishing that at this time the subject site is not a 'town centre' but rather more representative of a neighbourhood centre. It is acknowledged that in the long term the site may organically evolve into a town centre, however at this time and for the foreseeable future it is clear that the proposal better represents a neighbourhood centre, in particular noting the following: • The site is located on the outer edge of the LGA in an emerging urban release area.

LMCC Comment	Response
	• The proposal will predominantly serve the day to day convenience grocery shopping needs of the emerging local Cameron Park community. • The proposal provides the opportunity for the future establishment of other service providers (ie. bank, post office, etc). The proposal also provides opportunity for the future establishment of social / community facilities (ie. a medical centre, library, etc.). End user development within the centre will be driven by market demand. • The site is located within an emerging urban release area with approved Medium Density housing located opposite the site to the north and future mixed use zoned land located east of the site. • Whilst a bus stop is located directly in front of the site, bus services to the site are limited when compared with other neighbourhood; town and regional centres (refer to the carparking commentary provided within the cover letter of this submission). • The design aims to make the site pedestrian friendly with links to the site established by a footpath network throughout the broader subdivision as well as the provision of links to the future public cycleway (adaptive reuse of West Wallsend Heritage Tramway) which will extend through the southern portion of the site. Provided in **Appendix J1** is an Economic Impact Assessment that demonstrates the proposal is suitable in terms of economic considerations and a Social Impact Assessment was provided within the SoEE (refer to Section 6.12 and **Appendix K** of the SoEE) which confirms that the proposal is suitable in terms of social impact considerations.
c) Economic Impact Assessment: As stated in the Assessment of Market Potential, June 2017 submitted with the DA, the local community would benefit from the proposed shops because it will provide an opportunity for local grocery and convenience shopping. The population of Cameron Park is growing and this proposal will help to meet demand for local services. However, the study is a retail investigation of the demand for the proposed Woolworths and does not provide an economic analysis of the proposal.	Provided in **Appendix J1** of this submission is an Economic Impact Assessment (EIA) that has been prepared by Location IQ. The EIA has been prepared to address the requirements of Section 2.19 of the DCP, Council's Economic Assessment Guidelines and Council's commentary. The key findings of the EIA are as follows: • The proposed shopping centre will serve a main trade area population of 31,275 including 18,090 persons within the primary west sector (see **Figure 1** below and refer to Map 2.1 of the EIA for full size image). Significant residential development has been occurring within the region since the year 2000. Taking

LMCC Comment	Response
An Economic Impact Assessment should be prepared in accordance with Section 2.19 of DCP 2014 and the associated Economic Impact Assessment Guidelines. The assessment should demonstrate the proposal maximises economic benefits for the local community and minimises adverse impacts, but providing for economic diversity and a functioning town centre. It should also demonstrate that the proposal meets community needs (beyond retail).	this into account, by 2031 the population within the Cameron Park main trade area is projected to increase by over 11,125 persons to 42,400 persons. This represents an average annual growth rate of around 795 persons, or 2.2%.  **Figure 1 – Cameron Park Main Trade Area & Competition.** • The socio-economic profile of the main trade area population is typical of a

LMCC Comment	Response
	recently developed suburban location, including a young, traditional family based population who are more likely to own their homes. This trend is expected to continue as new residential development in the area attracts a younger, more affluent, family based population. • It is important that young family based populations are provided with conveniently located food and non-food retail facilities, particularly major full-line supermarket facilities which allow families to complete their weekly supermarket shop in a single location. • The key existing competitive facilities include the four supermarkets currently provided within and immediately beyond the Cameron Park main trade area, namely the Coles anchored Edgeworth Town Square, Aldi at Edgeworth, a free standing IGA supermarket in the Northlakes estate, as well as Stockland Glendale, which is located 5.3km to the south-east of the site and includes a range of major tenants (Target and Kmart discount department stores and Coles, Woolworths and Aldi supermarkets. • In terms of future facilities, key developments include the expansion of retail offers at Stockland Glendale and Westfield Kotara, which are approved and under construction, respectively. • Projected sales for the proposed Cameron Park Village are $53.1 million in 2019/20 (i.e. constant 2017 dollar terms), indicating that there is clearly potential to support the proposed retail floor space of the scale currently planned. All components of the centre are projected to be supportable, even allowing for competitive developments. • Key points to note regarding the likely sales impacts from the proposed Cameron Park Village include: o The largest impact is projected on Stockland Glendale (beyond the main trade area), in the order of $24.5 million or 6.5%. The majority of this impact is likely to fall on Woolworths and Coles supermarkets which are understood to trade strongly. o The next largest impacts would likely fall on retail facilities within the Edgeworth Town Centre (within the main trade area), which are projected to be impacted by some $11.1 million in combination, or around 15%. The majority of this impact would fall on Coles supermarket. o Alternate IGA based centres within the main trade area, namely at Cameron Park, West Wallsend and Woodrising Shopping Centre are projected to be impacted by $1.2 million (15%), $1.1 million (10%) and

LMCC Comment	Response
	$0.5 million (2.5%), respectively. o All other competitive impacts would be 10% or less and therefore within the normal competitive range. o Importantly, any impact from the proposed Cameron Park Village is only likely to be experienced by competitive centres in the short term, reflecting strong future population growth. • A substantial net community benefit will result from the proposed Cameron Park Village. Offsetting the trading impacts on some existing retailers, which will not impact the future viability of any existing or proposed centre, there are very substantial positive impacts including the following: o Significant improvement in the range of retail facilities that would be available to residents, particularly in terms of convenient full-line supermarket retailing. The proposed Woolworths supermarket would improve choice of location and also allow for price competition. o Further, the proposed supermarket at the site would represent the only full-line supermarket within around 3.5km, providing residents with a convenient, local major full-line supermarket at which to undertake a full weekly shop. o The retail offer would provide a convenient and competitive offer for local residents that would satisfy the significant retail demand, reduce travel time & distance and provide petrol cost savings. o The addition of a full-line supermarket would also result in the retention of spending currently being directed to other large supermarket facilities at the major shopping centres beyond the main trade area, which can become quite congested during peak times. o The creation of additional employment which would result from the project, both during the construction period, and more importantly, on an ongoing basis once the development is complete and operational. In total, some 904 jobs are likely to be created both directly and indirectly as a result of the development of Cameron Park Village. Overall the EIA concluded that the combination of the substantial positive economic impacts serve to more than offset the trading impacts that could be anticipated for a small number of existing retail stores in the region. Further the impacts would not threaten the viability of any centres or limit the expansion of these centres.

LMCC Comment	Response
d) Car parking: Car parking is considered to be a key economic issue within our town centres. The proposal includes an oversupply of car parking. An oversupply of parking creates considerable negative impacts on both the proposed development, and the function of the centre itself. Excessive car parking is an economically inefficient use of land within town centres. The applicant should revise their car parking rate to comply, or provide detailed justification for any oversupply, in accordance with Section 5.5 (Car Parking) of DCP 2014 (Refer to issue 8 below).	As established above, the subject site is not a town centre. Carparking has been addressed in the cover letter of this submission. The proposed development does not provide excessive parking for the location and type of retail.
e) Urban Design: The comments provided in the Integrated Planning referral (Refer to issue 14 below) requesting changes to the design of the development are supported from an economic perspective for the following reasons: i. Research shows positive correlations between improved walkability, raised local retail spend, enhanced value of local services and goods and the creation of more job opportunities. It is therefore important to design town centres for pedestrians, cyclists, and public transport and not just cars. ii. 'Investing in public space is a strong catalyst for local, social and economic vitality. It fosters the economic success of local shops and determines the increase of local independent businesses'. Therefore, the design of public spaces and town centres contributes to their economic success. iii. 'The presence, number and size of storefront businesses are fundamental indicators of neighbourhood economic health and vitality'. It is therefore critical to provide active street frontages and diversity of uses within the town centre. iv. The cost of private car ownership and car travel far exceeds the cost of other modes of transport. Designing centres to provide transport choice therefore frees up disposable income and has a positive economic and social impact. Town centres need to be designed to provide transport choice and support an efficient and accessible movement system.	The urban design comments are addressed in item 15 below. In relation to point i – v, the following is provided: i. It has been established that the subject site is not a town centre. Notwithstanding, appropriate provision has been made for pedestrians and cyclists to the established pedestrian network created as part of the surrounding broader subdivision as well as the linkages from the proposed development to the future cycleway (adaptive reuse of West Wallsend Heritage Tam Way alignment) that will extend through the southern portion of the site. A bus stop is located directly in front of the site, however services are limited when compared with other neighbourhood, town and regional centres in the LGA (refer to the cover letter of this submission). Car parking is addressed within the cover letter of this submission. ii. This matter is addressed in item 15(c) below. iii. Active street frontages are addressed in item 15 below and within the Urban Design commentary provided within **Appendix M** of this submission. iv. Proposed car parking and transport choice is addressed within the cover letter of this submission. v. The proposed loading dock location is addressed within the cover letter of this submission and also within the Urban Design commentary provided within **Appendix M** of this submission.

LMCC Comment	Response
v. A loading dock fronting Northridge Drive is undesirable for promoting walkability and activating the street front, which will impact on the economic function of the town centre as outlined above. A full copy of the economic development referral can be viewed via DA Tracking.	
6. Streetscape Improvements: Having regard to Section 3.4 (Streetscape Improvements) of DCP 2014, Council's Landscape Architect has advised the pedestrian plazas are covered walkways linking buildings with the street. As designed they do not create a 'civic venue' or central focus, they fringe the carpark setting that dominates the village. Pedestrian walkways through to the carpark along Northridge Drive appear to be below street level which creates an undesirable street interface. Pedestrian access to the Tramway is supported however multiple access points to the pathway is preferred with the Tramway accessing the future public parkland. Proposed embankments within Tramway Ave road reserve impact the buildability of the shared pathway. The use of materials that contextually reference the history of the site are supported.	Proposed carparking is addressed in the cover letter of this submission. Section 3.4 of Council's DCP does not appear to require the establishment of a 'civic venue' or central focus. The controls of Section 3.4 (with commentary) are as follows: 1. *Development must result in an improvement to the amenity and appearance of adjoining footpaths or public domain.* **Comment:** The subject site is currently vacant with an existing approval for a larger commercial development. The proposal will result in an improvement to the amenity of adjoining footpaths and the public domain when compared with the existing vacant site and considering the previous approval. The proposal incorporates linkages to the existing street network established as part of the broader Cameron Grove subdivision and also provides linkages to the future cycleway to the south and west and the approved Harrigans Hotel to the south west. The proposal provides street furniture (particularly around T22 which is located on the prominent corner of Portland and Northridge Drive)), and attractive landscaping through the site which will encourage pedestrian and cycling activity. Carparking is an essential ingredient to the success of the centre. Carparking has been centralised as much as possible to provide for built form to the street frontages now or in the future. Landscaping has been incorporated into the parking area. It is considered that an appropriate design outcome has been achieved. The proposal also provides opportunity for public art at 5 key points on the site being the corner of Portland Drive and Northridge Drive; the public outdoor

LMCC Comment	Response
	area surrounding T22; the entrance to the site from Portland Drive; the central linkage to the approved heritage cycleway; and the central linkage into the site off Northridge Drive (refer to the landscaping plans provided within **Appendix G** of this submission). 2. *Works undertaken within the public domain must be consistent with the provisions of the relevant Streetscape Master Plan and Council's Streetscape Technical Guidelines.* **Comment:** There is no streetscape master plan for the subject site. 3. *Where there is not a relevant Streetscape Master Plan for a town centre, Council will specify the extent and type of street trees, footpath paving, pedestrian lighting, street furniture, public art and the like.* **Comment:** The subject site is not a town centre and there is no applicable streetscape master plan. It is acknowledged that as necessary Council will provide input in relation to the type of street trees, footpath paving, lighting, street furniture, public art and the like. It is considered that these items have been adequately addressed by the proposed development. Pedestrian walkways within the site along Northridge Drive range from 0.8m to 1.2m below street level. This is a result of the topographical challenges of the site and the existing construction of Northridge Drive. Site constraints are addressed in detail within **Section 3.3.1** of the SoEE. The proposal will create three (3) linkages to the public cycleway with an opportunity for a fourth as follows: • At the Portland Drive / George Booth Drive intersection; • Centrally within the site; • At the proposed Tramway Drive roundabout; and • Potential for connection through the future development site (proposed Lot 4) at the south eastern corner of the site (subject to separate development application). It is considered that the above linkages are sufficient.

LMCC Comment	Response
	Provided in **Appendix E** of this submission are revised Civil Engineering plans that address proposed retaining walls along Tramway Drive. Council's comments regarding support for the use of materials that contextually reference the history of the site are welcomed.
7. Design of Parking and Service Areas: In regards to Section 5.2 (Design of Parking and Service Areas) of DCP 2014, concern is raised regarding the amount of at grade car parking dominating the development. As discussed under issue 10, the proposed tree planting within the carpark is problematic as inadequate root volumes have been provided and there is a lack of tree planting. Major concern is also raised regarding the proposed location of the service area on Northridge Drive, which is located directly opposite R3 Medium Density Residential zoned land at 255 George Booth Drive, Cameron Park, with a recent development approval (DA/2216/2016) for multi dwelling housing. Control 8 clearly states that "servicing facilities for non-residential uses must be located and designed to protect the amenity of residents". In this regard, Council's Environmental Officers have raised major acoustic amenity concerns (Refer to issue 13 below). Option D.10.3 for servicing the loading dock appears to have the least impact on the Northridge Drive streetscape with truck access through the site and exiting onto Tramway Drive possible. Being the northern orientation there is opportunity to sleeve buildings along Northbridge Drive frontage that activates the streetscape and reduces the dominance of vehicle movements that currently exists along this street. Concern is also raised regarding pedestrian amenity within the car park. The car park lacks pedestrian permeability and paths.	Proposed car parking is addressed in the cover letter of this submission. Provided in **Appendix D and G** are revised architectural plans and landscaping plans that address car park tree planting. Please note that additional car park tree planting has been incorporated into the revised plans. Proposed root volumes are addressed in item 10 below. The location of the loading dock and consideration of option D 10.3 has been addressed in the cover letter of this submission. Other loading dock location options have been addressed in **Section 3.3.1** of the SoEE. Please also refer to the Urban Design commentary prepared by Studio GL (provided in **Appendix M**) which further addresses the proposed loading dock location. Provided in **Appendix B** of this submission is an addendum to the acoustic assessment that confirms that the location of the loading dock will achieve full compliance with the Industrial Noise Policy. This matter is addressed further in Item 13 below. Provided in **Appendix D** are revised development plans that show proposed pedestrian linkages throughout the carpark. It is considered that permeability and pathways are well considered and suitable from an amenity, traffic management and safety perspective.
8. Car parking: In regard to Section 5.5 (Car Parking Rates) of DCP 2014 and the proposed over supply of car parking, control 2 requires that where the proposed number of car parking spaces is more than that specified in Table 7, detailed justification must be provided to support a	Proposed carparking is addressed in the cover letter of this submission. Whilst the carparking exceeds Council's DCP standard it is not an oversupply by

LMCC Comment	Response
variation including: a) Demonstration that exceeding the designated car parking rates does not detract from the urban design outcomes (streetscape and built form) of the proposal; and b) A detailed cost benefit analysis demonstrating the benefits to the community is superior than adherence to the rates including consideration of the environmental and economic benefits of using the land for a higher order use; and c) Parking survey data from existing operations where expansion is proposed. The submitted application has failed to justify the proposed over supply. Furthermore, having regard to the objectives of the control, concern is raised that the oversupply results in substandard urban outcomes, discourages the use of public transport and does not support the efficient use of land.	market standards. It is considered that the proposed parking is not at the expense of good urban design outcome. The following is noted in this regard: • The carparking is centralised within the site to allow a built edge to the Portland Drive, Northridge Drive and Tramway Drive street frontages, encouraging active street frontage. • The centralised carparking will minimise visual impact of at grade carparking. • Substantial landscaping has been incorporated throughout the carpark. • The centralised at grade carparking will allow the centre to evolve organically over time (ie. as dictated by a growing population, future market demand and improved public transport availability to the site). A Cost Benefit Analysis has been prepared by Location IQ to address Council's commentary and is provided within **Appendix J2** of this submission. The Cost Benefit Analysis notes that applying the DCP car parking rate to the proposed development indicates that 188 car spaces should be provided. In terms of the definition for car parking provision as undertaken in typical retail assessments, this would indicate 2.5 car spaces per 100m^2 (ie. 1 space per 40m^2) of floorspace which is significantly lower than the typical benchmark of around 5 spaces per 100m^2 of floorspace for similar shopping centres. The proposal seeks to provide 387 car parking spaces at a rate of 5.1 spaces per 100m^2 of floorspace. In relation to the need for the proposed 387 car parking spaces, the Cost Benefit Analysis confirms the following: • The higher provision of parking in comparison to the rate outlined in the DCP would not be a competitive advantage for Cameron Park Village as other shopping centres in the immediate area have similar car parking rates, namely: o Stockland Wallsend: 5.0 car spaces per 100m^2. o Edgeworth Town Square: 4.0 spaces per 100m^2. o Stockland Glendale (including cinema complex): 2.9 car spaces per 100m^2. o Northlakes IGA: 3.6 car spaces per 100m^2.

LMCC Comment	Response
	On this basis, should Cameron Park Village have a rate of 2.5 car spaces per 100m^2 of floorspace, the shopping centre would be significantly disadvantaged in comparison to other shopping centres. • Typically, a lower provision of car parking spaces for a shop or group of shops as part of a shopping centre is common in more densely populated areas. In inner city areas the density is generally higher, average household sizes are smaller and the average basket size of shoppers is smaller with these people undertaking smaller shops more regularly. A lower rate of car parking is not typically evident in outer suburban areas with lower density yields and larger household sizes. • A low rate of carparking spaces generally reflects an immediate large walker population and a reduced need for car based travel to a shopping centre / shops. Pedestrians would typically undertake a walk of 0.8 – 1km from their home or place of work to retail facilities. This is generally accepted to be a comfortable walking distance. Within an approximate 0.8 – 1km radius around the Cameron Park Village site, there is currently a resident population of 1,000 – 2,188 persons. This reflects a low level of density compared to other nearby shopping centres. It is noted that even when density increases with future development, density will still be relatively low. • With the provision of a full line Woolworths supermarket at the Cameron Park Village site, it is considered unlikely that the surrounding resident population would walk to the shopping centre to undertake a weekly family shop as it would be difficult to carry a number of bags back to their homes. A full line supermarket would typically indicate a bigger basket size / shop with these types of shopping trips undertaken by car for convenience. Smaller shops / shopping centres require less car parking as customers are more likely to undertake a quick, top up shopping trip only. • In outer suburban areas such as Cameron Park, families are more common with one or more young children. Parents taking children to the shops and undertaking a large weekly shop require convenient and ample car parking. • If the car parking rate applied to the Cameron Park site is in accordance with the DCP at around 2.5 car spaces per 100m^2 of floorspace, this would likely mean that a significant number of shoppers would be inconvenienced during peak shopping periods by being unable to easily find a car park. Shoppers would have to circle the car park until car spaces turnover; park on the street,

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	or choose to travel further afield to supermarkets with a greater provision of more accessible car parking. These actions would result in a greater cost in terms of petrol and car maintenance and also have more traffic generation on roads in the local area. Further, there are potential health risks with cars manoeuvring more often through a car park, particularly in an area that will house a number of younger families (i.e. parents and children). • The proposed provision of car parking at around 5.1 spaces per 100m^2 of floorspace at Cameron Park Village would ensure greater customer amenity, significant customer flows and a more equivalent offer with similar centres in the locality. Taking the above into consideration, the proposed parking rate is required and will ensure the best outcome for the proposed development whilst also minimising impacts on residents, consumers and infrastructure. If the DCP rate of 2.5 spaces per 100m^2 (or 1 per 40m^2) of floor space is applied to the Cameron Park Village site, this would result in a significant disadvantage to the site given that other shopping centres in the surrounding areas have significantly higher parking ratio's that are more in accordance with the proposed 5.1 spaces per 100m^2 (or 1 space per 19.5m^2). Other negative results would also likely occur including greater car based travel, potential traffic incidents, on street car parking, possible traffic congestion into and out of the car park and also on the site and increased costs for local residents.
9. Traffic: Council's Traffic Engineer, Kane Hitchcock, has reviewed the proposed development and raised the following concerns: a) Pedestrians and Cyclists: If pedestrian crossings are to be used within the car park it should be noted that: "A driver must not stop on a pedestrian crossing that is not at an intersection, or on the road within 20 metres before the crossing and 10 metres after the crossing, unless the driver stops at a place on a length of road, or in an area, to which a parking control sign applies and the driver is permitted to stop at that place under these Rules". This includes any shoulder of the road as defined in Rule 12 (Car parking bays).	Provided in **Appendix I** of this submission is an addendum to the Traffic Impact Statement prepared by Ason Group that addresses each of the items raised by Council. Specifically, in relation to each of the items raised, the following is noted: (a) Relevant to each comment the following response is provided: • It is considered reasonable that all comments be addressed at the design stage prior to issue of a Construction Certificate. • The crossings opposite T11 have been deleted as per Council's request. • As requested a pedestrian refuge is provided to replace the previously proposed crossing at the eastern entrance to the centre. • In relation to AS2890.6, all spaces comply however it is reasonable that any minor variations be dealt with at the Construction Certificate stage. (b) Give way priority through signage and line marking will be implemented at all

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As this would result in the removal of a number of car parks and the car park is a low speed area a pavement treatment to define walking paths is acceptable. The crossings indicated opposite Shop T11 appear to have no purpose and are not required. The crossing at the eastern entrance to the centre could result in queuing of traffic into the roundabout on Portland Drive. Consideration of a pedestrian refuge should be given in place of the pedestrian crossing at this location. Accessible (Disabled) Car Parking areas are to comply with AS2890.6. Kerb ramps appear to be obstructed by planter boxes in some instances. Bollards are to be provided in the shared area (AS2890.6, Clause 2.2.1(e)) at a height of 1300mm high (AS2890.1:2004, Clause 2.4.5.3(b). b) Car Parking Areas and Structures: Priority signage at the eastern entrance to the centre is adequate however, other four way intersections have not been addressed. Additionally the geometry of the southern entrance could be ambiguous and priority restrictions are recommended. c) On-Site Bicycle Facilities: Bicycle parking rates are stated at 32 however, locations on plan appear unable to achieve the stated number.	four-way internal locations (refer to **Appendix I**). (c) Provided in **Appendix D** of this submission are revised architectural plans that show 32 bicycle parking spaces.
10. Landscape and Tree Planting in Car Parks: Having regard to Section 7.4 (Landscape and Tree Planting in Car Parks) of DCP 2014, Council's Landscape Architect has advised the proposed tree planting within the carpark is not supported as inadequate root volumes have been provided and there is an overall lack of tree planting.	Design amendments have been made to provide increased landscaping throughout the carpark. The carparking design includes installation of shade sails over 141 carparking spaces, which forms part of the overall architectural design of the shopping centre whilst providing shade to more than a third of the carparking spaces proposed. The balance of the carparking proposed (246 spaces) is complemented with tree

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	planting (46 trees), which is in excess of the DCP required rate of 1 tree per 6 spaces. In relation to the root volumes for garden beds within the car park, the landscape architect has discussed this matter with Council staff and investigated in detail with the proponent and the project architect. The design is proposed to remain at 1m width and not 2m as recommended by the DCP. The rationale for the design is based on safety and maintenance considerations as follows: • Large 2m garden beds will present a trip hazard for people getting into and out of their cars due to the required gutter edge on the landscape bed. 1m garden beds are more appropriate in the context of the proposed carpark. • The gutter edge of the landscape bed is essential because without it matter such as bark and soil will escape the landscape bed and scatter throughout the carpark. This leads to an untidy site as well as creating an environment where landscaping is more prone to failure. The landscape architect has advised that the proposed garden beds can provide for adequate root volumes to sustain medium canopy trees as desired by the DCP. It is considered that the proposed car park landscaping as shown on the revised landscaping plans (**Appendix D**) is appropriate and can be supported by Council.

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11. Waste: In regards to Section 8.1 (Demolition and Construction Waste Management) and Section 8.2 (Waste Management) of DCP 2014, Council's Waste Co-ordinator, David Brake, and Waste Officer, Lindi Bowen, have reviewed the proposed development and advised the following information is required: a) The expected quantities of each waste type to be generated during the operation of the shopping centre; b) The number and size of bins, compacting equipment and space for bales expected to be required to store each waste type, considering the service frequency for each waste type; c) The waste enclosure to show that it is of suitable size to store the number of proposed bins, bales and/or compactors with bin layout provided on a plan to show staff can safely access the bins to place waste in; d) Access for waste collection vehicles to show that they can safely negotiate the internal road network to access the service area and waste enclosure; and e) e) Whether food wastes will be minimised by donation to charity of suitable quality foods; and the remaining food waste to be separated for diversion to composting or other alternative waste treatment.	Provided in **Appendix L** of this submission is a Waste Management Plan (Mark Rigby & Associates) that addresses each of the items raised by Council. The waste management plan addresses each of the items raised by Council including estimated quantities of waste; number and size of bins; compacting equipment; and service frequency. The waste management plan confirms that the waste enclosure is of a suitable size to service the proposed development and that waste collection vehicles can adequately access the waste enclosure area. The waste management plan confirms that suitable food that cannot be sold by the supermarket will be donated to charity.
12. Erosion and Sediment Control: Having regard to Section 5.5 (Erosion and Sediment Control) of DCP 2014, Council's Erosion and Sediment Control Officer, Janine Koppel, has reviewed the submitted plans as unsatisfactory. Accordingly, you are requested to submit a revised plan addressing the following: a) 501 – Page 9 of the SMR states that the soils are Type C soils. Based on site inspection and experience with these soils on prior stages, the onsite soils are Type F/D soils. Sediment fences alone are not appropriate for sediment control in this Sediment Type. All erosion and sediment controls shall be appropriate for Type D soils. Amend Plan. b) b) 501 – The Plan does not erosion and sediment controls that provide capacity to capture and treatment sediment and sediment-laden	Provided in **Appendix E** of this submission is a Stormwater Management Report and revised Concept Civil Engineering plans (ADW Johnson). The erosion and sediment control items raised by Council are addressed within this documentation.

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water for the whole disturbed area as the catchment areas shown on the SMR are much smaller than those included in basin catchments. Amend Plan to demonstrate that all disturbed areas have appropriate controls throughout the whole construction period until the site is stabilised and controls may be removed. c) 501 – Plan shows catch drains diverting water to proposed stormwater pits. Amend as this is not appropriate until such pipes and associated structures are installed, operational. And the site is considered not to be diverting any sediment laden water to them. d) 501 – Plan shows the area to the west of Proposed Woolworths and Basin 1 has a sediment fence as its sole protection during site works. This area shall need more/different controls based on the area, slope and soils. Amend. e) 501 – 512 – Remove all references to "hay" and replace with "straw" as per NSW Blue Book. f) 501 – Experience has shown with the highly erodible and highly dispersible soils in this area that excavated unlined catch drains will erode quickly and contribute additional sediment to sediment traps. I recommend that all excavated catch drains are lined or other diversion measures are utilised. Amend Plan to state which method. g) 501 and Appendix D of SMR – Both provide RUSLE and Sediment Basin Calculations. They have different inputs on the same parameters. Amend SMR (p9) to refer to correct sediment basin sizing calculations and ensure correct parameters are used. h) 501 – Provide full RUSLE and Sediment Basin Calculations showing all parameters. i) 511 – Replace all drawings with Standard Drawings from the NSW Blue Book (Landcom. 2004. Managing Urban Stormwater: Soils and Construction. 4th Edition) or White books (IECA 2008. Best Practice	

LMCC Comment	Response
Erosion and Sediment Control. Books 1 – 6 International Erosion Control Association (Australasia). Picton NSW.). j) 511 - Show a Standard Diagram from the NSW Blue Book for the appropriate sediment basin for the sediment type onsite. k) 512 – Amend units of Note 59(a) to correct units of mg/L. l) l) 512 – Amend Note 78 to state only "The LMCC seed mix shall be used unless stated on the ESCP/SWMP."	
13. Noise: In regards to Section 6.22 (Acoustic Privacy) and Section 8.7 (Noise and Vibration) of DCP 2014, Council's Environmental Officer, Keith Lainson, has reviewed the acoustic report and advised multi dwelling housing will be constructed approximately 27 metres from the Woolworths loading dock site boundary. It is evident that there will be an acoustic impact to residents from the loading dock and there appears to be no easy way to attenuate the noise from those loading operations. The loading dock requires relocation on the site to a position that will not impact upon the residential area, both acoustically and visually.	Marshall Day has prepared an addendum submission to their Noise Impact Assessment lodged with the SoEE. This addendum is provided within **Appendix B** of this letter. The addendum submission confirms that the proposed development is capable of full compliance with the site specific Industrial Noise Policy (INP) (as established within the Noise Impact Assessment lodged as part of the SoEE) provided that the loading dock hours of usage are restricted as follows: • 7am to 10pm, seven days per week; and • Deliveries to the loading dock will not be scheduled to occur before 7am on Monday to Saturday and 8am on Sunday. The proponent confirms that operation of the loading dock will be restricted to the abovementioned times. Accordingly, it is considered that the location of the proposed loading dock is acceptable in terms of acoustic impact considerations.
14 Subdivision: Having regard to Clause 4.1 (Minimum subdivision lot size) of the Lake Macquarie Local Environmental Plan (LMLEP) 2014 and Part 8 (Subdivision Development) of DCP 2014, Council's Chief Development Engineer has reviewed the proposed subdivision and dedication of the public reserve. Council staff are currently waiting for advice from Assets and Community Development Departments to determine whether Council will accept the dedication of the proposed public reserve as the	Provided in **Appendix E** of this submission are revised Concept Civil Engineering plans and Stormwater Assessment (ADW Johnson). Retaining walls are located on private property clear of the road reserve. Provided in **Appendix K** of this submission is a revised plan of subdivision. The shape and efficiency of proposed Lots 1, 3 and 4 are addressed within

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public reserve does not appear to meet Council's normal criteria for the dedication of open space. Subject to whether Council will accept the dedication of the public reserve, the following information will be required: a) An interallotment drainage connection pit will need to be provided on each lot. b) The Gross Pollutant Traps and detention basin will need to be removed from the public reserve and located on the development site. c) The Subdivision Plan needs to show full dimensions and include all necessary easements and rights of carriageway. a) d) The road reserve for Tramway Drive should be limited to the extent of the road reserve required for the new roundabout and not be extended to include part of the access road to the hotel. Access to the hotel should be by transfer of land to the hotel or by a Right of Access. d) A concept design, including full dimensions, will be required for the proposed new roundabout at the end of Tramway Drive. Turning circles will be required for the largest service vehicles and/or buses that will use this roundabout. e) The road batters for the proposed internal road off the end of Tramway Drive extend onto the alignment of the cycleway. The batters should be reduced so that they do not impact on the future alignment of the cycleway. Clause 4.1 (Minimum subdivision lot size) of the LMLEP 2014 provides objectives for the efficient and orderly use of land. The subdivision plan does not demonstrate this, creating irregular shaped lots with level and access complexities passed on without clear evidence that the lots facilitate orderly developed lots.	Section 15(b) of this response.

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Supporting the LEP requirements for subdivision, Part 8, Clause 3.8 (Lot Size and Dimensions) of DCP 2014 ensures subdivision occurs in a manner that supports the intention of the zone, and achieves orderly development of land and good urban structure outcomes. The future development lots and the residual lot created for the supermarket development are irregular shapes, designed without clear land uses. Thus, the lots appear to create likely development problems given the level changes, access arrangements, lot configurations etc. Evidence is needed to show the lots will facilitate orderly efficient use of the land.	
15. Integrated Planning: Council's Principal Strategic Planner, Shane Cahill, has reviewed the proposed development and raised the following issues: a) Strategic Direction: Lifestyle 2030 provides long-term strategic direction for the City's development. Strategic Direction 4: A well serviced and equitable city recognises Council's intent that development is to reduce the city's reliance on private vehicles, and support an efficient and accessible movement system. Council promotes active transport options to enhance the accessibility and connectivity of nearby residents to local town centres. This direction has been reinforced by recent consultation with the community undertaken for Council's long term planning. Council has moved forward in its support for active transport for over the past five years, an issue important to the community, and to the success and accessibility of local centres. In 2015, Council endorsed the Walk21 Charter, strengthening its stance to support healthy, efficient and sustainable walking communities. As a member of the Walk21 Charter, Council endeavours to meet its principles. This includes creating a network of connections for direct, easy and safe walking routes that link homes, shops, parks and other important destinations, and maximise opportunities reduce car-dependency. This commitment is reinforced by the City's vision and values, that identify the need for smart transport options such as an active transport network.	Proposed carparking numbers are addressed and justified within the cover letter of this submission. Whilst the carparking proposed exceeds Council's DCP standard it is consistent with the market and is not at the expense of good urban design outcome. The following is noted in this regard: • The carparking is centralised within the site to allow a built edge to the Portland Drive and Northridge Drive street frontages, encouraging active street frontage. • The centralised carparking will minimise visual impact of at grade carparking. • Substantial landscaping has been incorporated throughout the carpark. • Reduced carparking does not support relocating the loading dock off Northridge Drive. The location of the loading dock is justified within the cover letter of this submission. The subject site is not identified as a town centre. Notwithstanding, it is considered that appropriate pedestrian / cyclists linkages are provided as well as opportunity for public transport noting the following: • The proposal has been designed to promote pedestrian access with links to the established pedestrian network on Portland Drive, Northridge Drive and the future extension of Tramway Drive. • The proposed development and its surrounding pedestrian network provide 3 links to the future public cycleway (adaptive reuse of West Wallsend Heritage Tramline) with potential opportunity for a fourth following development of

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Consequently, Council does not support excess carparking, particularly where an oversupply compromises a development's design, as is the case with this proposal. Better integration of the design with the residential development opposite is important to achieve the feeling of a town centre for all, to encourage positive social activity, and active travel outcomes. In this sense, the development does not support the long-term strategic vision for the local centre.	proposed Lot 4 (subject to separate Development Application). • A bus stop is located directly in front of the site on Portland Drive. As noted within the cover letter of this submission, bus services to Cameron Park are very limited when compared with other centres that are more centrally located within the LGA. The Walk21 Charter is addressed with the SoEE (refer to Section 5.4.5 on page 64). It is considered that the proposal is consistent with the principles of the Walk21 Charter. Based on the above points, it is considered that the proposal adequately encourages visitation to the site from pedestrians, cyclists and those utilising public transport. It is also noted that during the public exhibition process, the only comment that was made regarding car parking was in fact whether enough car parking is being supplied to support the development. Based on the exhibition process completed by Council it would appear that the local community are satisfied with the extent of parking proposed as well as the pedestrian and public transport facilities that will be available.
b) Urban Design: The local centre should be open for all hour through pedestrian and cycling access. As a local centre, it should present active frontages to Portland and Northridge Drives. This is not evidenced. Proposed lots 1, 3 and 4 could offer variety, diversity and interest to the town centre. This could be supported however, there is insufficient evidence to demonstrate that these lots present to the street, and the practicalities for future use. That is, to show that proposed lots 1, 3, and 4 provide for holistic, efficient, coordinated development, including active fronts to Portland and Northridge Drives. It would be premature to approve these lots without evidence that the layout is practical, and will not leave a legacy of awkward shaped lots, access, level issues etc. The development must present as permeable, encouraging easy convenient walking and cycling access into and through the site for the neighbourhood. The location of the shared pathway between the	In response to Council's commentary, the following is advised: • The shopping centre and specialist commercial tenancies will operate in accordance with the hours of operation specified within the SoEE (**Section 3.2**). The pedestrian linkages through the site as well as the cycleway will be available accessible at all hours. Active street frontages are addressed in Item 15(e) below and within the Studio GL advice provided within **Appendix M**. • In considering future development Lots 1, 3 and 4, it is important to recognise that the proponent is seeking to develop a site that is already affected by an irregular lot shape, steep topography, a zoning anomaly, a heritage item that extends through the southern portion of the site and a fixed surrounding road network and access points to the site. These matters were explored in the urban design analysis undertaken as part of the SoEE and the site challenges are examined in Section 3.3.1 of the SoEE. It is also noted that an approved but not yet constructed hotel development south west of the site relies on

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supermarket and shops (T17 and T18) is supported. However, it should afford a clear line of sight for safe and easy pedestrian and cycling access. The proposed connection is kinked so cannot offer this. The design of the link is important to the success of the centre, it should allow 24 hour access and achieve an uninterrupted, clear line of sight along the extent of the path to encourage safe use and sufficient casual surveillance for the area. The site has westerly views to the Watagan Mountains, which are not optimised, an oversight for the town centre. The built form and outdoor café /eating areas should recognise this and provide an outlook to the west. The design faces the largest proposed shop into the car park, presenting the back of house loading dock/ service area to the street, which fails to achieve an appropriate interface with future medium density housing along Northridge Drive. Locating back of house to Northridge Drive discourages active transport into and around the centre, and supports car dependence. This is not acceptable to Council. The location of the loading dock achieves a poor outcome for the desired character of the town centre. The built form offers important beaks in the materials and the vertical treatments and Council supports this. This is particularly important to Northridge and Portland Drives. The open space between T21 and T22, would benefit from a break in the roof as suggested in the urban design report. The sandstone cladding and planter boxes are beneficial to the streetscape however, the breaks in the planter boxes evident in the landscape plan are not clear on the built form plan, and these are important to encourage pedestrian and cycling access to the site. The shop at the corner of Northridge and Portland Drives appears to face the car park, it should address the streets. The back of house and loading dock present a poor front to the residents of Northridge Drive. The proposed four shops on Portland Drive (except the corner) appear to	access from an extension of Tramway Drive. Notwithstanding, it is agreed that proposed Lots 1, 3 and 4 can add interest to the overall site in the long term. Development of proposed Lots 3 and 4 is currently highly restricted due to the current zoning anomaly. Proposed Lot 1 will be subject to separate Development Application which will be considered against Council's LEP and DCP requirements. Provided in **Appendix K** of this submission is a revised plan of subdivision. Proposed Lot 4 has been regularised in shape and proposed Lots 1, 3 and 4 will be required to supply their own carparking as part of a future development application. The plan also demonstrates that appropriate access can be provided to proposed Lots 1, 3 and 4. It is considered that the plan of subdivision as proposed will allow efficient and coordinated future development to be achieved. The size and shape of each of these allotments is considered suitable to allow appropriate future development that will present to the surrounding street network. • For the reasons provided in response to item 15(a) above, it is considered that the proposal presents convenient access to the site for pedestrians and cyclists. The shape of the pedestrian link between T17 and T18 has remained, however it is important to note that a clear line of site is maintained in 30-40m lengths of the development and also noting that the link is in excess of 10m wide. Furthermore, it is noted that the CPTED report provided as part of the SoEE as well as Council's CPTED referral and the Police referral do not raise the shape of the link as a potential safety issue. • Future development on proposed Lot 1 will have the opportunity to capitalise on views of the Watagan Mountains (subject to separate DA). As noted within the cover letter of this submission, the proponent went through a substantial design process that involved input from an urban designer, architect, civil engineer and traffic engineer to collectively determine the most appropriate location and orientation of the Woolworths supermarket. • The location of the loading dock is addressed within the cover letter of this submission and is also further addressed within the Urban Design commentary

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have active frontages and to provide some common area for the community; this is important to the design and encouraged. The Urban Design Review is a review of a proposal rather than an interrogation of the opportunities and constraints of the site. In this respect, it is clear that it has assumed certain elements are given rather than designed something suited to the site. Similarly, the options for the loading dock have not been adequately investigated, given that this is the town centre for the surrounding community it is an important matter.	provided within **Appendix M** of this submission. • Provided in **Appendix D** are revised development plans. The plans provide three (3) open air voids in the roof between T21 and T22. • T22 does not contain a loading dock that fronts Northridge Drive. T22 has been architecturally designed to achieve a focal point of the development on the corner of Northridge and Portland Drives. The building provides a sloped roof, windows and architectural relief to promote an active street frontage and is surrounded by footpaths and public spaces that contain street furniture and seating. Active street frontage is discussed in item 15(e) below and also further within the Urban Design commentary (Studio GL) provided within **Appendix M** of this submission. • It is noted that Council are satisfied with the proposed location and design of T18 – T21. • The proponent disagrees that the Urban Design Review is limited to a review of the proposal rather than an interrogation of the opportunities and constraints of the site and the proponent also disagrees that the options for the loading dock have not been adequately investigated. The urban design review, as well as **Section 3.3.1** of the SoEE confirm a range of design constraints that are fact (i.e. irregular shaped lot, steep topography, established road network with fixed connection points, heritage item (West Wallsend tramway alignment) and a zoning anomaly) and the various design options that were considered in arriving at the proposed design (which also included input from the proponent's civil engineer, traffic specialist and architect). This exercise was substantial and is described within **Section 3.3.1** of the SoEE. This matter is also addressed within the cover letter and **Appendix M** of this submission (Studio GL Urban Design response).
c) LMLEP 2014: The subject site makes up the majority of the area of land identified for the town centre for this new residential area. The B2 Local Centre Zone is to ensure the surrounding residential neighbourhood has easy access to a place to meet people and find daily needs and services. Consequently, the subject development will strongly influence the success of the town centre.	In response to Council's commentary, the following is advised: • The subject site is not identified as a town centre and there are no specific town centre controls that apply to the site (as is the case with town centres identified in Council's DCP). It is noted that the Pambulong Forest area plan controls that previously applied to the site have been removed from Council's

LMCC Comment	Response
The proposal generally meets the objectives of the B2 zone; to provide a range of commercial uses and to encourage employment opportunities in accessible locations. The local centre is expected to provide a range of retail, business, entertainment and community uses that serve the people who live, work in, and visit the local area, and which promote employment opportunities. However, it is not evident that the irregular shaped lots proposed support this. Detail is needed to show that these lots support the objectives of the zone, and efficient use of land. Other important objectives outlined in the LMLEP 2014 require the local centre to maximise public transport patronage and encourage walking and cycling, as well to create spaces that are accessible and provide a central focus for the community. The proposed development does not support these objectives well. The proposed supermarket faces inwards towards the car park, consequently discouraging pedestrian access into the town centre and encouraging access by car (potentially even for those living across the road from the town centre. The supermarket turns its back of house functions to the residential population opposite, presenting the loading dock to the medium density homes on Northridge Drive. A more appropriate and sensitive interface between the centre and R3 medium density housing is necessary ensuring nearby residents feel safe to walk to the centre without having to drive. The proposed development is not consistent with this objective. The car dominant design has unclear, indirect pedestrian/cycle access into and through the site from Northridge Drive. This fails to support active transport links to nearby residents. The location of the loading dock, does not present an active frontage to the street, and it interrupts the footpath on the southern side of Northridge Drive. This is a major concern for accessibility for the local centre. The north south access through the site should be direct and visible (without bends etc) for a visual and physical connection which is safe and convenient. The zone objective to provide housing as part of mixed use developments	DCP. It is agreed that the proposal satisfies the objectives of the B2 zone. • The shape and efficiency of proposed Lots 1, 3 and 4 are addressed above in item 15(b). • Public transport, pedestrian and cyclist provision is addressed in item 15(a) above. The proponent disagrees that the design of the development will encourage those future residents on Northridge Drive to enter the Woolworths site by vehicle due to safety concerns. It is noted from the approved plans of the medium density housing development (DA2216/2016) that pedestrians from within the medium density housing development are filtered (via footpaths) to the corner of Portland Drive and Northridge Drive, where a signalised intersection exists for safe road crossing into the Woolworths site. The location of the proposed loading dock is addressed within the cover letter of this submission and also within **Appendix M** (Urban Design commentary by Studio GL). • Two clear and obvious points of entry into the site for pedestrians are provided from Northridge Drive. The location of the loading dock is addressed in the cover letter of this submission and also within **Appendix M** (Urban Design commentary by Studio GL). The north / south access point through the site is addressed in item 15(b) above. • There is no requirement for the proponent to provide housing as part of the proposed development. It is agreed that the draft B4 zoning opposite the site (opposite Portland Drive) will provide opportunity for mixed use development in the area.

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is not met. However, the draft B4 zoning adjacent to the subject site will provide sufficient mixed use development opportunities for the area.	
d) Draft amendment to LMLEP2014: Integrated Planning has exhibited a draft amendment to the LMLEP 2014 in the area surrounding George Booth Drive, Edgeworth. The amendment will include rectifying zone boundary anomalies in addition to rezoning of land south of the proposed centre. This will facilitate the active frontages to Portland Drive.	It is agreed that the LEP amendment will rectify the current zoning anomaly on the eastern extremity of the site. It is also agreed that with the zoning anomaly removed, opportunity will be created for Lots 3 and 4 to provide development that will create an active street frontage along Portland Drive.
e) DCP 2014: Council requires Active Street Frontages to all streets within the B2 Local Centre zone. This is particularly important for the development's interface with the R3 medium density housing opposite the subject site, along Northridge Drive, and the B4 Mixed Use zoning proposed on the eastern side of Portland Drive. DCP 2014 defines Active Street Frontages as "a street frontage that enables a direct visual and physical contact between the street and the interior of the building". Clearly defined entrances, windows and shop fronts are elements of a building façade that contribute to an active street frontage. The location of the loading dock/service area fails to achieve an this as it does not enable direct visual and physical contact between the street and the interior of the building. This location also interferes with the pedestrian path along Northridge Drive. As highlighted in the Council's strategic direction, Council is working towards reducing car dependency and so encourages development designs that support more active transport options including public transport. Any car parking in excess of DCP requirements must be justified (refer to issue 8 discussion above). Section 5.1 (Traffic and Vehicle Access) of DCP 2014 further supports active street frontages by minimising the conflict with vehicles along pedestrian footpaths. Alternative locations for the proposed service area/loading dock do not appear to be sufficiently investigated.	The proposal provides an active street frontage to greater than 50% of Northridge Drive, with opportunity for this to be increased further at the time that proposed Lot 1 is developed (subject to separate application). The loading dock is located in Northridge Drive and the reasons why this is essential are detailed within the cover letter of this submission. The greatest concentration of pedestrian activity is likely to occur near the intersection of Portland Drive and Northridge Drive. To respond to this activity, three points of entry are provided, one at the bus stop on Portland Drive and two along Northridge Drive. The proposal provides a focal point around T22 with a public area inclusive of seating, furniture and public art. Due to the zoning anomaly that affects the eastern boundary of the site, it is not possible at this time for proposed Lots 3 and 4 to provide an active street frontage to Portland Drive, as any development on these sites would be required to be set back approximately 15m until the zoning anomaly is resolved. Accordingly, the proposal seeks to offer flexibility in that proposed lots 3 and 4 are proposed to be landscaped until a future Development Application is lodged on each lot. It is possible that at the time of DA lodgement that the zoning anomaly will be resolved, allowing development to occur to the Portland Drive boundary. If the zoning anomaly has not been resolved by this time, any future development will be subject to assessment against Council's controls. The location of the loading dock and proposed car parking are addressed in detail within the cover letter of this submission. Additionally, the location of the loading dock and consideration of active street frontages are further addressed within **Appendix M** of this submission (Studio GL Urban Design commentary).

LMCC Comment	Response
16. Roads and Maritime Services (RMS): Please be advised that the application was referred to the RMS under Clause 104 and Schedule 3 of State Environmental Planning Policy (Infrastructure) 2007 and Clause 17 of State Environmental Planning Policy No.64 - Advertising and Signage on 13 July 2017. To date, these referrals remain outstanding.	It is noted that since issue of Council's RFI, a response has been received from NSW RMS requesting additional information. Provide in **Table 2** below is a response to the matters raised by RMS.
17. Section 94 Contributions: This issue has previously been discussed under separate cover, email dated 12 September 2017.	Noted. This matter is being dealt with separately, noting that the proponent recently (18/1/18) submitted advice to Council from Addisons Lawyers regarding the applicability of Clause 2.9 of the Northlakes Urban Release Area Contributions Plan No 2, which provides allowances for existing development (noting the existing approval for a larger commercial development on the subject site – DA 2207/2007). The proponent is currently awaiting a response from Council.

Table 2: Response to RMS Comments

RMS Comment	Response
• It is recommended that an updated Traffic Impact Statement be provided with modelling updated based on 2017 data with a projection to 2027 figures, and submission of electronic Sidra files.	Provided in **Appendix I** is an addendum to the Traffic Impact Assessment that responds to these items.
• Further information on the proposed future use of Lot 902 DP 1222132 as shown in Drawing A02.01 Rev D.	The addendum notes that the site is currently approved to develop a shopping centre of 18,472m^2 GLFA (DA 2207/2007/C). The approved development generated 1,090vph during the Thursday afternoon peak hour (4pm – 5pm). The proposed development generates reduced traffic volumes when compared with the approved development. The proposed development, based on the revised yield of 7,528m^2 generates approximately 571vph. Accordingly, the approved and constructed intersection of George Booth Drive and Portland Drive has been designed to accommodate the traffic generation from the proposed Cameron Park Village. Additional analysis is not considered necessary because the proposal does not increase traffic volumes. The proposal is well within the approved traffic generation limit for the site. A hotel and place of public entertainment was approved on Lot 902 DP 1222132 (DA 1612/2008) in March 2009 (this consent has since been physically activated and is current). The existing and larger Woolworths development (DA 2207/2007) was approved after the hotel development in June 2010. The existing Woolworths development consent took into account the approved hotel use of Lot 902. As noted above, given that the proposal is smaller than the currently approved Woolworths development, there will be no adverse traffic impacts generated by the proposal.

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15 February 2017

Fabcot Pty Ltd
1 Woolworths Way
Bella Vista NSW 2153

Attention: Thomas Rethati

Dear Thomas

DA 1178/2017

WOOLWORTH LOCAL SHOPPING CENTRE, CAMERON PARK – ACOUSTIC ASSESSMENT

Marshall Day Acoustics (MDA) prepared an acoustic assessment for the proposed 'Woolworth Local Shopping Centre' at Cameron Park, detailed in our report *'Rp 001 r05 2016048SY'* dated 26/06/2017. Subsequent to that report we have been advised by Woolworths that the proposed loading dock hours have been updated to restrict delivery vehicles to only enter site during the Day and Evening assessment periods.

We have been requested by Woolworths to update our acoustic assessment on this basis. This letter presents the updated results of our assessment and conclusions.

Basis

Our assessment is based on the same information used in our June 2017 assessment, however the following assumptions have been updated:

- Proposed loading dock hours restrictions:
  - Use will be restricted to 7am to 10pm, seven days per week; and
  - Deliveries to the loading dock will not be scheduled to occur before 7am Monday to Saturday and 8am Sunday.

Assumptions made for traffic volumes have been updated to reflect these loading dock restrictions and are presented in Table 1 & 2. The traffic volumes are derived from data provided in draft traffic report '0313RO1V1AGTIA Issue 1' from Ason Group.

Table 1: Assumptions made for traffic volumes per period

Time Period		Hrs	Total for period			
			Carpark (387cars)	Loading dock large trucks (AV)	Loading dock small trucks (HRV & MRV)	Loading dock delivery vans
Day	0700 – 1800hrs	11	4551	2	22	11
Evening	1800-2200 hours	4	1368	1	8	4
Night	2200-0000 hours & 0600-0700 hours	3	547	0	0	0

Note that 1 vehicle movement in the table indicates one vehicle trip, i.e. a vehicle both entering and leaving site within the period

Table 2: Assumptions made for traffic volumes per busiest 15min period

Time Period		Hrs	Total for period			
			Carpark (387cars)	Loading dock large trucks (AV)	Loading dock small trucks (HRV & MRV)	Loading dock delivery vans
Day	0700 – 1800hrs	11	148	1	2	2
Evening	1800-2200 hours	4	86	1	2	2
Night	2200-0000 hours & 0600-0700 hours	3	46	0	0	0

Note that 1 vehicle movement in the table indicates one vehicle trip, i.e. a vehicle both entering and leaving site within the period

Noise Impact Assessment

Noise levels have been calculated to potential future receivers to the east of Portland Drive across the road from the future car park and to the north of Northridge Drive across to the road from Woolworths the loading dock.

Any noise impacts from the site must comply with the criteria presented in our previous report *'Rp 001 r05 2016048SY'*.

Noise emissions from the site have been re-assessed based on the loading dock restrictions and updated delivery vehicle volumes, and is presented in Table 3 overleaf.

Sleep Disturbance Assessment

Restricted loading dock hours to Day and Evening periods, means that the sleep disturbance criteria normally applied during the night hours is no longer applicable to the Loading Dock assessment.

Compliance requirements with INP daytime and evening time noise criteria remains applicable and achievable.

Conclusion

The proposed development is now capable of full compliance with the site specific INP noise criteria set out in our previous acoustic report *'Rp 001 r05 2016048SY'.*

Achieving compliance is based on the following loading dock hours as proposed by Woolworths:

- Use will be restricted to 7am to 10pm, seven days per week; and
- Deliveries to the loading dock will not be scheduled to occur before 7am Monday to Saturday and 8am Sunday.

Table 3: Calculated noise levels - INP Assessment

Period	Calculated noise level dB LAeq, 15min	Intrusiveness criteria, dB LAeq, 15mins	Compliance	Calculated noise level, dB LAeq, period	Amenity criterion, dB LAeq, period	Compliance
38-42 Craighill Cres						
Day	36	47	✓	34	55	✓
Evening	33	43	✓	33	45	✓
Night	30	41	✓	20	40	✓
1A Seaham St						
Day	36	47	✓	32	55	✓
Evening	31	43	✓	31	45	✓
Night	29	41	✓	22	40	✓
Portland Drive (future res)						
Day	39	47	✓	38	55	✓
Evening	37	43	✓	37	45	✓
Night	34	41	✓	25	40	✓
Northridge Drv (future res)						
Day	45	47	✓	40	55	✓
Evening	43	43	✓	39	45	✓
Night	25	41	✓	15	40	✓

Noise levels have been calculated to potential future receivers to the east of Portland Drive across the road from the future car park and to the north of Northridge Drive across the road from the Woolworths loading dock.

Yours faithfully

MARSHALL DAY ACOUSTICS PTY LTD

Nick Lynar

Consultant

APPENDIX C

CAR PARKING & PUBLIC TRANSPORT ANALYSIS
WOOLWORTHS CAMERON PARK (DA1178/2017)

DA as lodged July 2017

- **476 spaces**
- Proposed supermarket: 3,920m²
- Proposed tenancies (T1-T22): 3,908m²
- Total (GFA): 7,828m²

Plus

- Future development lots 3 and 4: 6,960m² (based on estimated GFA)

- **Total (supermarket, T1-T22 plus Future Lots 3 and 4): 14,788m²**

- Build now rate (Woolworths & T1-T22): 1 space per 16m² (GFA)
- Build now plus future rate (Lot 3 and 4): 1 space per 31m² (GFA)

Current Approval (DA2207/2007/C)

- **864 spaces**:
  - 322 at grade
  - 542 basement
- Approved supermarket, Big W & specialty retail: 17,428m²
- Approved offices: 298m²
- Total (GFA): 17,726m²
- Carparking Rate: 1 space per 20.5m² (GFA)

Council DCP Rate

Shop or Group of Shops:

Where total area is less than 5,000m² GFA: 1 space per 25m² (GFA)
Where total area is greater than 5,000m² GFA: 1 space per 40m² (GFA)

Proponent Interpretation of DCP (at time of DA lodgement July 2017)

- Adopting the DCP car parking rate theoretically means that if the proposal was 5,000m² (GFA) or 8,000m² (GFA), car parking required would be the same.
- Theoretically, if the development was 4,999m² (GFA), car parking generated is 200 spaces. If the development was 5,001m² (GFA), car parking generated is 125 spaces, a significant difference of 75 spaces.

Noting the above, the proponent considered a reasonable approach was to adopt a 'sliding scale' in terms of carparking calculation as follows:

- 1 space per 25m^2 (GFA) for the first 5,000m^2 GFA; plus
- 1 space per 40m^2 (GFA) for the balance (9,788m^2 GFA).

This generated a parking requirement of 445 spaces.

As originally proposed (July 2017), based on the proponent's interpretation of the DCP, a surplus of 31 spaces was proposed.

Council Interpretation of DCP & Proposed Carparking

- Council do not support including future development lots 3 and 4 in carparking calculations as it is unknown what the future uses will be (ie. the parking rate needed may be higher of less).
- Relevant to proposed Lot 2 (which will contain the supermarket and Tenancies T1-T22) Council note:
    - Supermarket: 3,920m^2
    - T1-T22: 3,908m^2
    - **Total GFA: 7,828m^2**

  Given that the above is a group of shops greater than 5,000m^2 in GFA, a rate of 1 per 40m^2 GFA applies which generates 196 spaces.

  Council are of the position that based on the original proposal as lodged in July 2017, a surplus of 280 parking spaces is proposed (ie. 476 – 196).

Revised Proposal February 2018

Noting Council's commentary, the proponent has revised the proposal as follows:

- Future development Lots 3 and 4 are removed from car parking calculations. Future uses on these lots will be subject to separate DA with carparking provision to be determined at that time.
- Future development Lot 1 remains excluded from car parking calculations and is subject to separate DA in the future.
- The GFA for the proposal is as follows:
    - Supermarket – 3,615m^2 (this includes a minor reduction to GFA as originally lodged in July 2017).
    - T1-T22 (inclusive of kiosks) – 3,913m^2.
    - **Total GFA – 7,528m^2.**
- 387 car parking spaces are proposed.
- **Noting the total GFA of 7,528m^2 (combined supermarket & T1-T22), the parking proposed is at a rate of 1 space per 19.5m^2 GFA.**
- Adopting Council's position that a parking rate of 1 space per 40m^2 GFA should be adopted, this results in a requirement of 188 spaces.
- It is acknowledged that the proposed carparking exceeds Council's interpretation of the DCP by 199 spaces (ie. 387 – 188). Notwithstanding, the

proponent is firmly of the position that the parking provided is essential for the successful operation of the local shopping centre. This is based on the extensive retail experience of the proponent, the Cost Benefit Analysis undertaken by Location IQ to support the proposed carparking numbers, and is evidenced in a number of other retail developments (both local and non-local) as shown in **Table 4** below.

- The proposal is consistent with RMS minimum parking requirements, which are:
  - Supermarket: 4.2 spaces per 100m² GLFA (1 space per 24m²)
  - Speciality Retail: 4.5 spaces per 100m² GLFA (1 space per 22m²)
    Note: RMS guidance recommends 75% of GFA = GLFA
- Additionally, Table 5 below provides a comparison of bus service availability at a number of centres in comparison to Cameron Park. A reduced number of car parks at the proposed Cameron Park Woolworths site to the point that there is inadequate parking to cater for demand will not result in people catching the bus or walking. The bus timetable does not support necessary frequency and people (particularly families) cannot do a full weekly shop and easily or realistically transport the groceries by bus or on foot. Instead people will park on the street or drive to the next available centre, which will have the effect of increased congestion and vehicle trip distance.

Table 1: Proposed Car Parking Rate – Cameron Park

Subject Site	Proposed GFA	Proposed Parking	Proposed Parking Rate
Cameron Park	7,528m²	387 spaces	1 space per 19.5m²

Table 2: Existing Approved Car Parking Rate – Cameron Park (DA 2207/2207/C)

Subject Site	Approved GFA	Approved Parking	Approved Parking Rate
Cameron Park	17,726m²	864 spaces	1 space per 20.5m²

Table 3: Approved Adjoining Hotel Site (Harrigans)

Subject Site	Approved GFA	Approved Parking	Approved Parking Rate
Cameron Park	1,708m²	129 spaces*	1 space per 13m²

***Note:** The DCP parking rate for a 'Food & Drink Premises' is 1 space per 25m² GFA. The DCP requirement is 68 spaces. Therefore a surplus of 61 spaces is approved.

Table 4: Car Parking Rates for Other Retail Developments (Local and Non Local)

Centre	GFA	Basis of Comparison	Parking Provided	Parking Rate
Mt Hutton (Lake Macquarie Fair)	22,054m²	Within LGA	1,025 spaces	1 space per 21.5m²
Edgeworth Town Square	5,811m² (retail) 1,488m² (commercial)	Within Locality & LGA	293 spaces	1 space per 25m²
Aldi Edgeworth	1,591m²	Within Locality & LGA	74 spaces	1 space per 21.5m²
Stockland Glendale	77,977m²	Within Locality & LGA	2,277 spaces	1 space per 34m²
Charlestown Square	93,500m²	Within LGA	3,552 spaces	1 space per 26m²
Westfield Kotara	74,200m²	Within adjoining LGA	2,973 spaces	1 space per 25m²
Cameron Park IGA	744m²	Within Locality & LGA	27 spaces	1 space per 27.5m²
Cardiff Marketplace	6,000m²	Within LGA	160 spaces	1 space per 37.5m²
Stockland	12,000m²	Within adjoining LGA	600 spaces	1 space per 20m²

Wallsend				
Glenrose Village, Belrose, NSW	10,872m²	Comparable Woolworths Development	519 spaces	1 space per 21m²
Spring Farm, NSW	4,949m²	Comparable Woolworths Development	257 spaces	1 space per 19m²
Vincentia Marketplace, NSW	9,273m²	Comparable Woolworths Development	432 spaces*	1 space per 21m²
Bulli, NSW	4,260m²	Comparable Woolworths Development	173 spaces*	1 space per 24m²
Woolgoolga, NSW	3,800m²	Comparable Woolworths Development	165 spaces*	1 space per 23m²
Cornubia, QLD	6,929m²	Comparable Woolworths Development	376 spaces	1 space per 18m²
Aveley, WA	5,086m²	Comparable Woolworths Development	255 spaces	1 space per 20m²
Brighton, WA	9,049m²	Comparable Woolworths Development	570 spaces	1 space per 16m²

*** Note:** This development did not achieve the minimum 1 space per 20m² parking rate required by Woolworths. As a result these developments have experienced significant problems with lack of availability of car parking and the following is noted:

- To alleviate the inadequate carparking issue at Bulli, Woolworths have acquired additional land to provide increased carparking. Plans are currently being prepared for approval.
- Woolworths are experiencing the same problem at Woolgoolga and Vincentia Marketplace and are currently making investigations on how to supply more carparking to service the developments.

Table 5: Bus Service Comparison (Local)

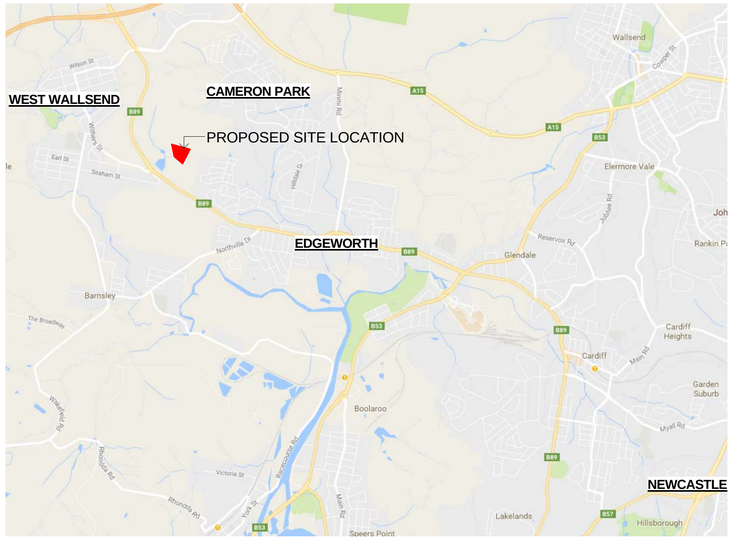
Location	Routes	Weekday Services	Saturday Services	Sunday / Public Holiday Services
Northlakes Drive, Cameron Park	2	32	24	17
Charlestown Square	10	175	153	91
Westfield Kotara	7	111	87	49
Stockland Glendale	4	80	58	46
Mt Hutton (Lake Macquarie Fair)	4	65	56	35
Edgeworth Town Square	3	43	27	22
Cardiff Shopping Centre	3	61	41	33

CAMERON PARK VILLAGE

DEVELOPMENT APPLICATION

No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DIVE, CAMERON PARK NSW 2285

DRAWING LIST - DA	
Sheet Number	**Sheet Name**
A00.01	TITLE SHEET, LOCATION PLAN & DRAWING LIST
A00.05	SITE ANALYSIS
A00.20	GFA & CARPARKING ANALYSIS
A00.80	SOLAR STUDY
A01.01	EXISTING & DEMOLITION PLAN - SITE PLAN
A02.01	PROPOSED SITE PLAN
A06.01	PROPOSED FLOOR PLAN - GL
A06.10	PROPOSED ROOF PLAN
A10.01	PROPOSED ELEVATIONS - NORTH
A10.02	PROPOSED ELEVATIONS - SOUTH
A10.03	PROPOSED ELEVATIONS - EAST & WEST
A12.01	PROPOSED SITE SECTIONS
A100.81	3D VISUALISATIONS
A100.90	MATERIALS SAMPLE BOARD
A100.91	SIGNAGE DETAILS
A100.01	LOADING DOCK ANALYSIS



LOCATION MAP

LOCATION AERIAL PLAN

NORTH

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ISSUE	DATE	DESCRIPTION
DA-E	14/02/2018	FOR DA APPROVAL
DA-D	06/02/2018	FOR DA APPROVAL
DA-C	19/06/2017	FOR DA APPROVAL
DA-B	08/06/2017	FOR DA APPROVAL
DA-A	02/06/2017	FOR REVIEW

Coordinated Reference Drawings

Discipline	Company
SURVEY	
STRUCTURE	
CIVIL	
MECHANICAL	
HYDRAULIC	
ELECTRICAL	
LANDSCAPE	
FIRE	

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Project

CAMERON PARK VILLAGE

No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DRIVE, CAMERON PARK NSW 2285

Sheet name

TITLE SHEET, LOCATION PLAN & DRAWING LIST

Scale @ A1: 1 : 1
Project No.: S1641
Drawn By: CF
Checked By: MF

A00 SERIES - INFORMATION & ANALYSIS

Drawing No. A00.01
Stage - Rev DA-E

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

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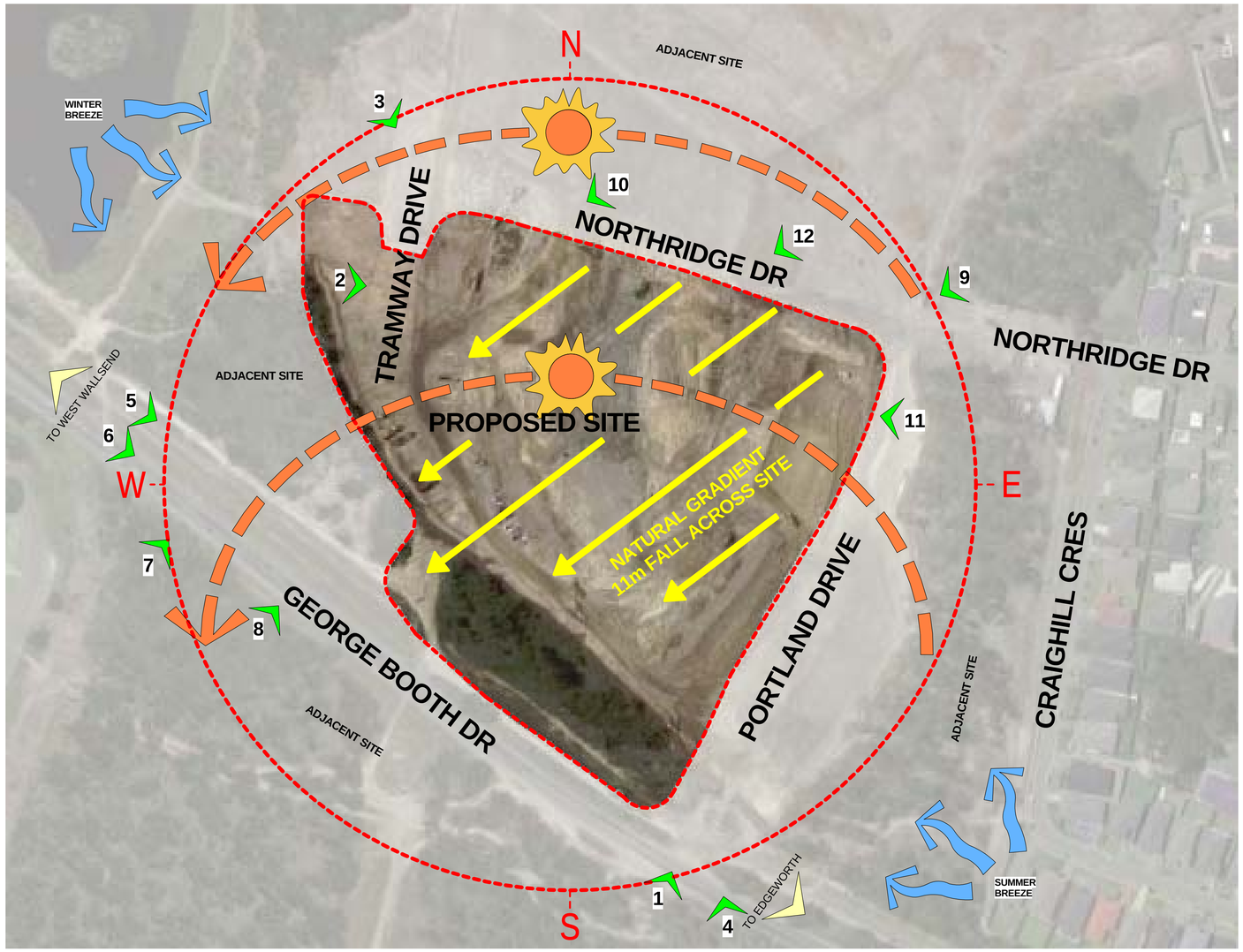

WIND ROSE - NEWCASTLE UNIVERSITY

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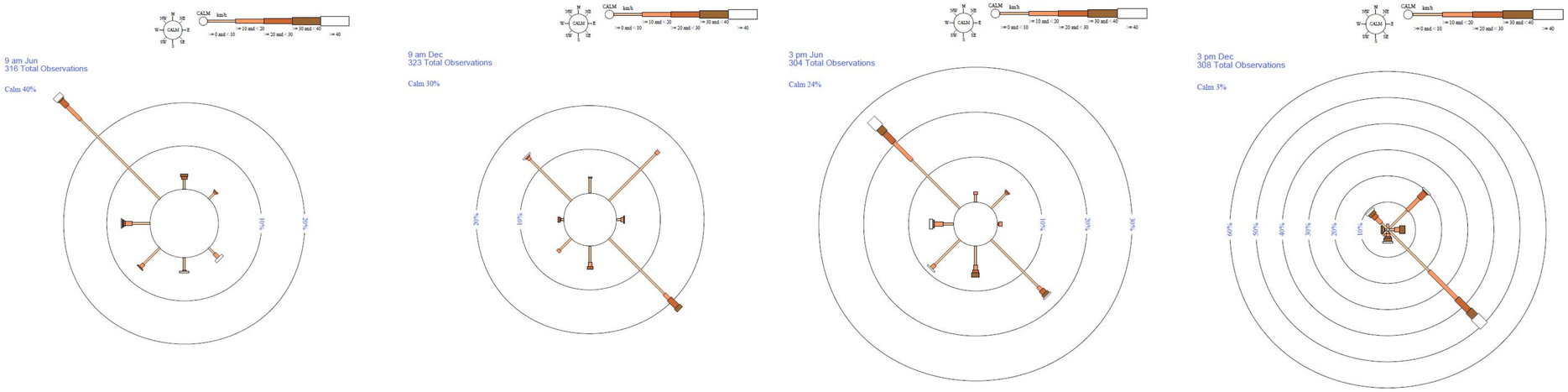

CONTEXT PHOTOS


VIEW 1


VIEW 2


VIEW 3


VIEW 4


VIEW 5


VIEW 6


VIEW 7


VIEW 8


VIEW 9


VIEW 10


VIEW 11


VIEW 12

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

NORTH

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ISSUE	DATE	DESCRIPTION
DA-E	14/02/2018	FOR DA APPROVAL
DA-D	06/02/2018	FOR DA APPROVAL
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Project

CAMERON PARK VILLAGE

No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DRIVE, CAMERON PARK NSW 2285

Sheet name

SITE ANALYSIS

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Project No.: S1641
Drawn By: CF
Checked By: MF

A00 SERIES - INFORMATION & ANALYSIS

Drawing No. A00.05
Stage - Rev DA-E

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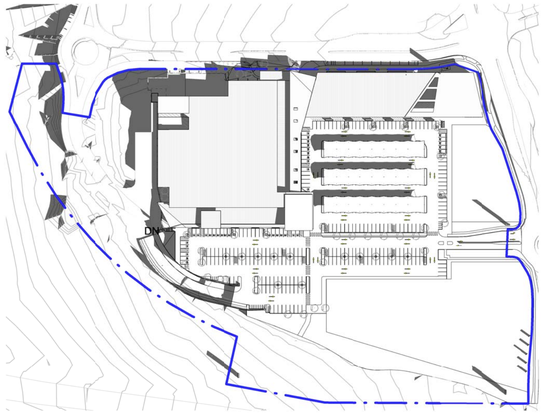

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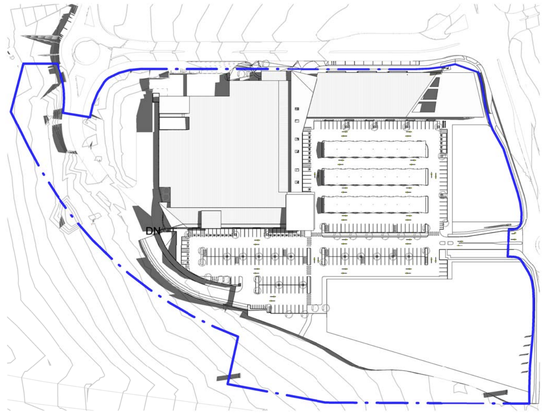

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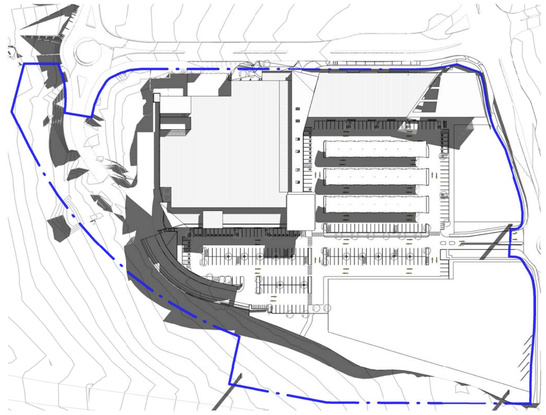

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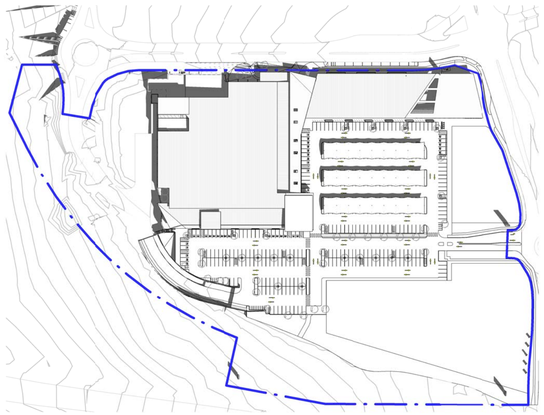

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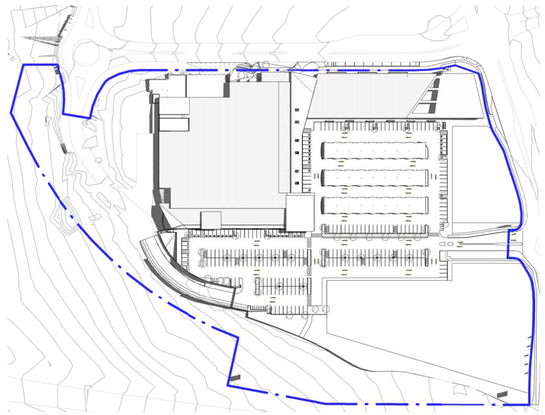

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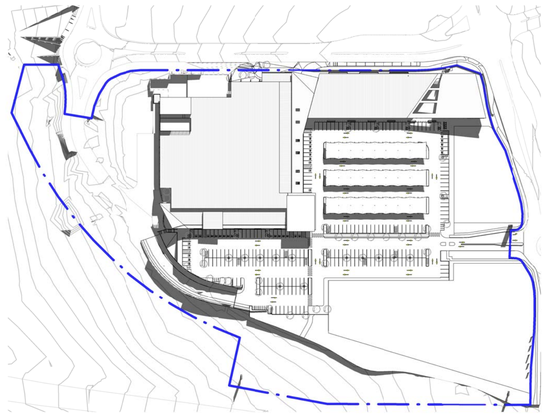

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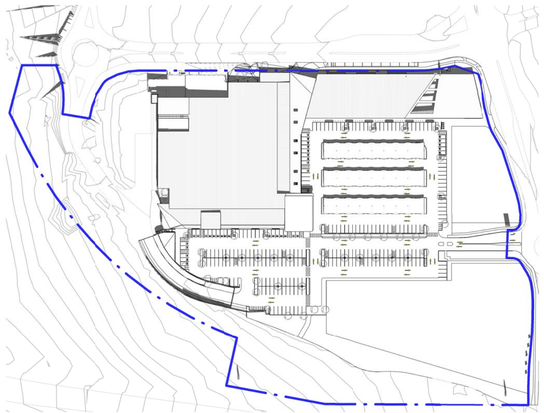

7 SUMMER 9AM - SITE PLAN
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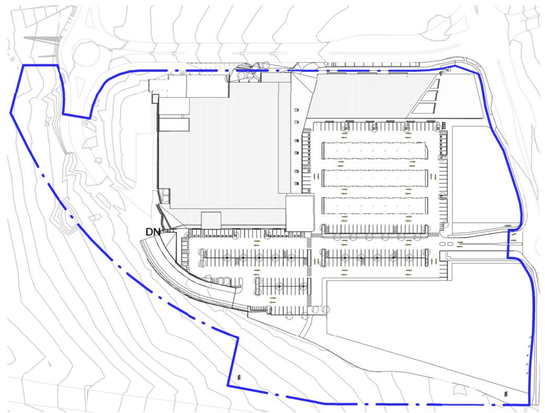
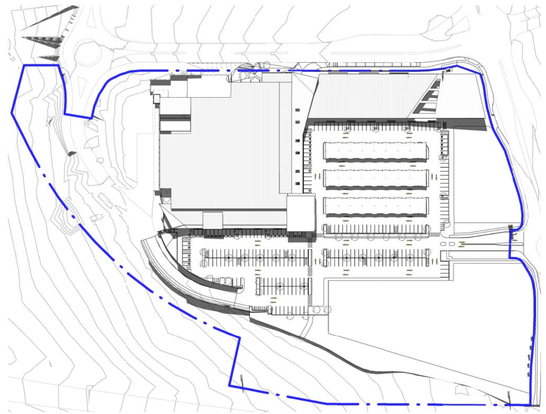


8 SUMMER 12PM - SITE PLAN
1 : 2000



9 SUMMER 3PM - SITE PLAN
1 : 2000

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

NORTH

SUN ANGLE CALCULATIONS

LOCATION	NEWCASTLE, AUSTRALIA
LATITUDE	32.92 deg
LONGITUDE	151.78 deg
MAGNETIC VARIATION	TRUE NORTH 12 deg EAST OF M.M.

SEPT 23rd & MAR 21st EQUINOXES		
TIME	AZIMUTH	ALTITUDE
9.00 AM	62 deg E	35 deg
12.00 PM	0 deg	58 deg
3.00 PM	62 deg W	35 deg

SHADOW CALCULATION IS GENERATED USING AUTODESK REVIT 2016 SOFTWARE.

ISSUE	DATE	DESCRIPTION
DA-F	14/02/2018	FOR DA APPROVAL
DA-E	06/02/2018	FOR DA APPROVAL
DA-D	19/06/2017	FOR DA APPROVAL
DA-C	09/06/2017	FOR DA APPROVAL
DA-B	08/06/2017	FOR DA APPROVAL
DA-A	02/06/2017	FOR REVIEW

Coordinated Reference Drawings

Discipline	Company
SURVEY	
STRUCTURE	
CIVIL	
MECHANICAL	
HYDRAULIC	
ELECTRICAL	
LANDSCAPE	
FIRE	

Client

FABCOT PTY LTD
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Project Manager

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CAMERON PARK VILLAGE

No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DRIVE, CAMERON PARK NSW 2285

Sheet name

SOLAR STUDY

Scale @ A1: As indicated
Project No.: S1641
Drawn By: CF Checked By: MF

A00 SERIES - INFORMATION & ANALYSIS

Drawing No. A00.80
Stage - Rev DA-F

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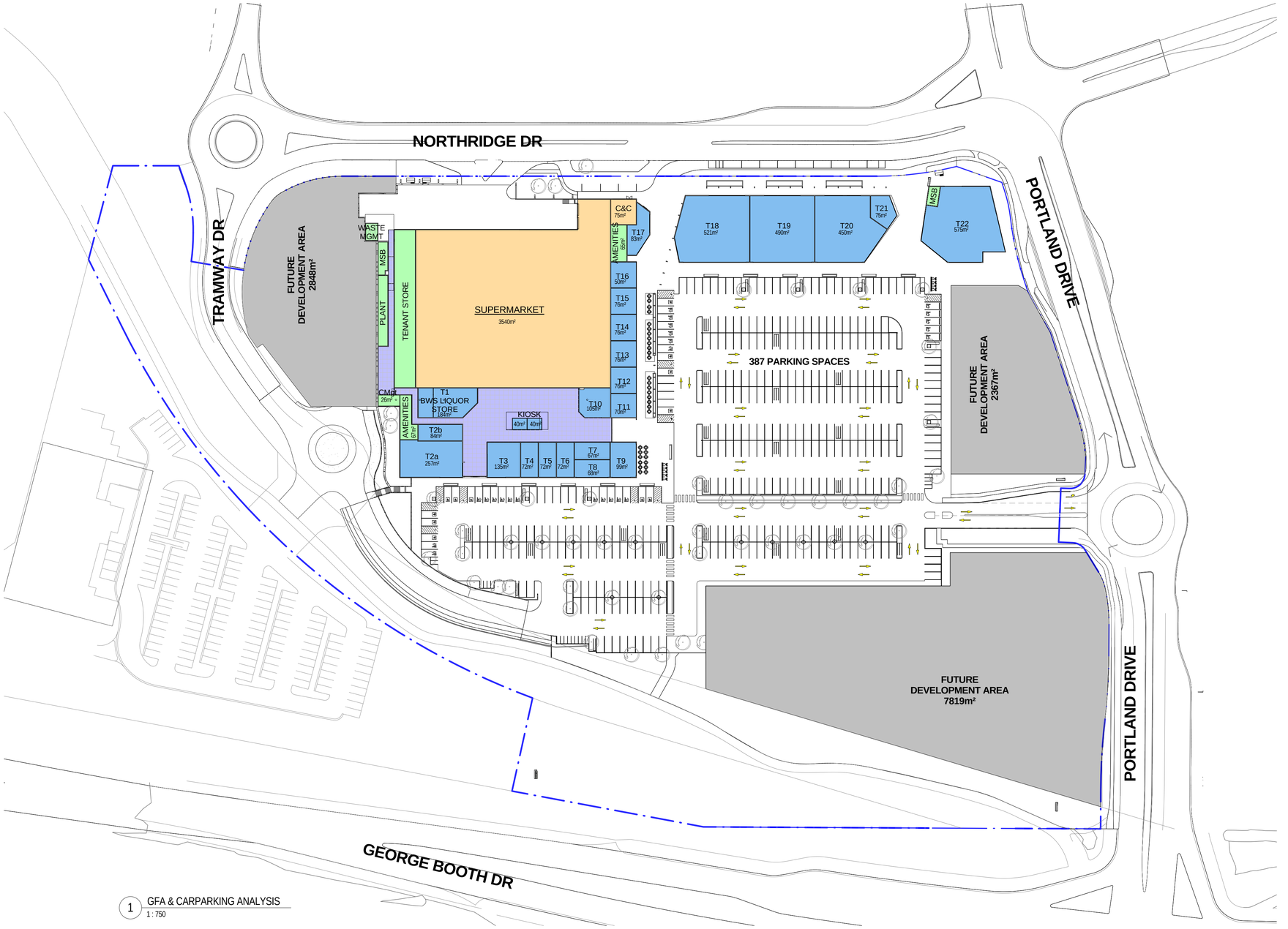

1 GFA & CARPARKING ANALYSIS
1 : 750

AREA SCHEDULE - GFA	
NAME	AREA
SUPERMARKET	3615
RETAIL	3913
MALL	1064
MISCELLANEOUS	678
FUTURE DEVELOPMENT LOT	13034

NOTE:

FOR FUTURE DEVELOPMENT AREA REFER TO PLAN OF SUBDIVISION (ADW JOHNSON) FOR DETAIL.

PARKING SCHEDULE	
TYPE	COUNT
CAR 5400 X 2600MM	351
DISABLED 5400 X 2600MM	12
PARENTS 5400 X 2600MM	24
TOTAL	387

NOTE:

PARKING SCHEDULE INCLUDES PARKING ON SITE AND OFF STREET PARKING ON NORTHRIDGE DRIVE.

MOTORBIKE 2500 X 1200MM	19
BICYCLES	32

METHOD OF MEASUREMENT

GROSS FLOOR AREA (GFA)

REF: LAKE MACQUARIE ENVIRONMENTAL PLAN 2014

MEANS THE SUM OF AREAS OF EACH FLOOR OF A BUILDING MEASURED FROM THE INTERNAL FACE OF EXTERNAL WALLS, OR FROM THE INTERNAL FACE OF WALLS SEPARATING THE BUILDING FROM ANY OTHER BUILDING, MEASURED AT A HEIGHT OF 1.4M ABOVE THE FLOORS, AND INCLUDES:

(i) THE AREA OF A MEZZANINE, AND

(ii) HABITABLE ROOMS IN A BASEMENT OR AN ATTIC, AND

(iii) ANY SHOPS, AUDITORIUM, CINEMA, AND THE LIKE, IN A BASEMENT OR ATTIC,

BUT EXCLUDES:

(iv) ANY AREA FOR COMMON VERTICAL CIRCULATION, SUCH AS LIFTS AND STAIRS, AND

(v) ANY BASEMENT:
(a) STORAGE, AND
(b) VEHICULAR ACCESS, LOADING AREAS, GARBAGE AND SERVICES, AND

(vi) PLANT ROOMS, LIFT TOWERS AND OTHER AREAS USED EXCLUSIVELY FOR MECHANICAL SERVICES OR DUCTING, AND

(vii) CAR PARKING TO MEET ANY REQUIREMENTS OF THE CONSENT AUTHORITY, AND

(viii) ANY SPACES FOR THE LOADING OR UNLOADING OF GOODS, AND

(ix) TERRACES AND BALCONIES WITH OUTER WALLS LESS THAN 1.4M HIGH, AND

(x) VOIDS ABOVE A FLOOR AT THE LEVEL OF A STOREY OR STOREY ABOVE.

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

NORTH
1 : 1000 0 10 20 30 40 50

LEGEND
= SUPERMARKET
= RETAIL
= MISCELLANEOUS
= MALL
= FUTURE DEVELOPMENT AREA
= SITE BOUNDARY

ISSUE	DATE	DESCRIPTION
DA-H	14/02/2018	FOR DA APPROVAL
DA-G	06/02/2018	FOR DA APPROVAL
DA-F	12/10/2017	FOR DA APPROVAL
DA-E	19/06/2017	FOR DA APPROVAL
DA-D	09/06/2017	FOR DA APPROVAL
DA-C	08/06/2017	FOR DA APPROVAL
DA-B	02/06/2017	FOR REVIEW
DA-A	31/05/2017	FOR INFORMATION

Coordinated Reference Drawings

Discipline	Company
SURVEY	
STRUCTURE	
CIVIL	
MECHANICAL	
HYDRAULIC	
ELECTRICAL	
LANDSCAPE	
FIRE	

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CAMERON PARK VILLAGE

No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DRIVE, CAMERON PARK NSW 2285

Sheet name

GFA & CARPARKING ANALYSIS

Scale @ A1: As indicated
Project No.: S1641
Drawn By: CF Checked By: MF

A00 SERIES - INFORMATION & ANALYSIS

Drawing No.	Stage - Rev
A00.20	DA-H

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EXISTING AND DEMOLITION PLAN

NORTH

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ISSUE	DATE	DESCRIPTION
DA-F	14/02/2018	FOR DA APPROVAL
DA-E	06/02/2018	FOR DA APPROVAL
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DA-A	02/06/2017	FOR REVIEW

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Discipline	Company
SURVEY	
STRUCTURE	
CIVIL	
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CAMERON PARK VILLAGE

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Sheet name

EXISTING & DEMOLITION PLAN - SITE PLAN

Scale @ A1: 1 : 1
Project No.: S1641
Drawn By: CF Checked By: MF

A01 SERIES - EXISTING & DEMOLITION

Drawing No. A01.01

Stage - Rev DA-F

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

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1 PROPOSED - SITE PLAN
1 : 1000

NORTH

0 10 20 30 40 50
1 : 1000

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ISSUE	DATE	DESCRIPTION
DA-F	14/02/2018	FOR DA APPROVAL
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Coordinated Reference Drawings

Discipline	Company
SURVEY	
STRUCTURE	
CIVIL	
MECHANICAL	
HYDRAULIC	
ELECTRICAL	
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FIRE	

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Sheet name

PROPOSED SITE PLAN

Scale @ A1: 1 : 1000
Project No.: S1641
Drawn By: CF Checked By: MF

A02 SERIES - PROPOSED SITE PLAN - GROUND LEVEL

Drawing No. A02.01
Stage - Rev DA-F

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

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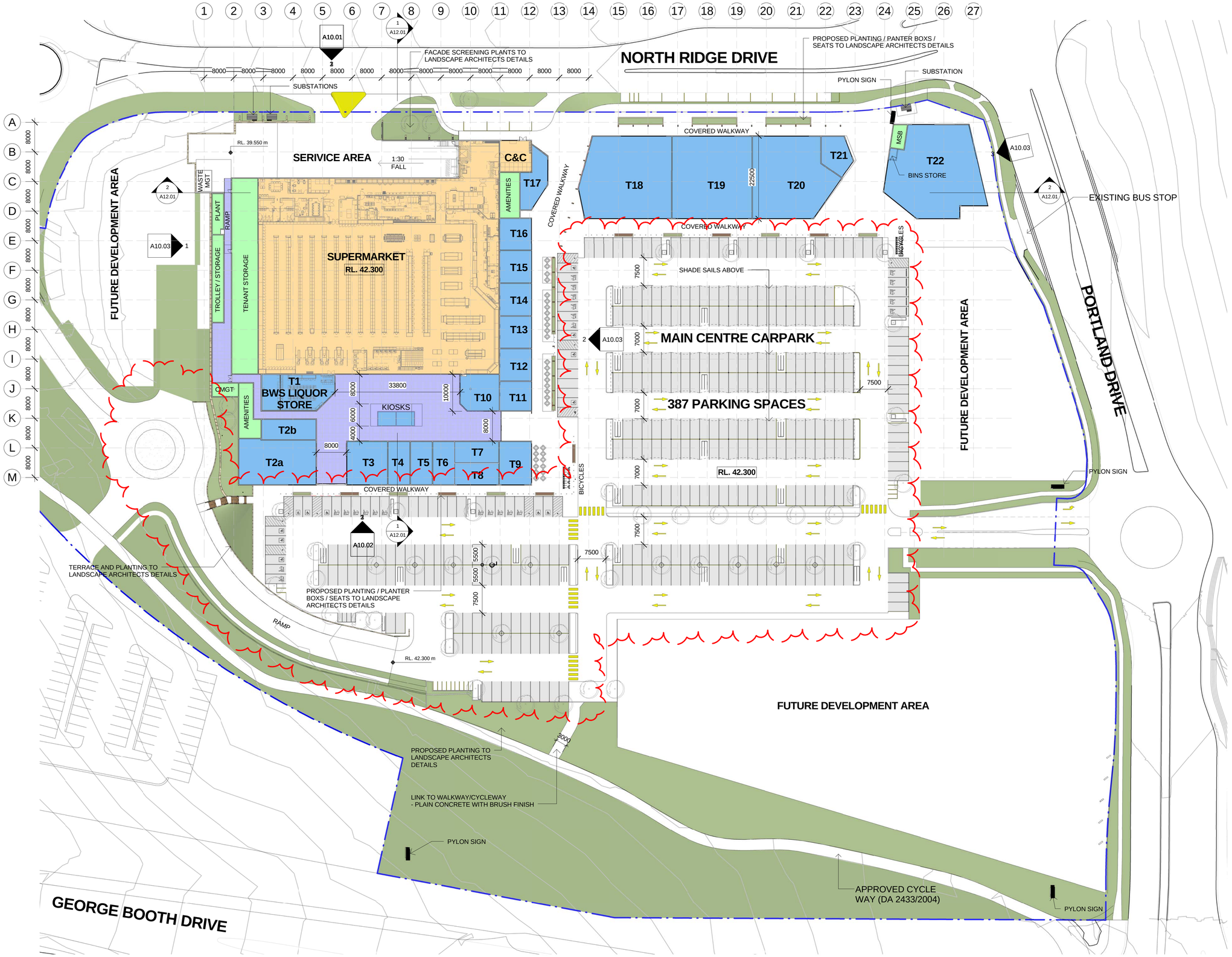

1 PROPOSED - GROUND FLOOR
1 : 500

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

NORTH
1 : 500 0 10 20 30

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LEGEND

- = SUPERMARKET
- = RETAIL
- = MISCELLANEOUS
- = MALL
- = FUTURE DEVELOPMENT AREA
- = SITE BOUNDARY

NOTE:

- REFER TO LANDSCAPE ARCHITECTS DRAWINGS FOR DETAILS ON LANDSCAPED AREAS
- REFER TO CIVIL ENGINEERS DRAWINGS FOR DETAILS ON LANDSCAPED AREAS

ISSUE	DATE	DESCRIPTION
DA-K	14/02/2018	FOR DA APPROVAL
DA-J	06/02/2018	FOR DA APPROVAL
DA-H	12/01/2018	FOR DA APPROVAL
DA-G	11/01/2018	FOR DA APPROVAL
DA-F	11/01/2018	FOR DA APPROVAL
DA-E	12/10/2017	FOR DA APPROVAL
DA-D	19/06/2017	FOR DA APPROVAL
DA-C	09/06/2017	FOR DA APPROVAL
DA-B	08/06/2017	FOR DA APPROVAL
DA-A	02/06/2017	FOR REVIEW

Coordinated Reference Drawings

Discipline	Company
SURVEY	
STRUCTURE	
CIVIL	
MECHANICAL	
HYDRAULIC	
ELECTRICAL	
LANDSCAPE	
FIRE	

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CAMERON PARK VILLAGE

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Sheet name

PROPOSED FLOOR PLAN - GL

Scale @ A1: As indicated
Project No.: S1641
Drawn By: CF Checked By: MF

A06 SERIES - SETOUT PLANS

Drawing No. A06.01
Stage - Rev DA-K

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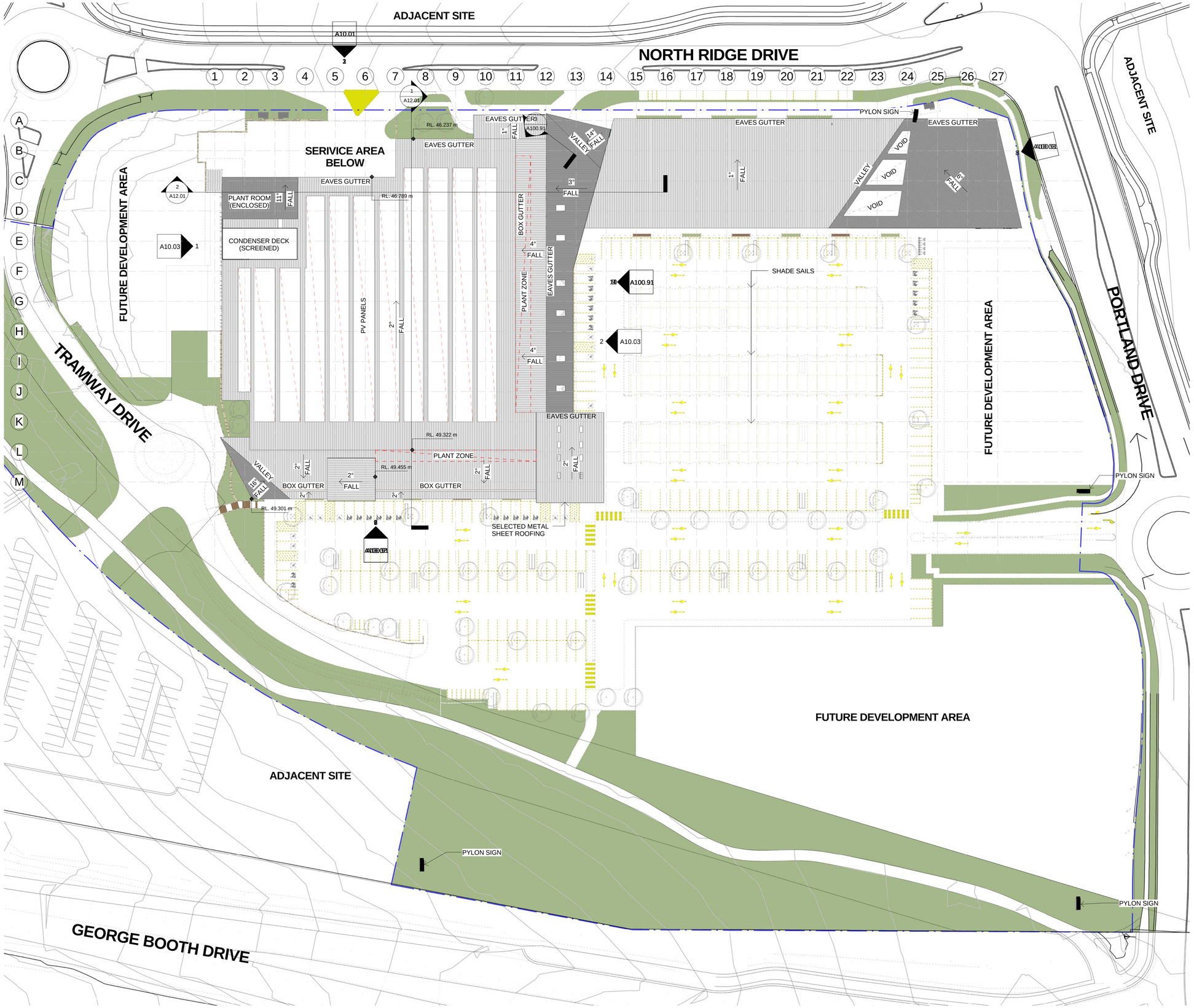

1 PROPOSED - ROOF PLAN
1 : 500

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

NORTH
1 : 500 0 10 20 30

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ISSUE	DATE	DESCRIPTION
DA-F	14/02/2018	FOR DA APPROVAL
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DA-B	08/06/2017	FOR DA APPROVAL
DA-A	02/06/2017	FOR REVIEW

Coordinated Reference Drawings

Discipline	Company
SURVEY	
STRUCTURE	
CIVIL	
MECHANICAL	
HYDRAULIC	
ELECTRICAL	
LANDSCAPE	
FIRE	

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CAMERON PARK VILLAGE

No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DRIVE, CAMERON PARK NSW 2285

Sheet name

PROPOSED ROOF PLAN

Scale @ A1: 1 : 500
Project No.: S1641
Drawn By: CF Checked By: MF

A06 SERIES - SETOUT PLANS

Drawing No.	Stage - Rev
A06.10	DA-F

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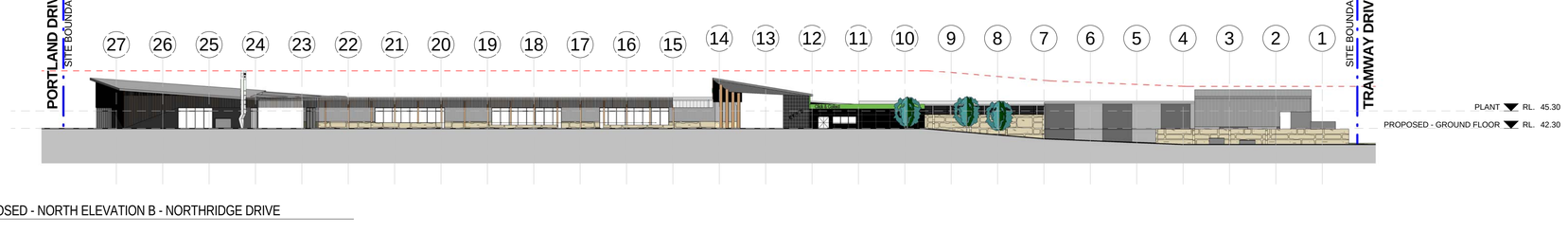
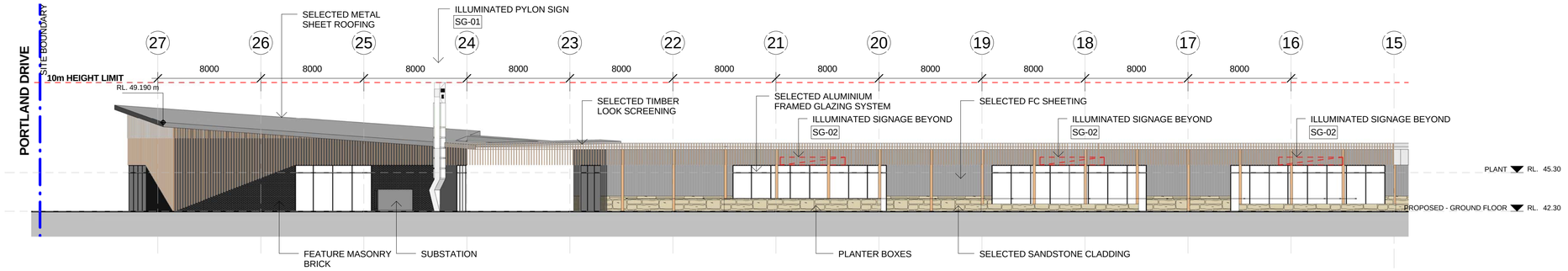
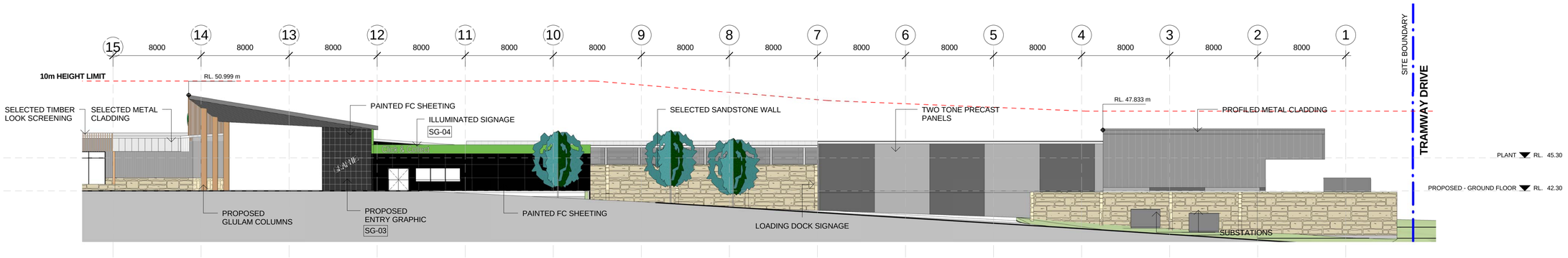


3 PROPOSED - NORTH ELEVATION B - NORTHRIDGE DRIVE
1 : 500



1 PROPOSED - NORTH ELEVATION A - NORTHRIDGE DRIVE
1 : 200



2 PROPOSED - NORTH ELEVATION B - NORTHRIDGE DRIVE
1 : 200

1 : 500 (0, 10, 20, 30)
1 : 200 (0, 2, 4, 8, 12)

NOTE:

- REFER TO DRAWING A100.91 FOR SIGNAGE DETAILS

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ISSUE	DATE	DESCRIPTION
DA-E	14/02/2018	FOR DA APPROVAL
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Coordinated Reference Drawings

Discipline	Company
SURVEY	
STRUCTURE	
CIVIL	
MECHANICAL	
HYDRAULIC	
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LANDSCAPE	
FIRE	

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CAMERON PARK VILLAGE

No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DRIVE, CAMERON PARK NSW 2285

Sheet name

PROPOSED ELEVATIONS - NORTH

Scale @ A1: As indicated
Project No.: S1641
Drawn By: CF Checked By: MF

A10 SERIES - EXTERNAL ELEVATIONS

Drawing No. A10.01
Stage - Rev DA-E

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

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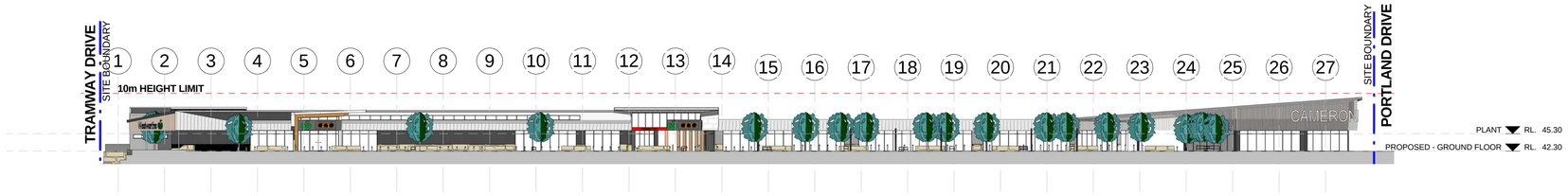
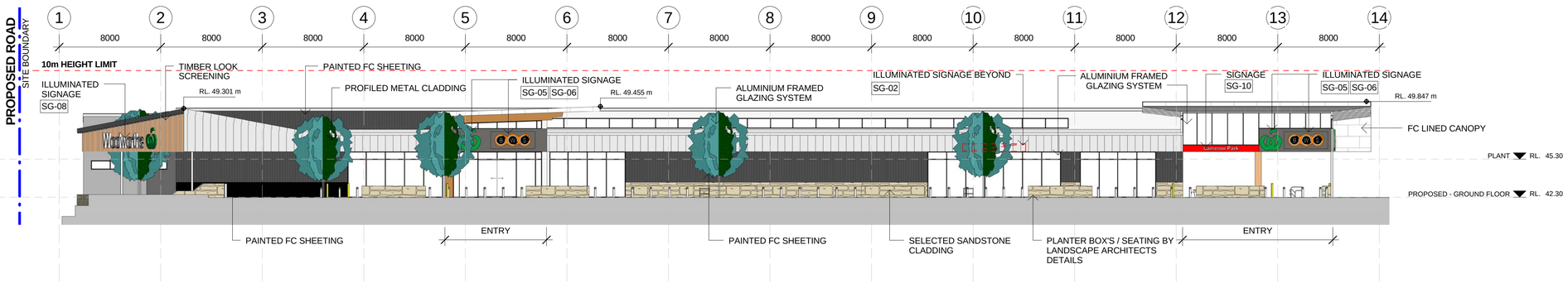


3 PROPOSED - SOUTH ELEVATION B
1 : 500



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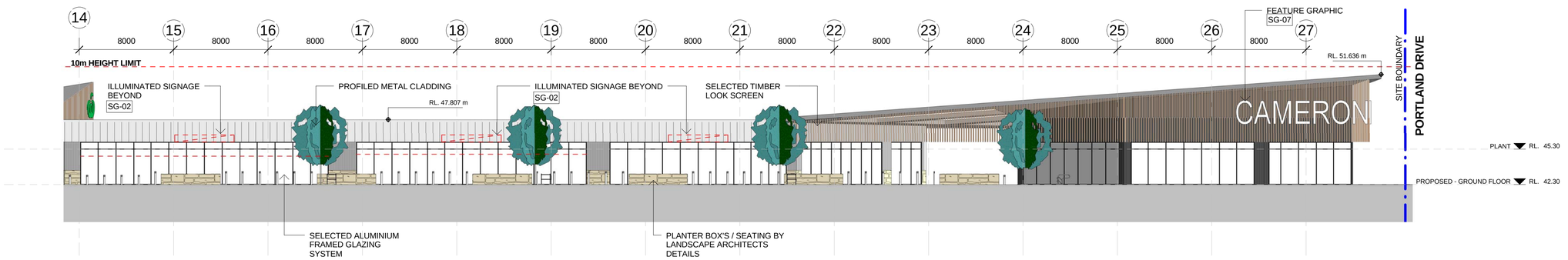
1 : 200



2 PROPOSED - SOUTH ELEVATION B
1 : 200

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

1 : 500 0 10 20 30
1 : 200 0 2 4 8 12

NOTE:

- REFER TO DRAWING A100.91 FOR SIGNAGE DETAILS

ISSUE	DATE	DESCRIPTION
DA-E	14/02/2018	FOR DA APPROVAL
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Coordinated Reference Drawings

Discipline	Company
SURVEY	
STRUCTURE	
CIVIL	
MECHANICAL	
HYDRAULIC	
ELECTRICAL	
LANDSCAPE	
FIRE	

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No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DRIVE, CAMERON PARK NSW 2285

Sheet name

PROPOSED ELEVATIONS - SOUTH

Scale @ A1: As indicated
Project No.: S1641
Drawn By: CF Checked By: MF

A10 SERIES - EXTERNAL ELEVATIONS

Drawing No. A10.02
Stage - Rev DA-E

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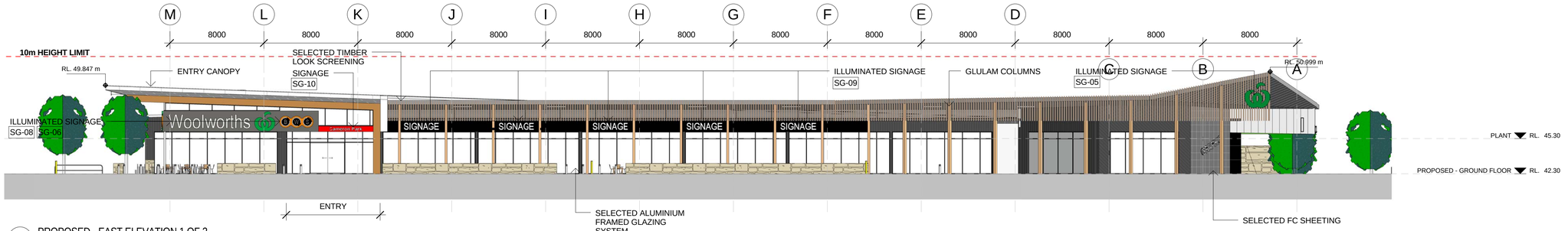
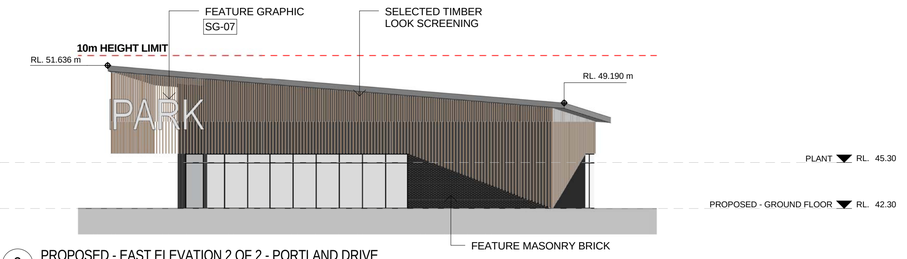
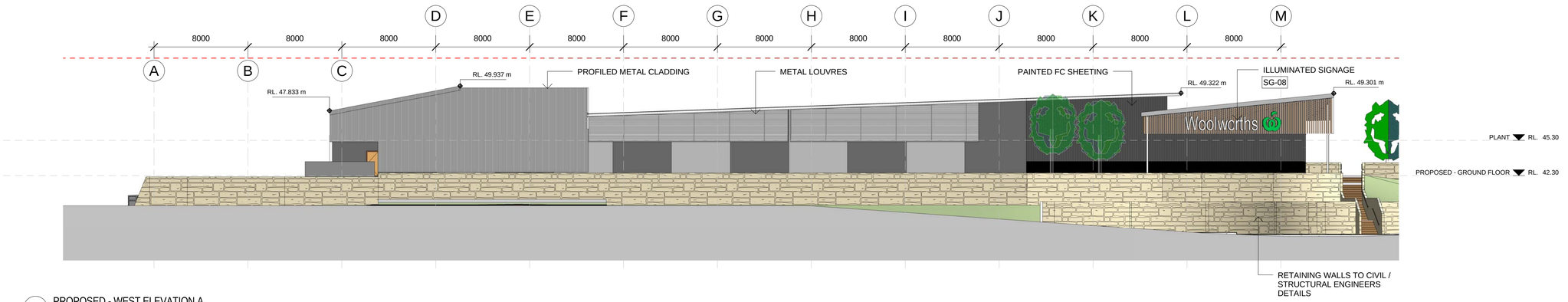


2 PROPOSED - EAST ELEVATION 1 OF 2
1 : 200



3 PROPOSED - EAST ELEVATION 2 OF 2 - PORTLAND DRIVE
1 : 200



1 PROPOSED - WEST ELEVATION A
1 : 200

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

1 : 200 0 2 4 8 12

NOTE:

- REFER TO DRAWING A100.91 FOR SIGNAGE DETAILS

ISSUE	DATE	DESCRIPTION
DA-E	14/02/2018	FOR DA APPROVAL
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DA-A	02/06/2017	FOR REVIEW

Coordinated Reference Drawings

Discipline	Company
SURVEY	
STRUCTURE	
CIVIL	
MECHANICAL	
HYDRAULIC	
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Sheet name

PROPOSED ELEVATIONS - EAST & WEST

Scale @ A1: 1 : 200
Project No.: S1641
Drawn By: CF Checked By: MF

A10 SERIES - EXTERNAL ELEVATIONS

Drawing No. A10.03
Stage - Rev DA-E

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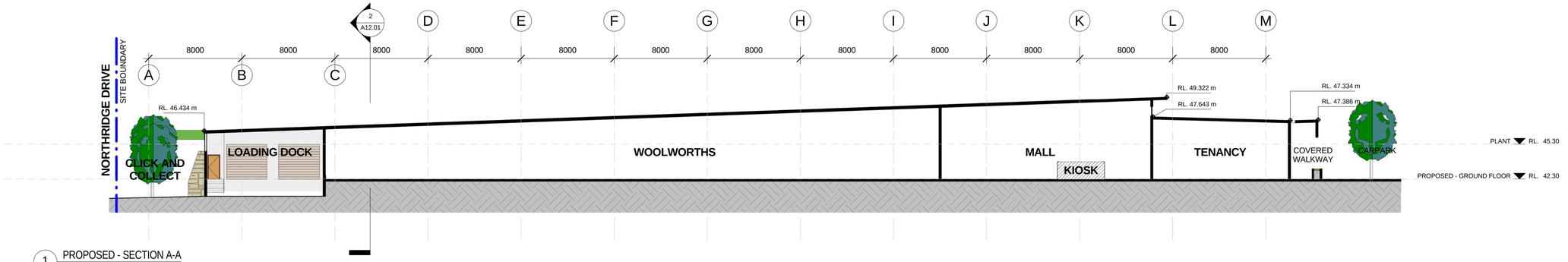

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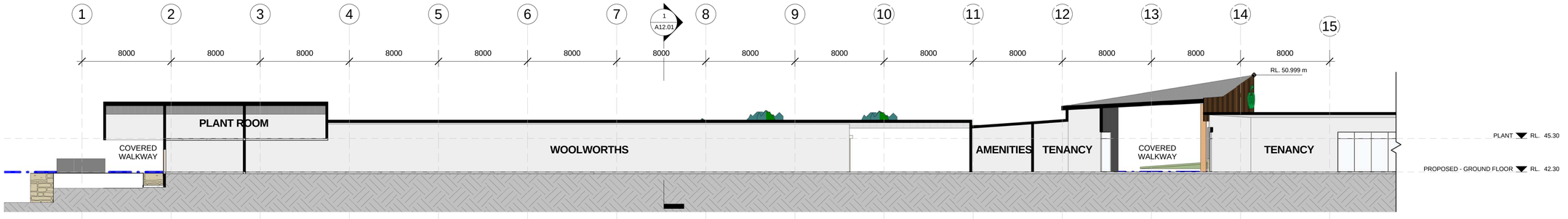

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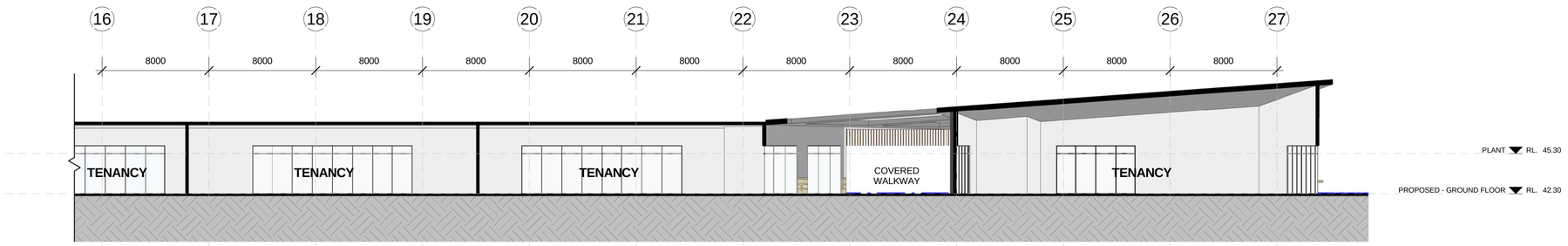

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DA-C	19/06/2017	FOR DA APPROVAL
DA-B	08/06/2017	FOR DA APPROVAL
DA-A	02/06/2017	FOR REVIEW

Coordinated Reference Drawings

Discipline	Company
SURVEY	
STRUCTURE	
CIVIL	
MECHANICAL	
HYDRAULIC	
ELECTRICAL	
LANDSCAPE	
FIRE	

Client

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Project

CAMERON PARK VILLAGE

No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DRIVE, CAMERON PARK NSW 2285

Sheet name

PROPOSED SITE SECTIONS

Scale @ A1: 1 : 200
Project No.: S1641
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Checked By: MF

A12 SERIES - SECTIONS

Drawing No. A12.01
Stage - Rev DA-E

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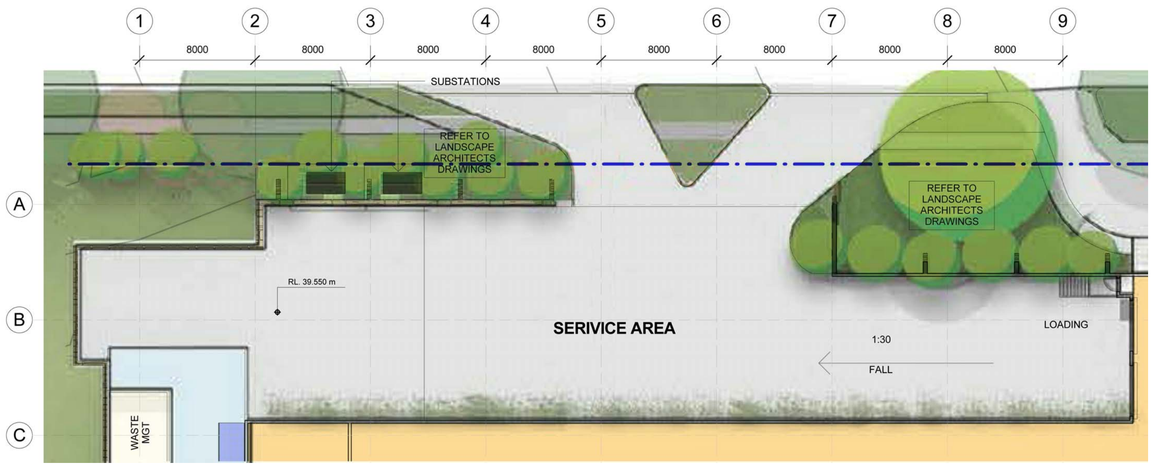

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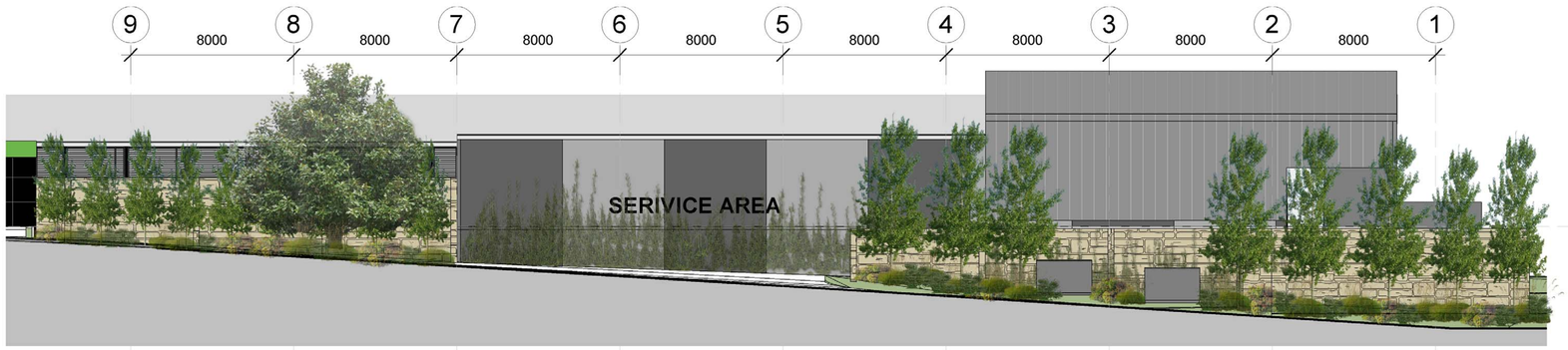

LOADING DOCK ELEVATION FROM NORTHRIDGE DRIVE - N.T.S.

VIEW OF PROPOSED LOADING DOCK FROM NORTHRIDGE DRIVE - ARTISTIC IMPRESSION ONLY - N.T.S.

DEVELOPMENT APPLICATION
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NORTH

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CAMERON PARK VILLAGE

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Sheet name

LOADING DOCK ANALYSIS

Scale @ A1:
Project No.: S1641
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Drawing No.	Stage - Rev
A100.01	DA-B

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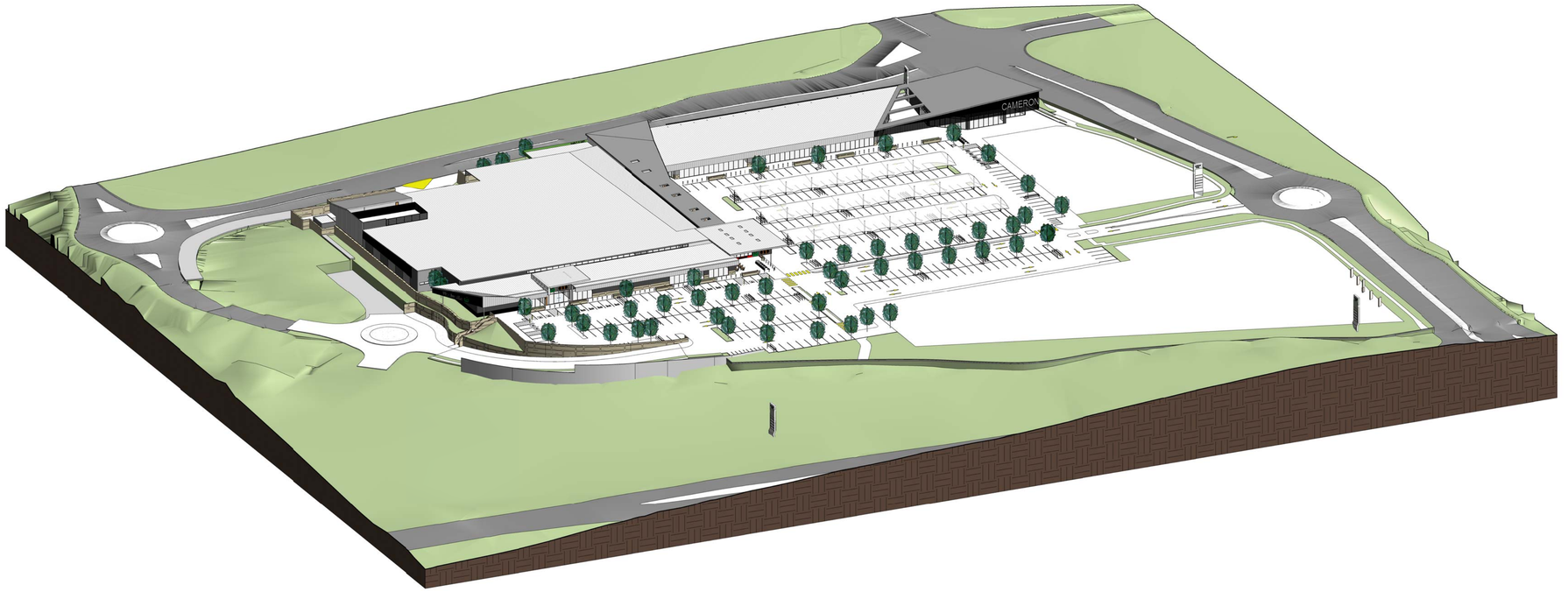

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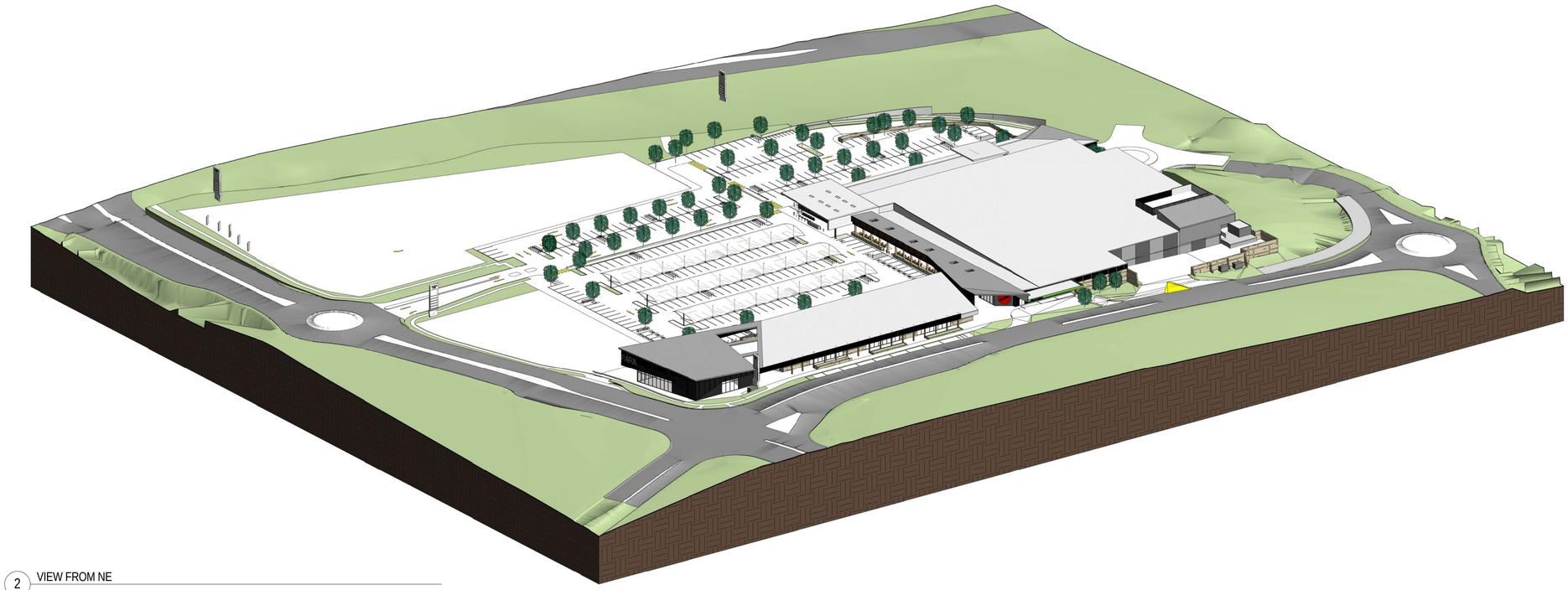

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DA-D	19/06/2017	FOR DA APPROVAL
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CAMERON PARK VILLAGE

No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DRIVE, CAMERON PARK NSW 2285

Sheet name

3D VISUALISATIONS

Scale @ A1:

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A100 SERIES - INFORMATION & ANALYSIS

Drawing No. A100.81

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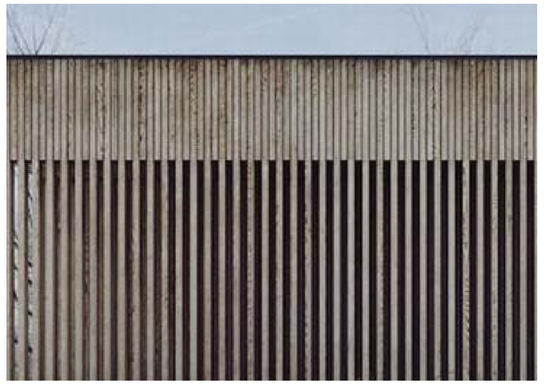






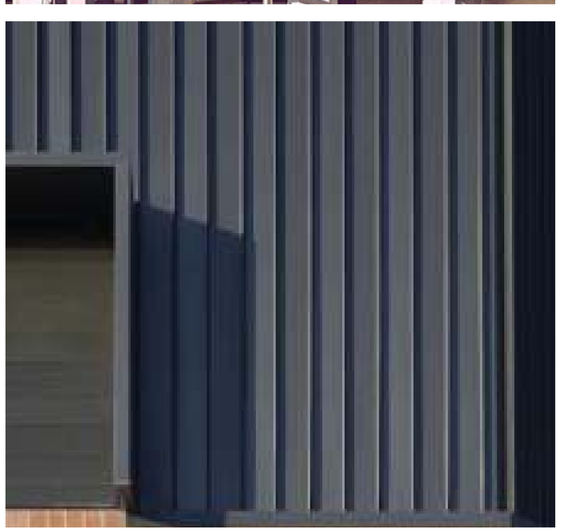

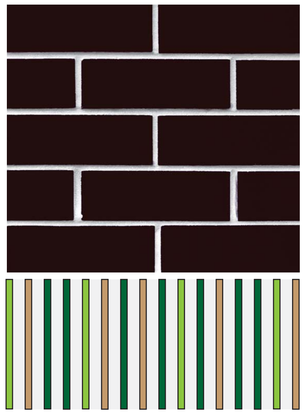



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ISSUE	DATE	DESCRIPTION
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DA-A	02/06/2017	FOR REVIEW

Coordinated Reference Drawings

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CAMERON PARK VILLAGE

No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DRIVE, CAMERON PARK NSW 2285

Sheet name

MATERIALS SAMPLE BOARD

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Drawing No.	Stage - Rev
A100.90	DA-B

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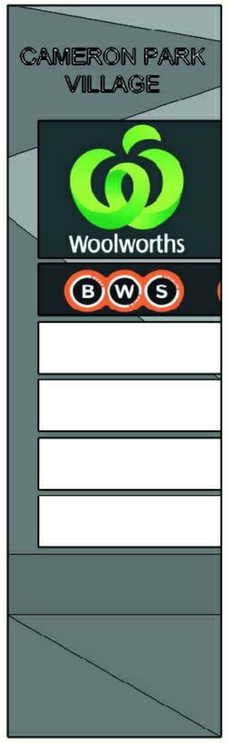

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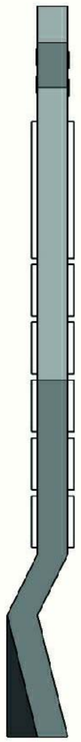

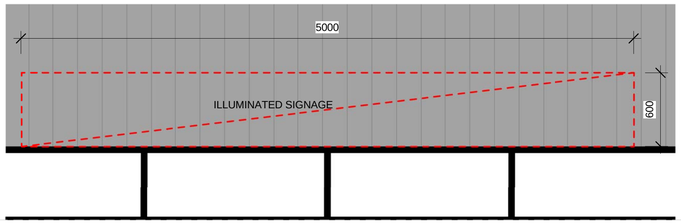

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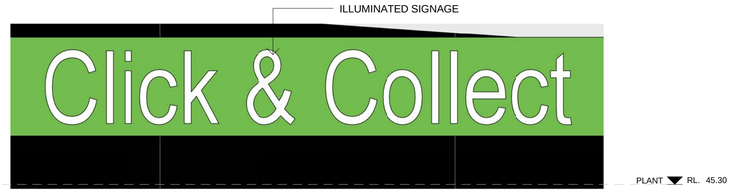

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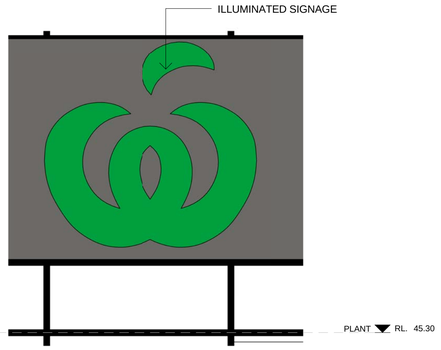

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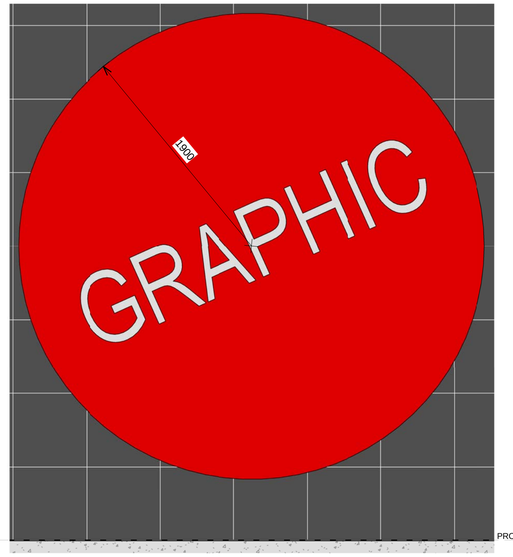

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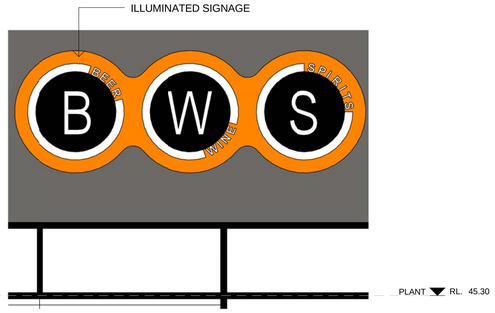

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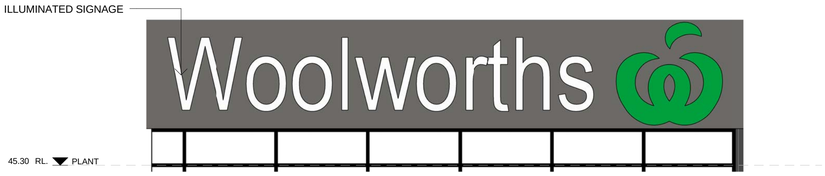

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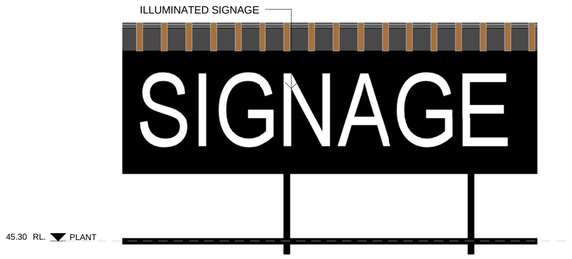

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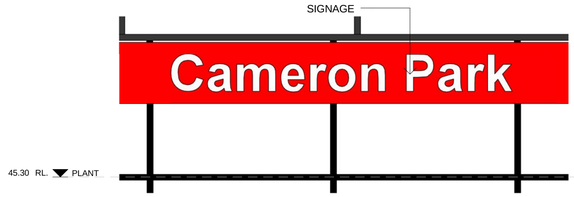

SG-10

SIGNAGE SCHEDULE

REF	SIGNAGE	DIMENSIONS	QUANTITY	ILLUMINATION
SG-01	PYLON SIGN	10000 x 3000	4	YES
SG-02	SIGN 1	5000 x 600	7	YES
SG-03	GRAPHIC	1900R	1	NO
SG-04	"CLICK & COLLECT"	4340 x 600	1	YES
SG-05	WOW LOGO	1725 x 1680	3	YES
SG-06	BWS LOGO	2865 x 1000	2	YES
SG-07	CAMERON PARK	17370 x 1940	1	NO
SG-08	WOW + LOGO	9085 x 1200	2	YES
SG-09	SIGN 2	3800 x 950	5	YES
SG-10	CAMERON PARK	2800 x 300	2	YES

DEVELOPMENT APPLICATION
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Coordinated Reference Drawings

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STRUCTURE	
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CAMERON PARK VILLAGE

No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DRIVE, CAMERON PARK NSW 2285

Sheet name

SIGNAGE DETAILS

Scale @ A1: As indicated
Project No.: S1641
Drawn By: CF Checked By: MF

A100 SERIES - INFORMATION & ANALYSIS

Drawing No. A100.91
Stage - Rev DA-E

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Engineering

Working Beyond Expectations

Stormwater Management Report

Proposed Woolworths Local Shopping Centre & 1 into 6 Lot Torrens Title Subdivision

Property:
309 George Booth Drive, Cameron Park
Lot 901 DP 1222132

Applicant:
Fabcot Pty Ltd

Date:
February 2018

Document Control Sheet

Issue No.	Amendment	Date	Prepared By	Checked By
A	Draft	20/06/17	Mark Littlefield	Mark Kelly
B	ESCP updates	20/02/18	Rexx Brown	Mark Kelly

Table of Contents

APPENDICES

1.0 Introduction

ADW Johnson Pty Ltd has been commissioned by Fabcot Pty Ltd to prepare a Stormwater Management Plan (SWMP) to accompany a Development Application (DA) for a proposed Woolworths Local Shopping Centre development and one (1) into six (6) lot Torrens Title Subdivision at Lot 901 DP 1222132, 309 George Booth Drive, Cameron Park. The proposed development is to be known as Cameron Park Village.

2.0 Site Description

The subject site is located within the Cameron Grove Residential Estate at Cameron Park, approved under DA 2433/2004. This subdivision approval included creation of the subject site to facilitate commercial development.

The subject site has an area of 5.652ha and frontages to Portland Drive, Northridge Drive, Tramway Drive and George Booth Drive.

In accordance with the abovementioned subdivision approval, substantial works have been undertaken including site vegetation clearing, earthworks, servicing infrastructure, drainage controls and road construction. Construction of the major intersection on George Booth Drive is well advanced.

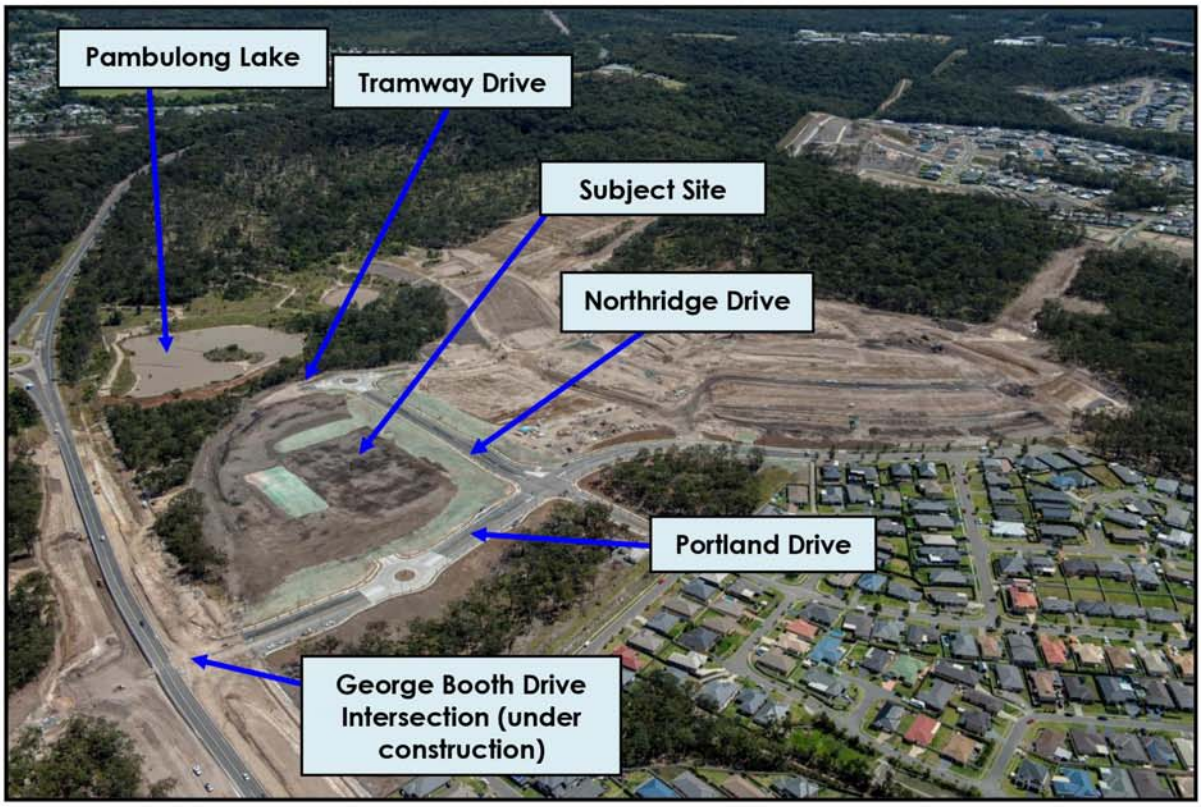


Figure 1: Aerial Image of Subject Site (October 2016)

Major stormwater infrastructure has already been constructed to serve the eastern portion of the site in accordance with the Cameron Grove subdivision approval (DA 2433/2004). Engineering plans for this existing infrastructure prepared by Brown Consulting are shown in **Appendix F.**

A stormwater and water control quality pond "Pambulong Lake" has been previously established to the west of the site (as seen above) and will provide the major storm water management including water quality and detention for the site in accordance with DA 2433/2004.

The subject site is not identified as containing potential contamination, and has been previously approved by Council to facilitate commercial use as part of the broader subdivision under DA 2433/2004.

The subject site is not identified on the Lake Macquarie LEP 2014 Acid Sulphate Soils map as containing potential Acid Sulphate Soils (ASS).

3.0 Proposed Development

The proponent is seeking to establish a local shopping centre with Woolworths as the anchor tenant. The development is to be known as Cameron Park Village.

Specific details of the proposal can be seen in the Statement of Environmental Effects prepared by ADW Johnson including architectural plans.

The figure below shows the proposed site layout.

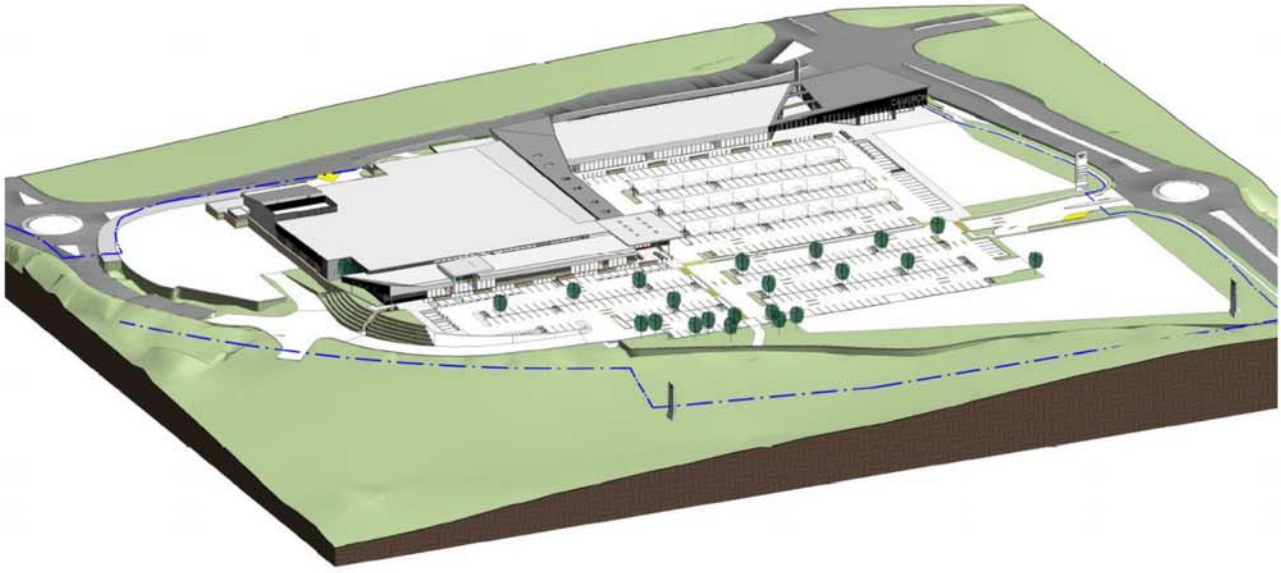


Figure 2: Indicative Proposed Development

4.0 Requirements

4.1 COUNCIL REQUIREMENTS

From Part 2.5 – Stormwater Management, Infrastructure and On-Site Services of Council's Development Control Plan No. 1 (DCP No. 1), the proposed development is described as that which: *"involve(s) water flows exceeding the equivalent water demand of 50 persons or more."* This triggers the requirement for a comprehensive water cycle strategy to be prepared as an acceptable solution to mitigate potential stormwater impacts from the proposed development.

The stormwater management system is to minimise environmental impact of urban runoff. Typically, this is addressed by modelling simulation of water quality controls to target objectives. For this proposed development, the above has been addressed generally in the report prepared by Brown Consulting, "Stormwater Masterplan Lot 104, Pambulong Forest, Estelville" – January 2004. Additional controls above that specified in the report by Brown consulting are detailed within this report.

From Part 2.1.11 – Erosion Prevention & Sediment Control of Council's DCP No. 1, the proposed development is described as Category 3 – greater than 2,500m^2 (of disturbance). This triggers the requirement for a Soil and Water Management Plan (SWMP) to be prepared to mitigate potential stormwater impacts during construction of the proposed development. General requirements for the preparation of the SWMP are described by Council guidelines and the Soils and Construction – Volume 1, 4th Edition 'Blue Book' - (reprinted July 2006). Full details of the SWMP are described in **Section 5.4**.

4.2 SPECIFIC SITE REQUIREMENTS

Plans approved by Brown Consulting for Portland Drive (Project Ref L05016.014) have specified flows generated from the eastern portion of the site for both the minor (10 year) and major (100 year) events that are to be discharged through an adjoining development. It is therefore critical that these flows are not exceeded and detention measures provided if necessary.

5.0 Stormwater Management Strategy

The proposed strategy for the commercial development is in accordance with the approved strategy for the entire catchment. The strategy for water quality improvement utilises the existing "Pambulong Lake" for stormwater management for the western portion of the site, a smaller proposed basin for management of the eastern portion of the site and also includes end of line controls prior to discharge from the proposed development site in the form of GPT's. The overall strategy is shown in **Appendix A.**

5.1 OVERALL SYSTEM

There are five (5) controlled discharge points proposed from the site, with two (2) of these locations specified as significant points of discharge. These locations can be seen in Appendix A. The treatment elements selected for the improvement of stormwater quality prior to discharge from the proposed development site from the two (2) major discharge locations are:

- Gross Pollutant Traps (litter baskets may be substituted if accepted by Council);
- Rainwater tanks where appropriate; and
- "Pambulong Lake" (Western Portion of site), "Proposed Basin No.1" (Eastern Portion of site).

'Pambulong Lake" has been shown to provide adequate treatment for the western portion of the site. Downstream treatment measures have been designed and constructed for the eastern portion of the site in accordance with the report prepared by Brown Consulting, "Stormwater Masterplan Lot 104, Pambulong Forest, Estelville" – January 2004, which was approved as part of the Cameron Grove subdivision (DA 2433/2004). The proposed basin has been provided to ensure peak flow rates determined in the approved plans in both the minor and major storm are not exceeded. Although the basin has been placed to ensure peak flow rates are managed there will also be a treatment benefit in terms of reducing sediment, suspended solids and target nutrients.

Conventional piped street drainage will be used for the control of stormwater runoff from the roads and carpark. This system will convey the stormwater to the treatment elements outlined above.

5.2 WATER QUANTITY - MODELLING, BASE PARAMETERS & CATCHMENTS

The subcatchments were defined by concept design and site grading to distribute stormwater flows to the two (2) discharge locations described in **Section 5.1.** These catchments have been simplified into two (2) parts, namely Catchment East (Discharging to Portland Drive) and Catchment West (Discharging to "Pambulong Lake"). It has been determined that as flows for Catchment East connect to the existing drainage network on Portland Drive that the design flows approved under the Construction Certificate must not be exceeded by the current proposal. The discharge location for Catchment East is shown in Appendix A as well as in the figures below.

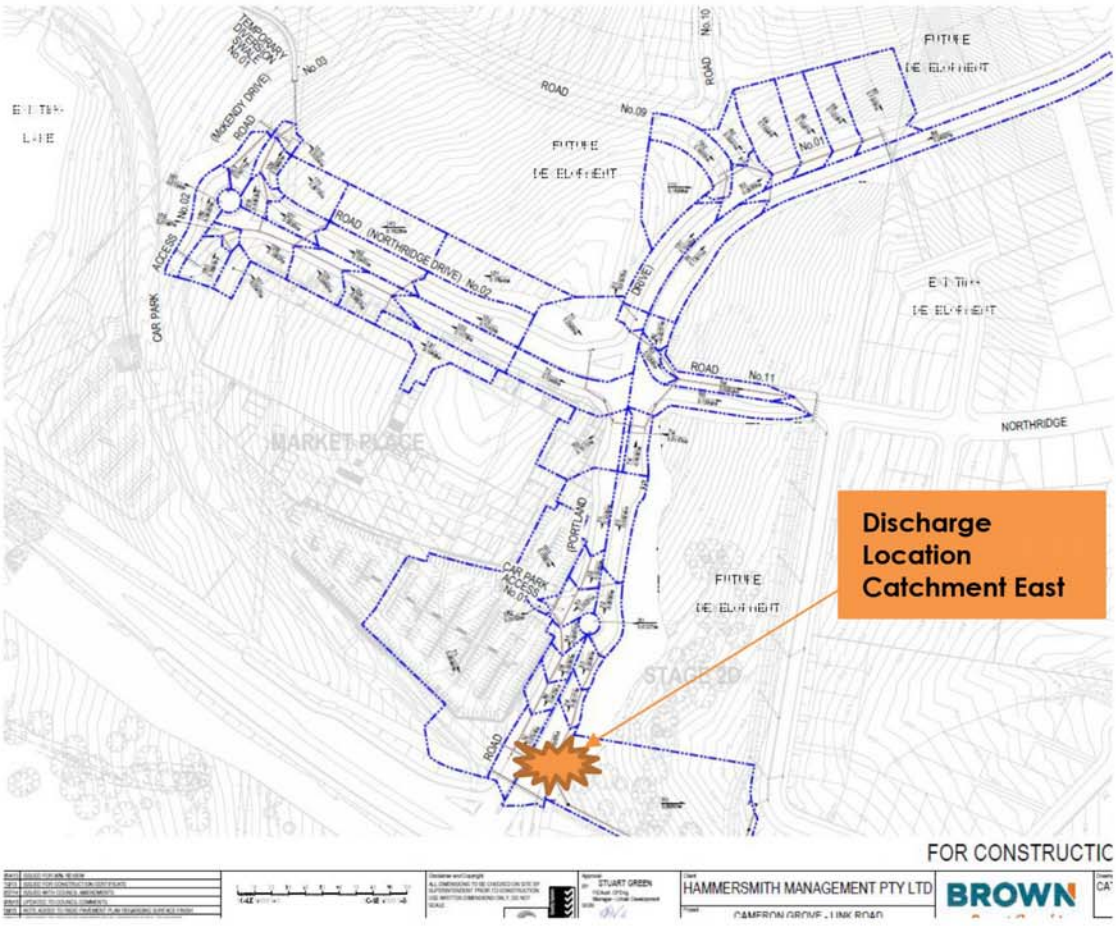


Figure 3: DA 2433/2004 Approved Catchment Plan (BROWN Consulting)

Based on the latest proposed Woolworths development the contributing catchment to Portland Drive has been modified and is shown below.

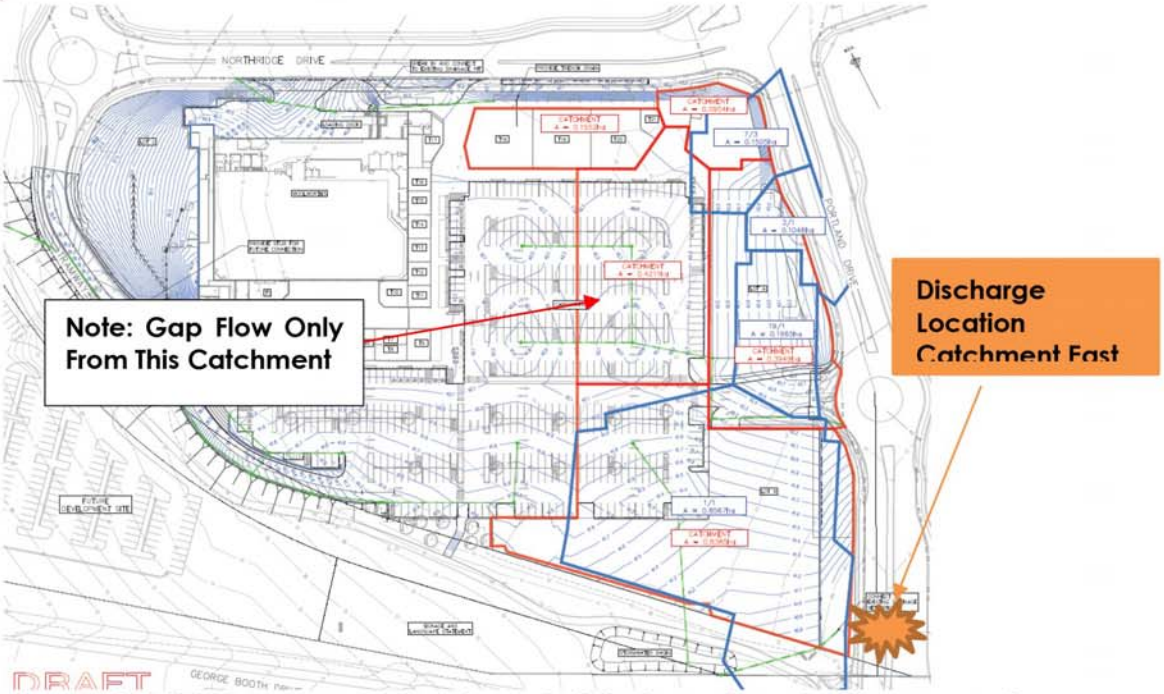


Figure 4: DA 2433/2004 Approved Catchments (Blue) overlayed with proposed catchments (Red)

To determine the peak design flows at the point of discharge a DRAINS storm water routing model was used. DRAINS uses the time-area method to estimate runoff hydrographs for pervious and impervious surfaces.

The Rainfall Intensity Frequency Duration (IFD) data used in the model was sourced from LMCC Handbook of Drainage Design Criteria.

Table 2 –Catchment East Analysis – Approved Catchment allowance off proposed site, Based off BROWNS plans

CATCHMENT	AREA (ha)	IMPERVIOUS (%)	PERVIOUS (%)	10 Yr ARI Peak Q (l/s)	100 Yr ARI Peak Q (l/s)
EAST A	1.01	80%	20%	401	578

Table 3 –Catchment East Analysis – Updated Catchment from proposed site

CATCHMENT	AREA (ha)	IMPERVIOUS (%)	PERVIOUS (%)	10 Yr ARI Peak Q (l/s)	100 Yr ARI Peak Q (l/s)
EAST B	1.63*	80%	20%	465	792*

*0.42ha of this is contributing gap flow only (Major storm flow – Minor storm flow)

An analysis of the peak flows from the site based on the original approved plans of the surrounding road network against the proposed development has determined that detention is now required to limit flows back to the peak flows approved.

To achieve this reduction in flows for the proposed development a detention basin has been modelled within DRAINS at the south end of the site. Details of the basin can be seen in **Appendix A.**

Table 4 – Catchment East with Detention

ARI Storm Event (yr)	Approved Development Peak Flow (l/s)	Post Development Peak Flow (l/s) with updated catchments	Post Development Peak Flow With Detention (l/s)
10	401	465	303
100	578	792	547

It can be seen that through the utilisation of the proposed detention basin flows generated from the development are less than that approved to be discharged within the plans prepared by Browns Consulting for Portland Drive.

5.3 WATER QUALITY STRATEGY

Gross Pollutant Traps (GPTs) are an essential element to the treatment train for water quality improvement. The traps are to collect heavy sediment and litter and provide a regulated location for maintenance, improving the ongoing function of the stormwater controls. There are two (2) GPT's proposed for the proposed development. The locations of the proposed GPT's can be seen in **Appendix A.**

A rainwater tank is proposed for the buildings. The rainwater tank will collect stormwater runoff from roof areas. The tank is to have appropriate first flush controls for maintenance purposes. Details for these controls will be specified with detailed design for the Construction Certificate.

The stormwater captured in the rainwater tanks will be used for toilet flushing and irrigation of landscaped areas. Harvesting rainwater tank water is a significant benefit in potable mains water reduction to the proposed development. Refer to **Appendix A** for rainwater tank locations.

The existing "Pambulong Lake" will provide effective detention for peak flows and retention of nutrients for the western portion of the site as well as be aesthetically pleasing. Details can be seen in the report "Stormwater Master plan, Lot 104 Pambulong Forest, Estelville" prepared by Brown Consulting (Refer Appendix F).

The proposed detention basin located at the south eastern corner of the site is included as a means to reduce peak flows but will also have an additional benefit of retaining nutrients before overflows are discharged through the catchment wide WSUD strategy described in the report "Stormwater Master Plan, Lot 104 Pambulong Forest, Estelville" prepared by Brown Consulting.

5.4 SOIL & WATER MANAGEMENT

A concept Soil and Water Management Plan has been prepared. This plan is to outline the temporary control measures for the protection of the downstream receiving waters during construction. Sediment fencing will be installed to boundaries of work areas. Stockpiles will be protected by sediment fencing. These measures need to be installed prior to commencement of earthworks. All controls need to be designed in accordance with *'Managing Urban Stormwater – Soils & Construction Volume 1'* (Landcom, 2004) – 'Blue Book'. Refer to **Appendix B.**

Correspondence from LMCC has indicated the soils encountered are likely to be of type F/D which include dispersible particles. Standard monitoring techniques for Total Suspended Solids will be required during construction however the sediment basins are likely to require aided flocculation prior to pump-out/discharge.

Sediment basin sizing has been undertaken in accordance with the 'Blue Book', allowing for full site disturbance. Preliminary sizing indicates that utilising the proposed basins as temporary sediment basins with the following minimum volumes will satisfy the guidelines:

- Sediment Basin 1 – 874m^3;
- Sediment Basin 2 – 364m^3.

Refer to **Appendix D** for temporary sediment basin sizing calculations and **Appendix A** for temporary sediment basin locations.

6.0 Key Compliance

The key compliance requirements for stormwater strategy including the comprehensive water cycle and soil and water management requirements are shown below in **Tables 6** and **7**.

Table 6 – Comprehensive Water Cycle Requirements

Issue Description	Section Reference/ Comment
Site conditions, catchment context and land capability	Section 2.0
Estimates of all water flows	Section 5.2
Objectives and strategies for improving water efficiency, water quality, discharge volumes, concentrations, flood protection and aquatic environments	Section 5.3 – GPT's, rainwater tanks for irrigation and utilisation of existing downstream basins and proposed basins
The provision of integrated water infrastructure systems	Section 5.3 – Stormwater harvesting for irrigation of landscaping areas and other uses is an integrated system
Proposed layout and street design measures to minimise disturbance to natural landscape features and incorporate stormwater source controls in street reserves	Section 5.3 – GPT are included as at source controls
Proposed landscape design measures to protect natural features, improve water quality, provide recreation opportunities and satisfy safety requirements	Section 5.3 – Stormwater controls will be integrated as landscape features and not pose a risk in terms of safety
Proposed landscape practices to retain or restore natural landscape features, manage and treat stormwater runoff and reduce demand for water, fertilisers and herbicides	Section 5.3 – A rainwater tank for irrigation of landscaping areas and other non-potable uses located on site will reduce potable water demand to the development.
Provision of water tanks, infiltration devices and other on-site stormwater infrastructure at the subdivision stage including aquifer storage and harvesting of stormwater	Section 5.3 – GPT's, rainwater tanks for irrigation and basins
Wastewater reuse	None specified
Erosion, sediment and pollution control maintenance, monitoring and performance evaluation	Section 5.5

Table 7 – Soil and Water Management Requirements - Category 3

Issue Description	Section Reference/ Comment
Locality Details	Section 2.0
North point and scale	Appendix A
Property boundaries and adjoining roads	Appendix A, B
Existing land contours	Appendix C
Location of existing trees and vegetation	Appendix C
Location of existing significant landscape features	None present
Existing watercourses and drains flowing through, or adjacent to, the site	"Pambulong lake"
Outline of proposed building/structures and disturbed areas	Appendix A, B
Proposed vehicular access	Appendix A, B
Extent of vegetation to be cleared	Landscape Plan
Extent of earthworks and limits of cut and fill	Appendix B
Location of proposed stockpiles	Appendix B
Location of proposed temporary and permanent site drainage	No temporary drains proposed, Permanent are shown Appendix A
Location of proposed temporary erosion prevention and sediment control measures	Appendix B
Location of temporary and permanent revegetation areas	See landscape plans
An explanation of any changes to the erosion prevention and sediment controls as the works proceed	No change required
Supplementary notes covering inspection and maintenance requirements	Appendix F
SWMP's shall include detailed calculations to determine the soil loss and the size of any sediment basins that may be required on the site.	Appendix E
The location of lots, public open space, stormwater drainage systems, schools, shopping centres/community centres – (if nearby)	Appendix A, B
The location of land designated or zoned for special uses	N/A
Location and diagrams of all erosion and sediment site controls used	Appendix B
Locations, calculations and engineering details of any sediment basins	Appendix B, E
Location and details of other stormwater management structures such as; constructed wetlands, gross pollutant traps, trash racks or separators.	Appendix A

7.0 Conclusion

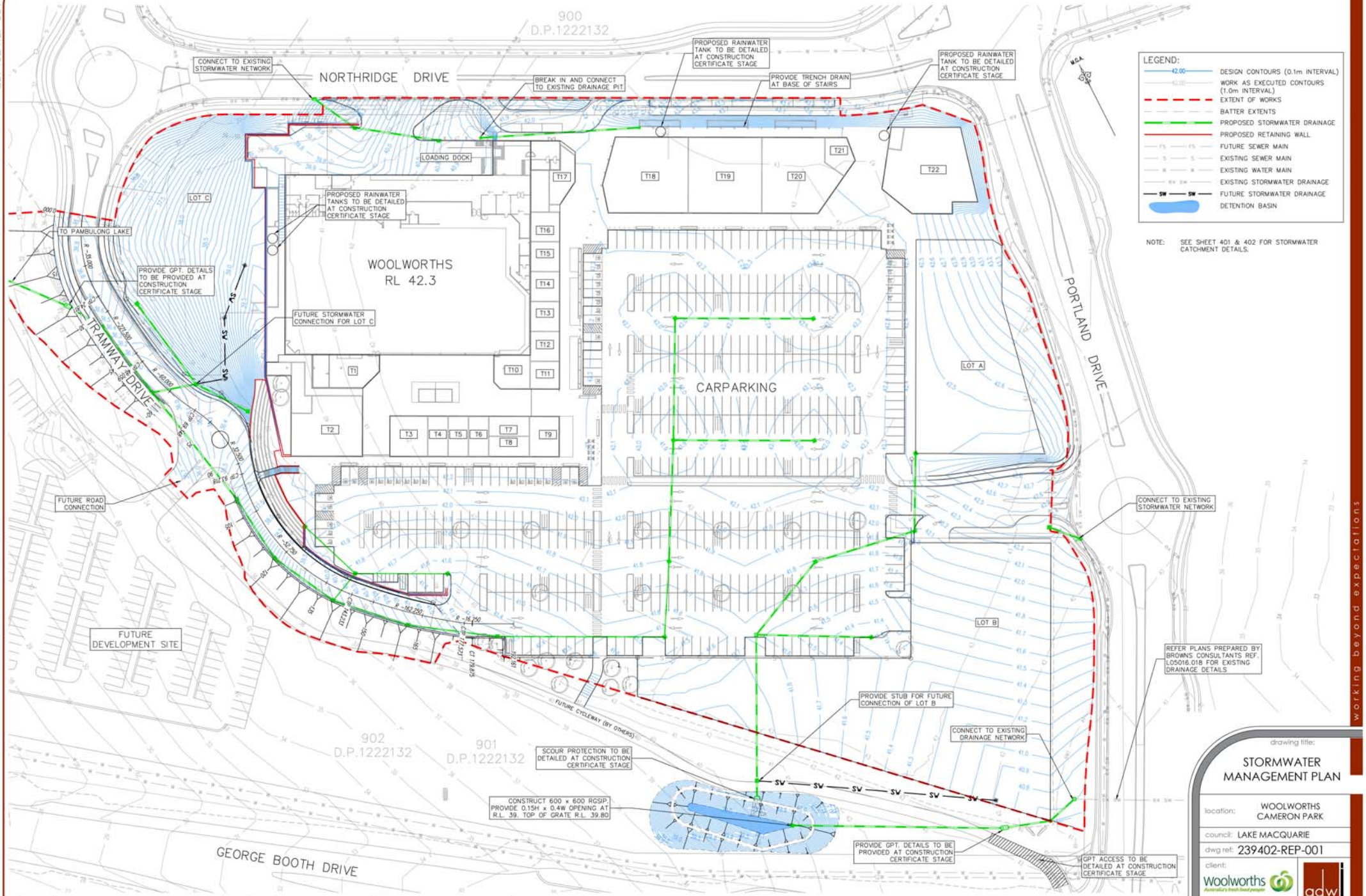
The key compliance requirements for stormwater management and soil and water management for the proposed Woolworths Shopping Centre have been met. The permanent controls for the site include Gross Pollutant Traps at each major outlet, rainwater tanks for stormwater harvesting and irrigation of the landscaped areas, and a detention basin. Further treatment measures have been implemented further downstream including "Pambulong Lake" and several significant stormwater basins east of the site.

Peak flows being discharged through adjoining development east of the site has been modelled and the use of a detention basin has ensured approved flow rates from the site have not been exceeded.

The site is well elevated above regional 1:100 year ARI peak flood levels. Standard temporary sediment controls of sediment fencing will apply to the site during construction.

Appendix A

STORMWATER MANAGEMENT PLAN



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drawing title:

STORMWATER MANAGEMENT PLAN

location: WOOLWORTHS CAMERON PARK

council: LAKE MACQUARIE

dwg ref: 239402-REP-001

client: Woolworths

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Appendix B

CONCEPT ENGINEERING INCLUDING EROSION AND SEDIMENT CONTROL PLAN

CAMERON PARK, LAKE MACQUARIE
D.P.1222132
DEVELOPMENT APPLICATION
CIVIL DESIGN PLANS

LOCALITY PLAN
N.T.S.

INDEX OF DRAWINGS

DRAWING	NAME
239402-DA-001	TITLE SHEET, DRAWING INDEX AND LOCALITY PLAN
239402-DA-002	SITE LAYOUT PLAN
239402-DA-101	DETAIL PLAN - SHEET 1
239402-DA-102	DETAIL PLAN - SHEET 2
239402-DA-103	ACCESS ROAD LONGITUDINAL SECTION
239402-DA-201	EARTHWORKS PLAN
239402-DA-301	SITE SECTIONS - SHEET 1
239402-DA-302	SITE SECTIONS - SHEET 2
239402-DA-401	STORMWATER DRAINAGE PLAN - SHEET 1
239402-DA-402	STORMWATER DRAINAGE PLAN - SHEET 2
239402-DA-451	INDICATIVE ROOF CATCHMENT AND DOWNPIPE PLAN
239402-DA-501	EROSION & SEDIMENT CONTROL PLAN - SHEET 1
239402-DA-502	EROSION & SEDIMENT CONTROL PLAN - SHEET 2
239402-DA-511	EROSION & SEDIMENT CONTROL DETAILS - SHEET 1
239402-DA-512	EROSION & SEDIMENT CONTROL DETAILS - SHEET 2
239402-DA-513	EROSION & SEDIMENT CONTROL NOTES
239402-DA-551	TYPICAL RETAINING WALL DETAILS & SECTIONS
239402-DA-601	SERVICES PLAN - SHEET 1
239402-DA-602	SERVICES PLAN - SHEET 2

ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
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drawing title:
TITLE SHEET, DRAWING INDEX & LOCALITY PLAN

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-001
client: Woolworths

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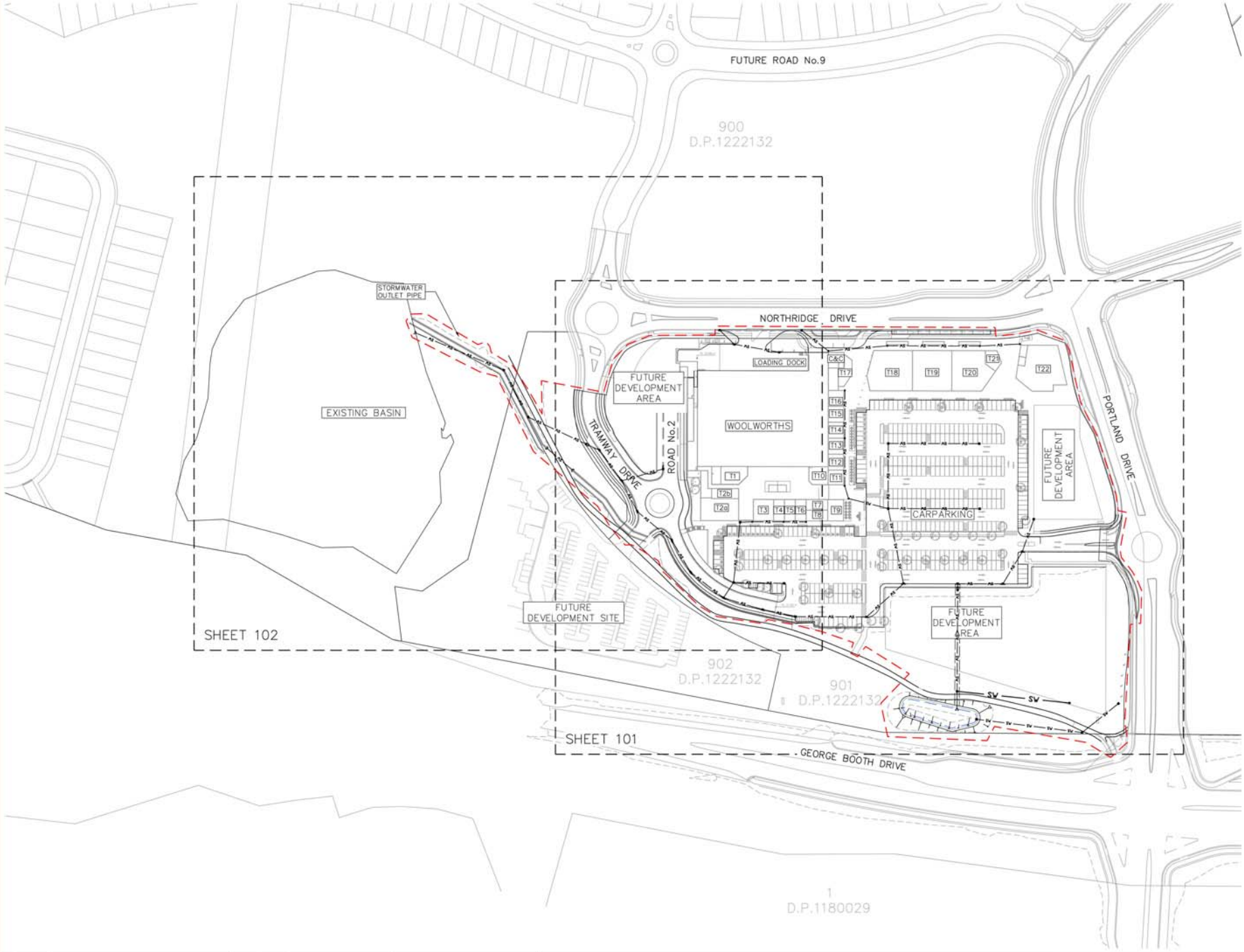

239402-DA-002-SITE_LAYOUT_PLAN

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ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
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drawing title:

SITE LAYOUT PLAN

location: WOOLWORTHS CAMERON PARK

council: LAKE MACQUARIE

dwg ref: 239402-DA-002

client: Woolworths

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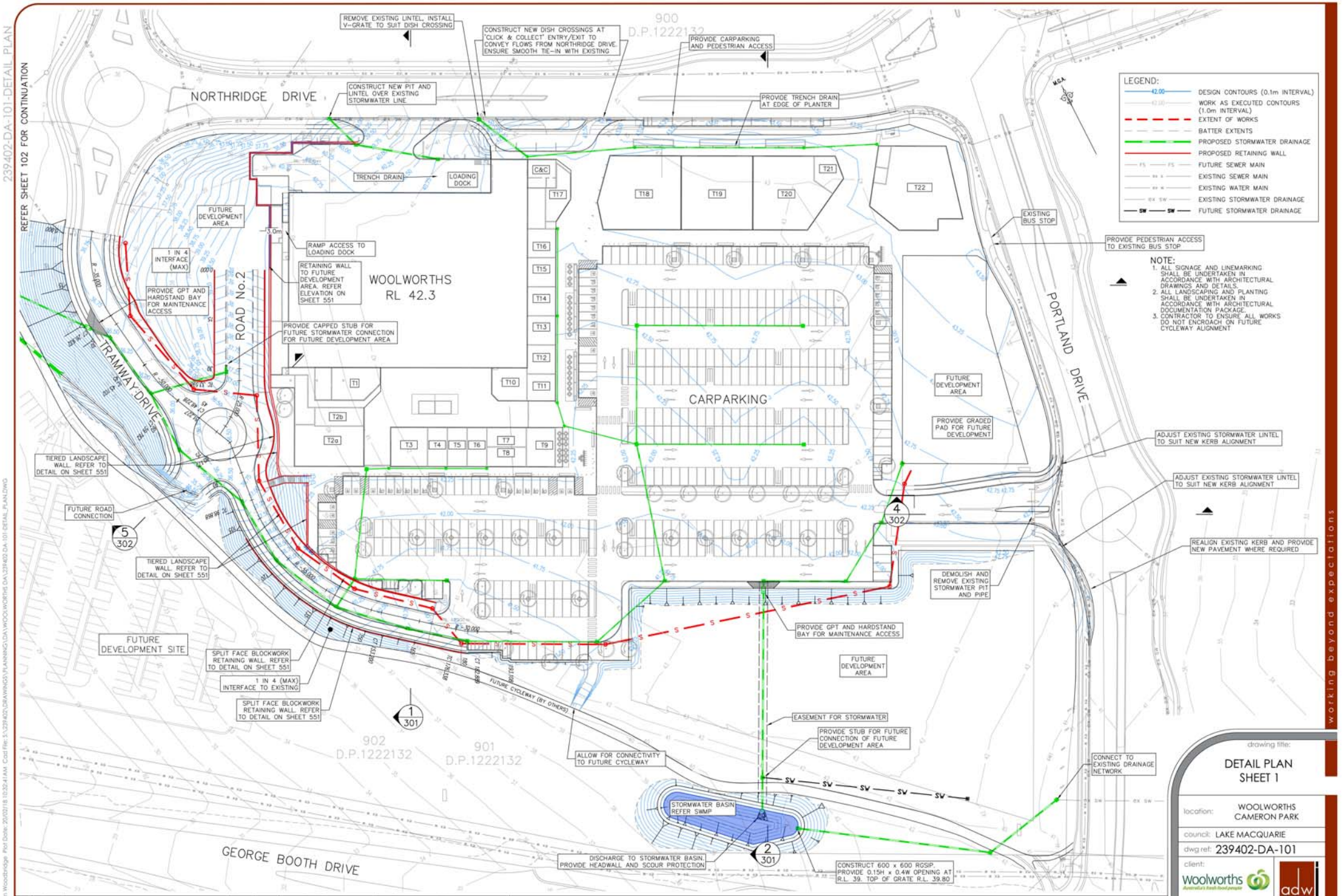
239402-DA-101-DETAIL PLAN
REFER SHEET 102 FOR CONTINUATION
NORTHRIDGE DRIVE
REMOVE EXISTING LINTEL, INSTALL V-GRATE TO SUIT DISH CROSSING
CONSTRUCT NEW DISH CROSSINGS AT 'CLICK & COLLECT' ENTRY/EXIT TO CONVEY FLOWS FROM NORTHRIDGE DRIVE. ENSURE SMOOTH TIE-IN WITH EXISTING
PROVIDE CARPARKING AND PEDESTRIAN ACCESS
CONSTRUCT NEW PIT AND LINTEL OVER EXISTING STORMWATER LINE
PROVIDE TRENCH DRAIN AT EDGE OF PLANTER
TRENCH DRAIN
LOADING DOCK
C&C
T17
T18
T19
T20
T21
T22
FUTURE DEVELOPMENT AREA
3.0m
RAMP ACCESS TO LOADING DOCK
1 IN 4 INTERFACE (MAX)
RETAINING WALL TO FUTURE DEVELOPMENT AREA. REFER ELEVATION ON SHEET 551
WOOLWORTHS
RL 42.3
PROVIDE GPT AND HARDSTAND BAY FOR MAINTENANCE ACCESS
ROAD No.2
PROVIDE CAPPED STUB FOR FUTURE STORMWATER CONNECTION FOR FUTURE DEVELOPMENT AREA
T16
T15
T14
T13
T12
T11
T10
T1
T2b
T2a
T3
T4
T5
T6
T7
T8
T9
CARPARKING
TRAMWAY DRIVE
TIERED LANDSCAPE WALL REFER TO DETAIL ON SHEET 551
FUTURE ROAD CONNECTION
5
302
TIERED LANDSCAPE WALL REFER TO DETAIL ON SHEET 551
FUTURE DEVELOPMENT SITE
SPLIT FACE BLOCKWORK RETAINING WALL REFER TO DETAIL ON SHEET 551
1 IN 4 (MAX) INTERFACE TO EXISTING
SPLIT FACE BLOCKWORK RETAINING WALL REFER TO DETAIL ON SHEET 551
1
301
FUTURE CYCLEWAY (BY OTHERS)
902
D.P.1222132
901
D.P.1222132
900
D.P.1222132
ALLOW FOR CONNECTIVITY TO FUTURE CYCLEWAY
GEORGE BOOTH DRIVE
EXISTING BUS STOP
PROVIDE PEDESTRIAN ACCESS TO EXISTING BUS STOP
PORTLAND DRIVE
FUTURE DEVELOPMENT AREA
PROVIDE GRADED PAD FOR FUTURE DEVELOPMENT
ADJUST EXISTING STORMWATER LINTEL TO SUIT NEW KERB ALIGNMENT
ADJUST EXISTING STORMWATER LINTEL TO SUIT NEW KERB ALIGNMENT
4
302
REALIGN EXISTING KERB AND PROVIDE NEW PAVEMENT WHERE REQUIRED
DEMOLISH AND REMOVE EXISTING STORMWATER PIT AND PIPE
PROVIDE GPT AND HARDSTAND BAY FOR MAINTENANCE ACCESS
FUTURE DEVELOPMENT AREA
EASEMENT FOR STORMWATER
PROVIDE STUB FOR FUTURE CONNECTION OF FUTURE DEVELOPMENT AREA
CONNECT TO EXISTING DRAINAGE NETWORK
STORMWATER BASIN REFER SWMP
2
301
DISCHARGE TO STORMWATER BASIN. PROVIDE HEADWALL AND SCOUR PROTECTION
CONSTRUCT 600 x 600 RGSIP. PROVIDE 0.15H x 0.4W OPENING AT R.L. 39. TOP OF GRATE R.L. 39.80
LEGEND:
42.00 DESIGN CONTOURS (0.1m INTERVAL)
WORK AS EXECUTED CONTOURS (1.0m INTERVAL)
EXTENT OF WORKS
BATTER EXTENTS
PROPOSED STORMWATER DRAINAGE
PROPOSED RETAINING WALL
FUTURE SEWER MAIN
EXISTING SEWER MAIN
EXISTING WATER MAIN
EXISTING STORMWATER DRAINAGE
FUTURE STORMWATER DRAINAGE
NOTE:
1. ALL SIGNAGE AND LINEMARKING SHALL BE UNDERTAKEN IN ACCORDANCE WITH ARCHITECTURAL DRAWINGS AND DETAILS.
2. ALL LANDSCAPING AND PLANTING SHALL BE UNDERTAKEN IN ACCORDANCE WITH ARCHITECTURAL DOCUMENTATION PACKAGE.
3. CONTRACTOR TO ENSURE ALL WORKS DO NOT ENCROACH ON FUTURE CYCLEWAY ALIGNMENT
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drawing title:
DETAIL PLAN SHEET 1
location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-101
client: Woolworths
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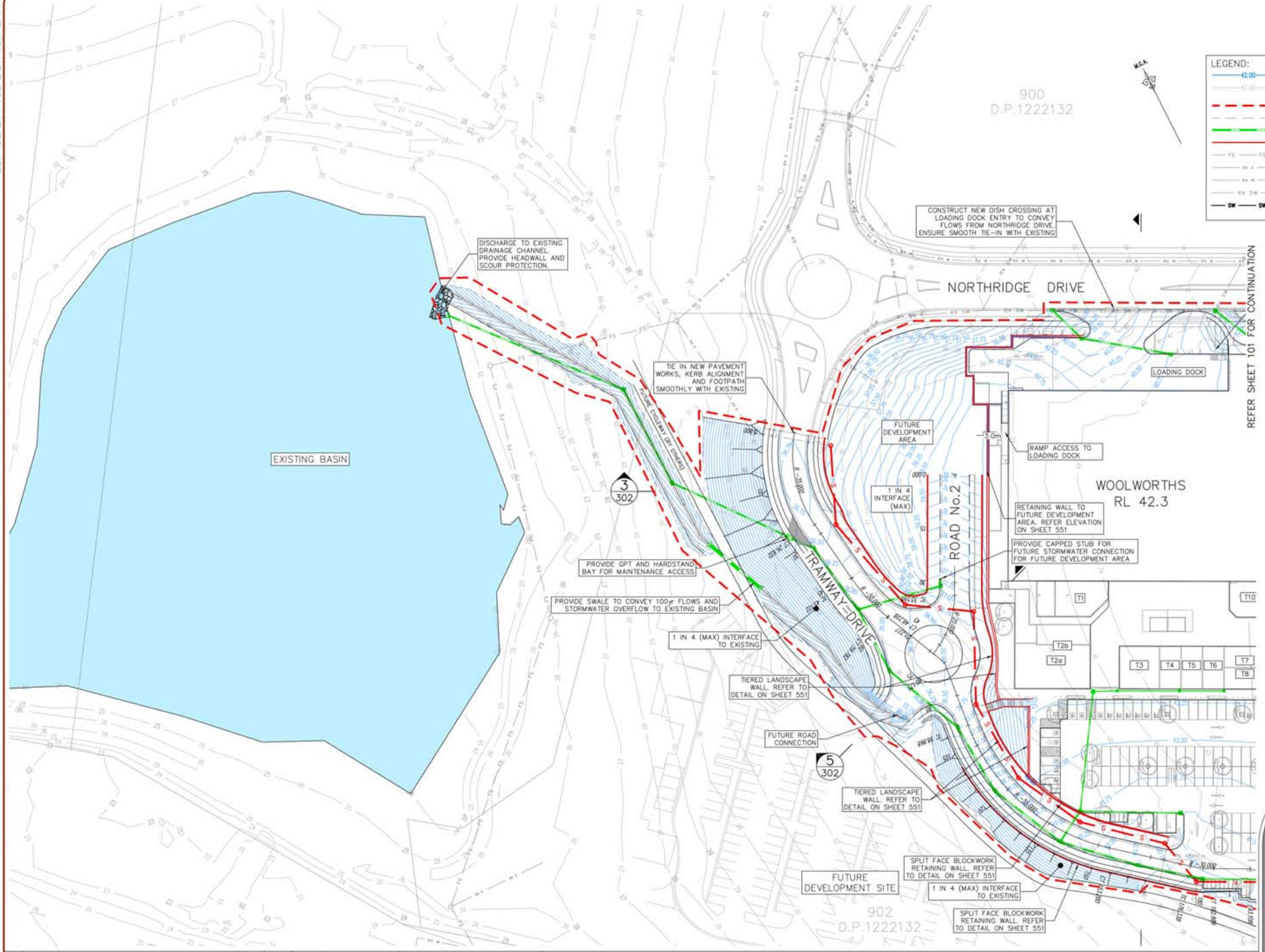

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DETAIL PLAN SHEET 2

location: WOOLWORTHS CAMERON PARK

council: LAKE MACQUARIE

dwg ref: 239402-DA-102

client: Woolworths

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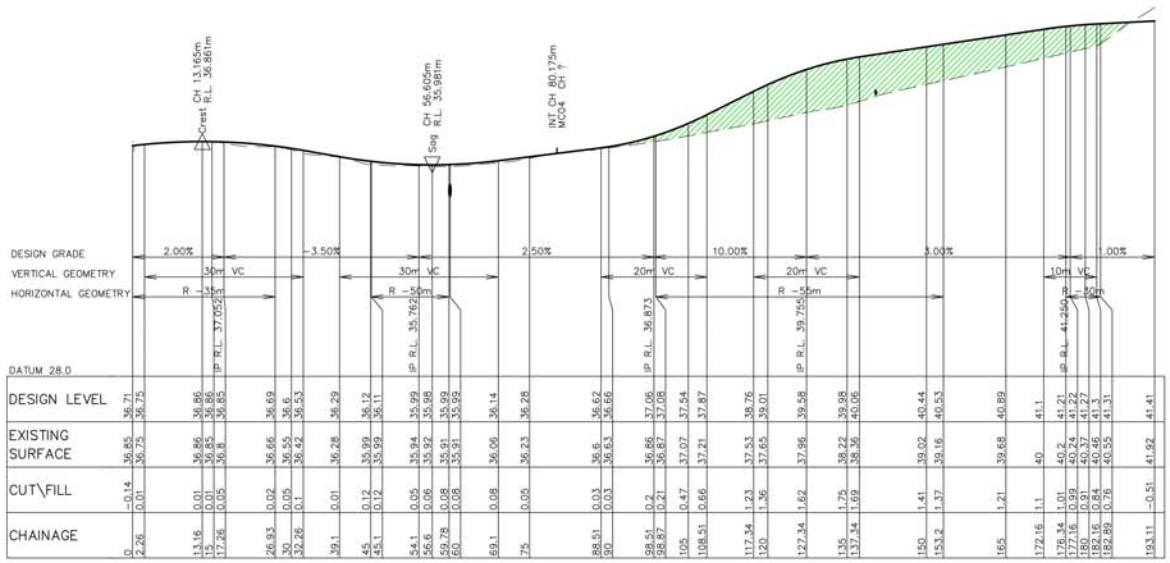
239402-DA-102-DETAIL PLAN



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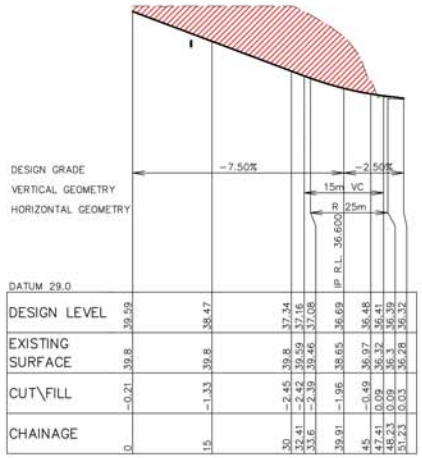
VERTICAL SCALE 1:100



LONGITUDINAL SECTION – ROAD No.2
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drawing title:
ACCESS ROAD
LONGITUDINAL SECTION

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-103
client: Woolworths

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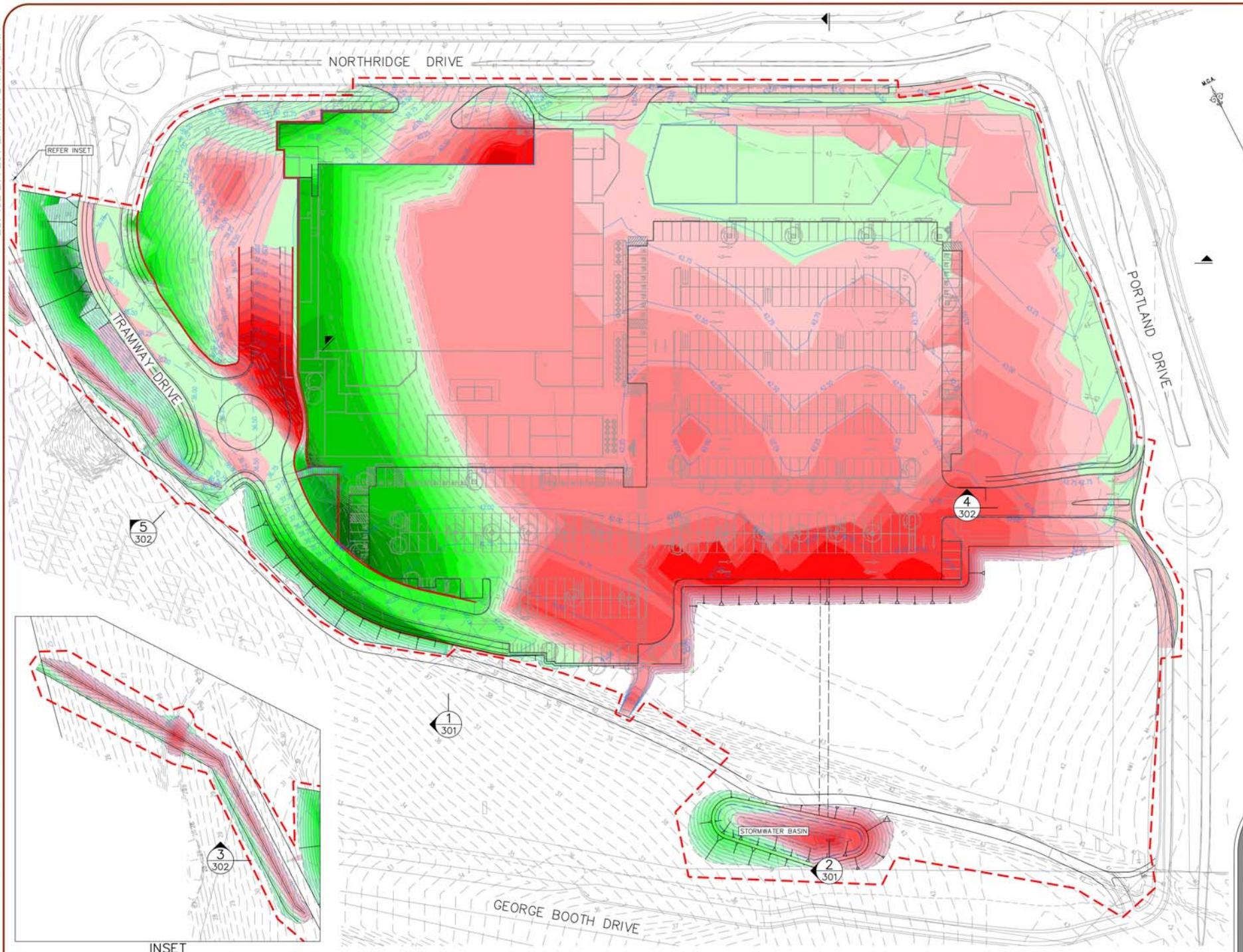

INSET

LEGEND:

Lower value		Upper value	
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3	to	2	m
2	to	1.5	m
1.5	to	1	m
1	to	0.75	m
0.75	to	0.5	m
0.5	to	0.25	m
0.25	to	0.05	m
0.05	to	0	m
0	to	−0.05	m
−0.05	to	−0.25	m
−0.25	to	−0.5	m
−0.5	to	−0.75	m
−0.75	to	−1	m
−1	to	−1.5	m
−1.5	to	−2	m
−2	to	−3	m
−3	to	−6	m

VOLUMES:
CUT – 17750m³
FILL – 13800m³
EXPORT – 3950m³

NOTES:
1: CUT FILL VOLUMES ARE FROM WORK AS EXECUTED SURFACE TO FINAL DESIGN SURFACE.
2: NO INCLUSION HAS BEEN MADE FOR SITE STRIPPING
3: NO INCLUSION HAS BEEN MADE FOR BOXING VOLUMES

42.00 DESIGN CONTOURS (0.1m INTERVAL)
42.00 WORK AS EXECUTED CONTOURS (0.2m INTERVAL)
EXTENT OF WORKS
BATTER EXTENTS

ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
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drawing title:

EARTHWORKS PLAN

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-201
client: woolworths

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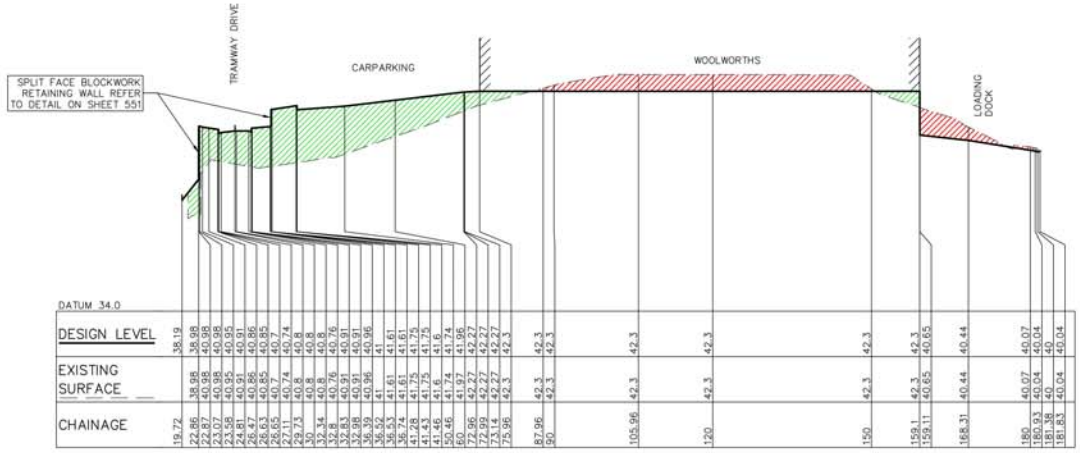

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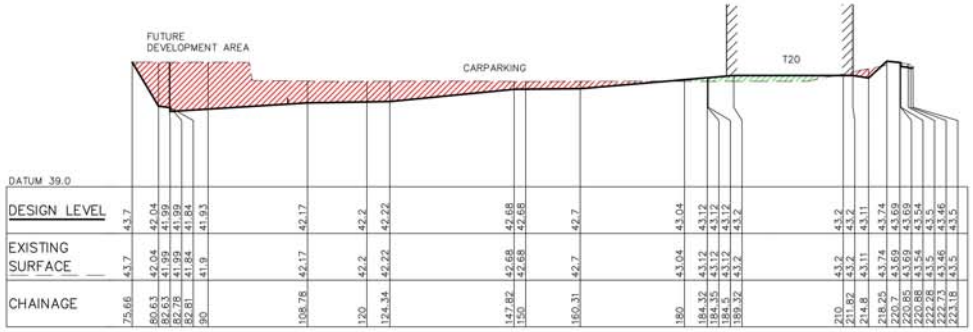

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drawing title:
SITE SECTIONS
SHEET 1

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-301
client: Woolworths

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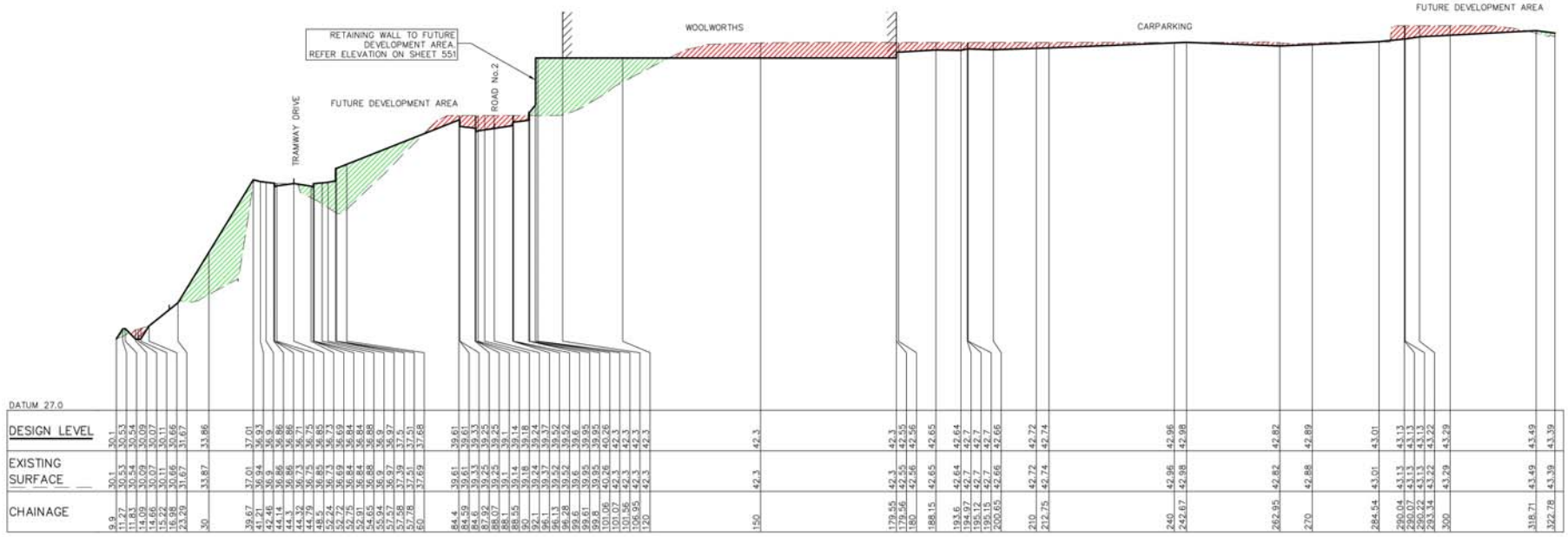

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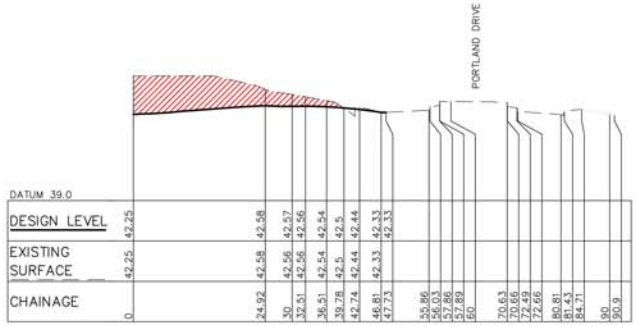

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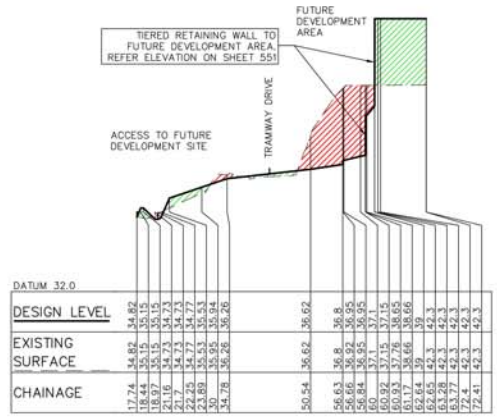

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drawing title:
SITE SECTIONS
SHEET 2

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-302
client: Woolworths

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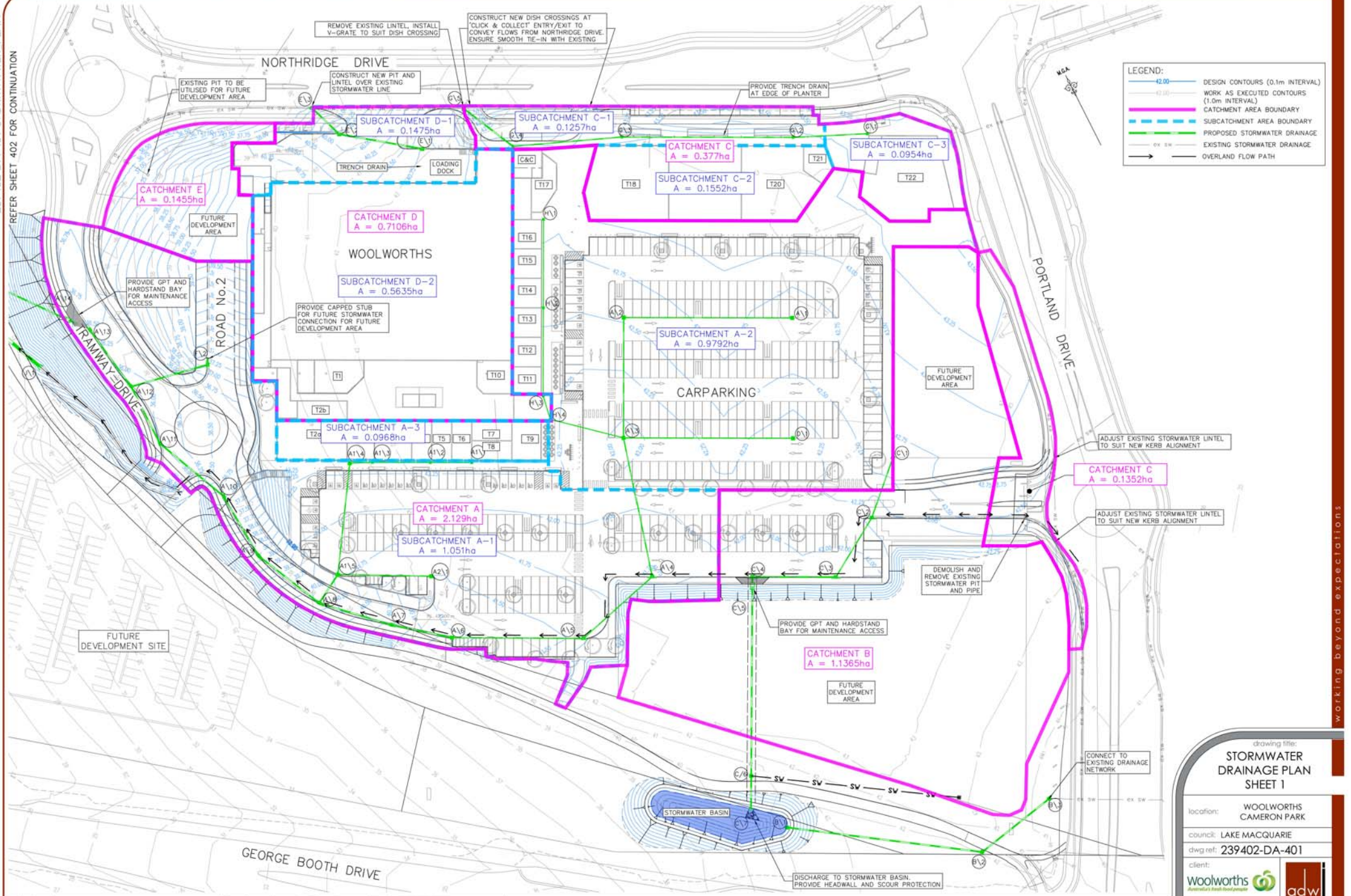

REFER SHEET 402 FOR CONTINUATION

239402-DA-401-STORMWATER PLAN

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drawing title:
STORMWATER DRAINAGE PLAN SHEET 1

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-401
client: Woolworths

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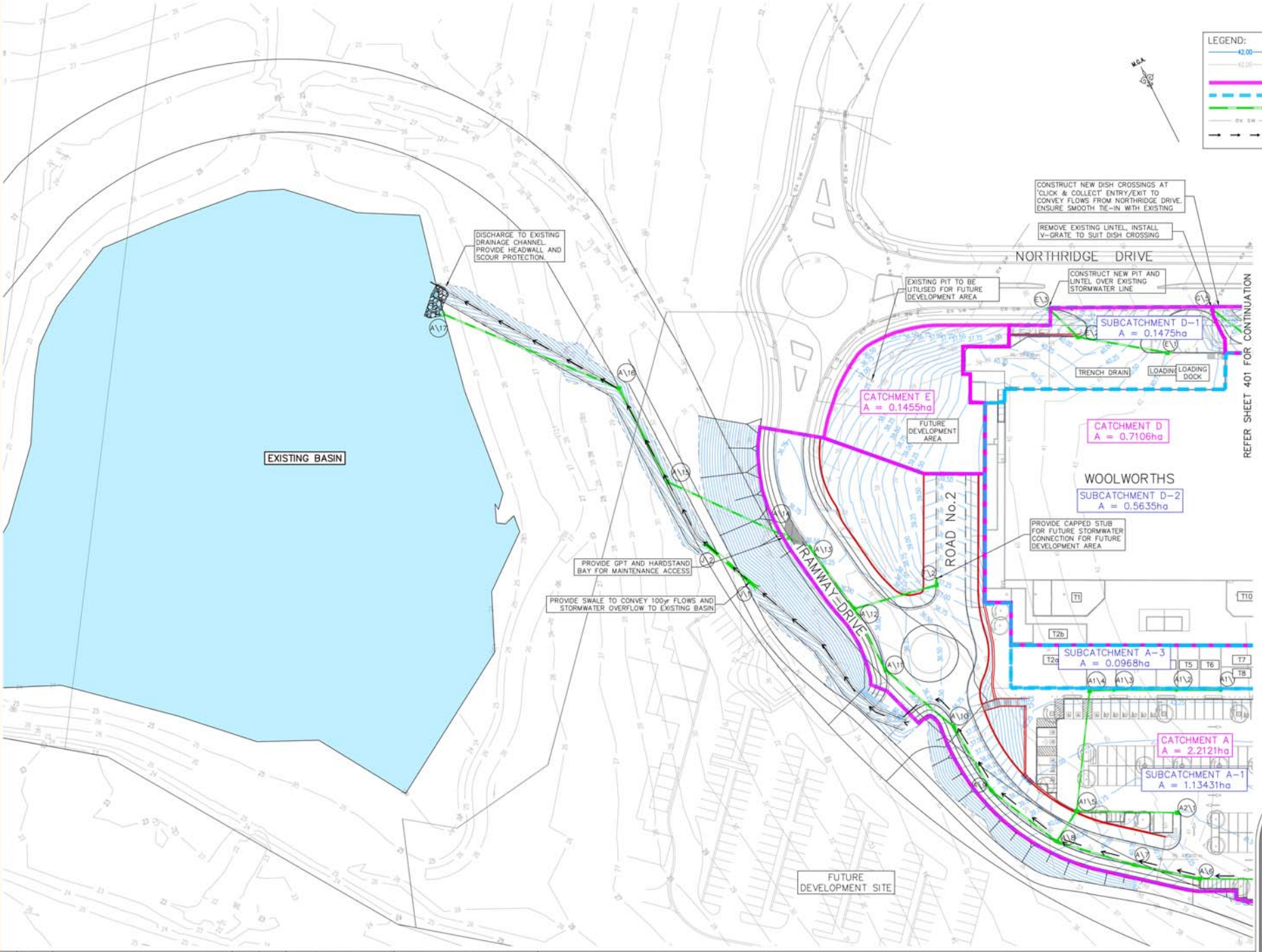

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STORMWATER DRAINAGE PLAN SHEET 2

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-402
client: woolworths

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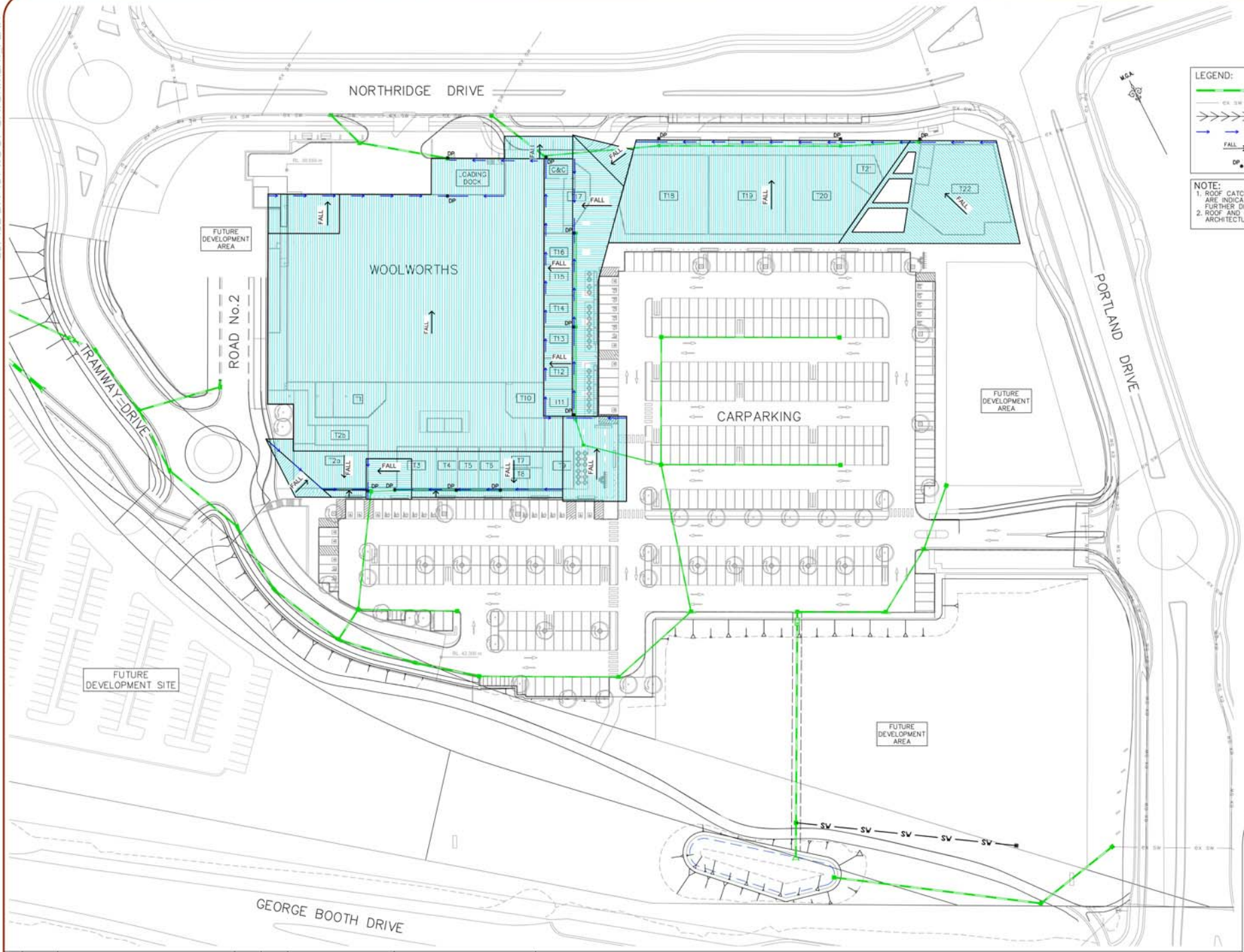

ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
B	20/2/18	ISSUE FOR DEVELOPMENT APPLICATION	DW	MK	DATUM: AHD CONTOUR INTERVAL: 0.1m	0 12.5 25.0m SCALE: 1:500 (FULL)	

drawing title:
INDICATIVE ROOF CATCHMENT AND DOWNPIPE PLAN

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-451
client: Woolworths

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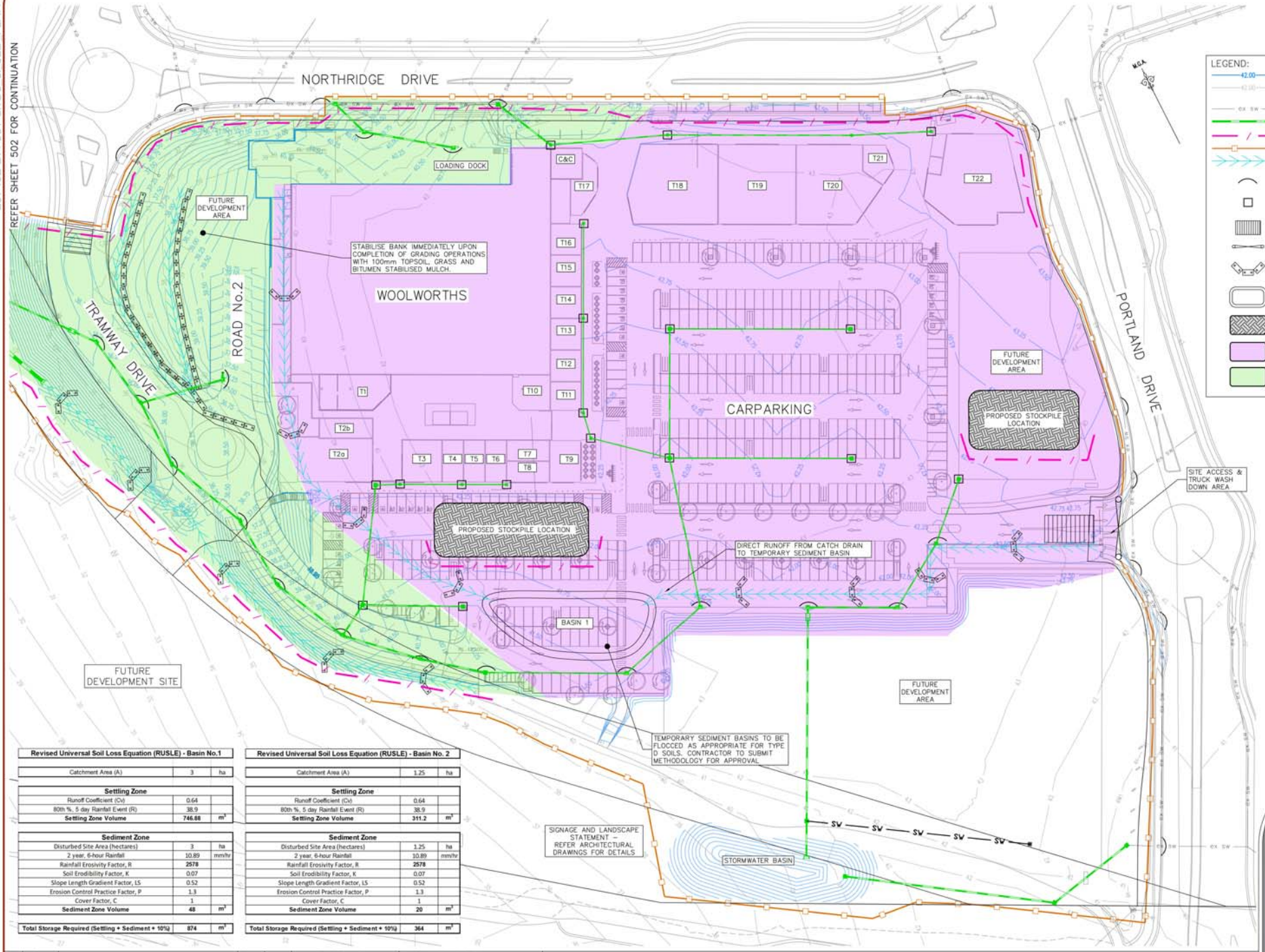
239402-DA-451-ROOF CATCHMENT PLAN
Plotted By: Dean Woodbridge Plot Date: 20/02/18 10:53:54AM Cad File: S:\239402\DRAWINGS\PLANNING\DA\WOOLWORTHS DA\239402-DA-451-ROOF CATCHMENT_PLAN.DWG



REFER SHEET 502 FOR CONTINUATION

239402-DA-501-EROS & SED PLAN

Revised Universal Soil Loss Equation (RUSLE) - Basin No.1		
Catchment Area (A)	3	ha
Settling Zone		
Runoff Coefficient (Cv)	0.64	
80th %, 5 day Rainfall Event (R)	38.9	
Settling Zone Volume	**746.88**	**m³**
Sediment Zone		
Disturbed Site Area (hectares)	3	ha
2 year, 6-hour Rainfall	10.89	mm/hr
Rainfall Erosivity Factor, R	**2578**	
Soil Erodibility Factor, K	0.07	
Slope Length Gradient Factor, LS	0.52	
Erosion Control Practice Factor, P	1.3	
Cover Factor, C	1	
Sediment Zone Volume	**48**	**m³**
Total Storage Required (Settling + Sediment + 10%)	**874**	**m³**

Revised Universal Soil Loss Equation (RUSLE) - Basin No. 2		
Catchment Area (A)	1.25	ha
Settling Zone		
Runoff Coefficient (Cv)	0.64	
80th %, 5 day Rainfall Event (R)	38.9	
Settling Zone Volume	**311.2**	**m³**
Sediment Zone		
Disturbed Site Area (hectares)	1.25	ha
2 year, 6-hour Rainfall	10.89	mm/hr
Rainfall Erosivity Factor, R	**2578**	
Soil Erodibility Factor, K	0.07	
Slope Length Gradient Factor, LS	0.52	
Erosion Control Practice Factor, P	1.3	
Cover Factor, C	1	
Sediment Zone Volume	**20**	**m³**
Total Storage Required (Settling + Sediment + 10%)	**364**	**m³**

ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
F	20/2/18	ISSUE FOR DEVELOPMENT APPLICATION	DW	MK	DATUM: AHD CONTOUR INTERVAL: 0.1m	0 12.5 25.0m SCALE: 1:500 (FULL)	

drawing title:
EROSION & SEDIMENT CONTROL PLAN - SHEET 1

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-501
client: Woolworths

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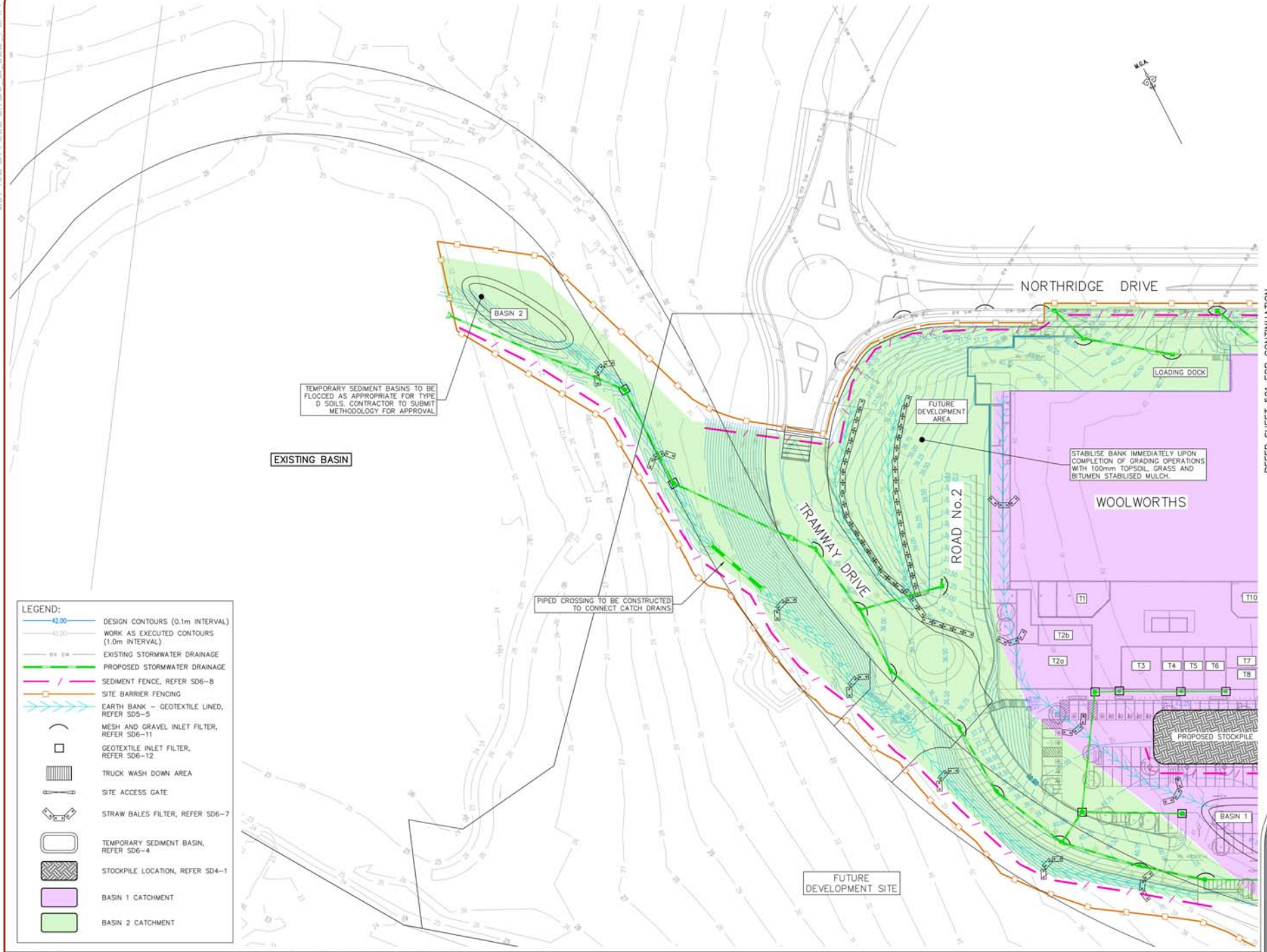

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F	20/2/18	ISSUE FOR DEVELOPMENT APPLICATION	DW	MK	DATUM: AHD CONTOUR INTERVAL: 0.1m	0 12.5 25.0m SCALE: 1:500 (FULL)	

drawing title:
EROSION & SEDIMENT CONTROL PLAN - SHEET 2

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-502
client: Woolworths

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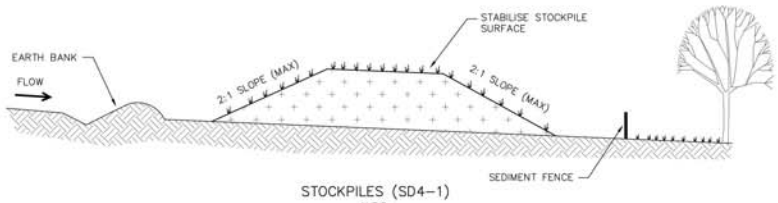
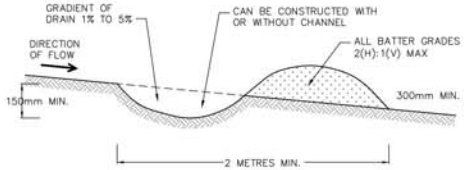


STOCKPILES (SD4–1)
N.T.S.

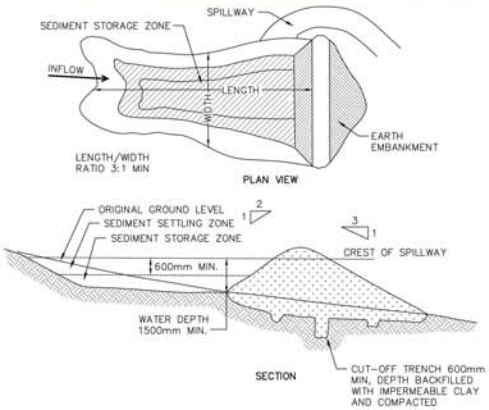
CONSTRUCTION NOTES:
1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C–FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5–5) ON THE UPSLOP SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6–8) 1 TO 2 METRES DOWNSLOPE.



NOTE: ONLY TO BE USED AS TEMPORARY BANK WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.

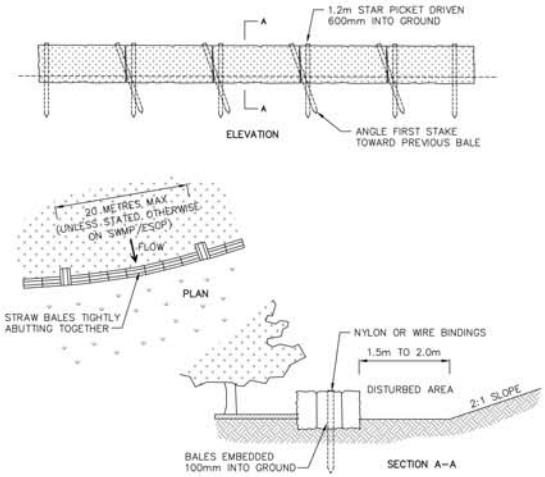
EARTH BANK (SD5–5)
N.T.S.

CONSTRUCTION NOTES:
1. BUILD WITH GRADIENTS BETWEEN 1 PERCENT AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE – WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.



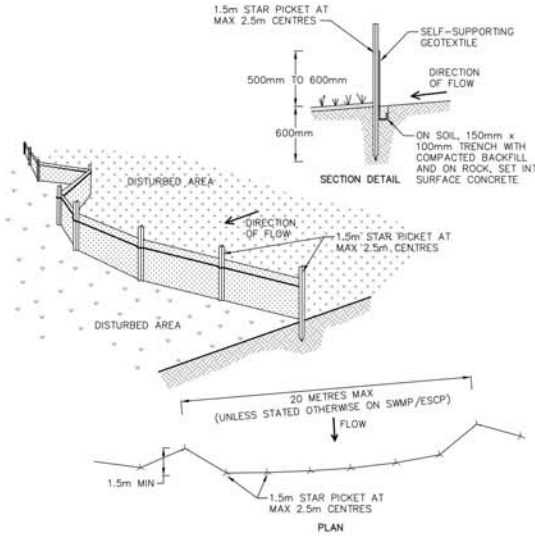
WET EARTH BASIN (SD6–4)
(APPLIES TO 'TYPE D' SOILS ONLY)
N.T.S.

CONSTRUCTION NOTES:
1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. CONSTRUCT A CUT–OFF TRENCH 500mm DEEP AND 1200mm WIDE ALONG THE CENTRELINE OF THE EMBANKMENT EXTENDING TO A POINT ON THE GULLY WALL LEVEL WITH THE RISER CREST.
3. MAINTAIN THE TRENCH FREE OF WATER AND RECOMPACT THE MATERIALS WITH EQUIPMENT AS SPECIFIED IN THE SWMP TO 95 PERCENT STANDARD PROCTOR DENSITY.
4. SELECT FILL ACCORDING TO THE SWMP THAT IS FREE FROM ROOTS, WOOD, ROCK, LARGE STONE OR FOREIGN MATERIAL.
5. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING TO AT LEAST 100mm TO HELP BOND THE COMPACTED FILL TO THE EXISTING SUBSTRATE.
6. SPREAD THE FILL IN 100mm TO 150mm LAYERS AND COMPACT IT AT OPTIMUM MOISTURE CONTENT FOLLOWING THE SWMP.
7. CONSTRUCT THE EMERGENCY SPILLWAY.
8. REHABILITATE THE STRUCTURE FOLLOWING THE SWMP.



STRAW BALE FILTER (SD6–7)
N.T.S.

CONSTRUCTION NOTES:
1. CONSTRUCT THE STRAW BALE FILTER AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE.
2. PLACE BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE STRAW TO FILL ANY GAPS BETWEEN BALES. STRAWS ARE TO BE PLACED PARALLEL TO GROUND.
3. ENSURE THAT THE MAXIMUM HEIGHT OF THE FILTER IS ONE BALE.
4. EMBED EACH BALE IN THE GROUND 75mm TO 100mm AND ANCHOR WITH TWO 1.2m STAR PICKETS OR STAKES. ANGLE THE FIRST STAR PICKET OR STAKE IN EACH BALE TOWARDS THE PREVIOUSLY LAID BALE. DRIVE THEM 600mm IN THE GROUND AND, IF POSSIBLE, FLUSH WITH THE TOP OF THE BALES. WHERE STAR PICKETS ARE USED AND THEY PROTRUDE ABOVE THE BALES, ENSURE THEY ARE FITTED WITH SAFETY CAPS.
5. WHERE A STRAW BALE FILTER IS CONSTRUCTED DOWNSLOPE FROM A DISTURBED BATTER, ENSURE THE BALES ARE PLACES 1 TO 2 METRES DOWNSLOPE FROM THE TOE.
6. ESTABLISH A MAINTENANCE PROGRAM THAT ENSURES THE INTEGRITY OF THE BALES IS RETAINED – THEY COULD REQUIRE REPLACEMENT EACH TWO TO FOUR MONTHS.



SEDIMENT FENCE (SD6–8)
N.T.S.

CONSTRUCTION NOTES:
1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10–YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF–SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

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drawing title:
EROSION & SEDIMENT CONTROL DETAILS - SHEET 1

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-511
client: Woolworths

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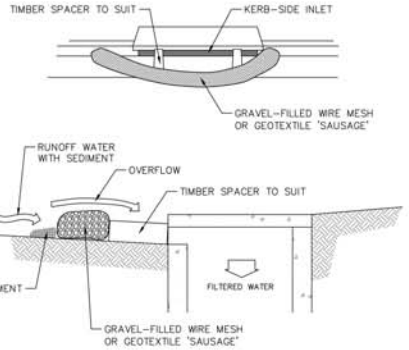


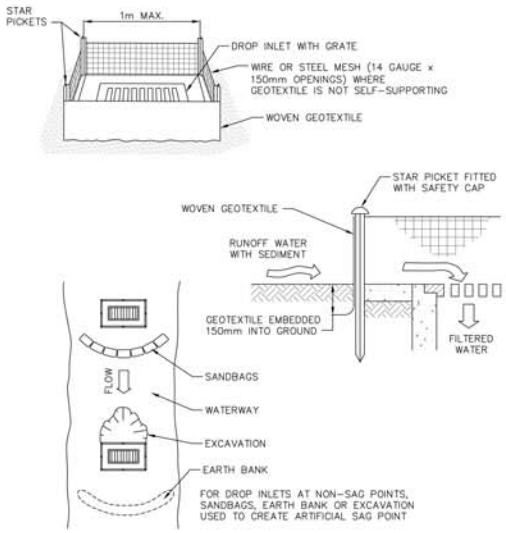
NOTE: THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN AN APPROVED SWMP/ESCP.

MESH AND GRAVEL INLET FILTER (SD6-11)

N.T.S.

CONSTRUCTION NOTES:

1. INSTALL FILTERS TO KERB INLETS ONLY ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

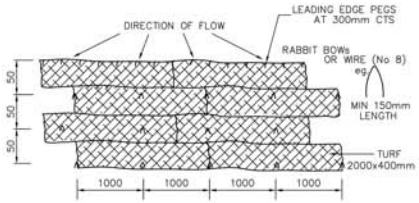


GEOTEXTILE INLET FILTER (SD6-12)

N.T.S.

CONSTRUCTION NOTES:

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. REFER STANDARD DRAWINGS 6-7 & 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.



TURF LAYING CONFIGURATION

ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
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drawing title:
EROSION & SEDIMENT CONTROL DETAILS - SHEET 2

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-512
client: Woolworths

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239402-DA-513-EROS_&_SED_CONTROLS

Plotted By: Dean Woodbridge Plot Date: 20/02/18 10:34:38AM Cad File: S:\239402\DRAWINGS\PLANNING\DA\WOOLWORTHS DA\239402-DA-513-EROS_&_SED_CONTROLS.DWG

GENERAL

1. ESCP REFERS TO EROSION AND SEDIMENT CONTROL PLAN OR A SOIL AND WATER MANAGEMENT PLAN (SWMP).
2. ESC REFERS TO EROSION AND SEDIMENT CONTROL.
3. SEDIMENT, INCLUDES, BUT IS NOT LIMITED TO, CLAY, SILT, SAND, GRAVEL, SOIL, MUD, CEMENT, AND CERAMIC WASTE.
4. ANY REFERENCE TO THE BLUE BOOK REFERS TO MANAGING URBAN STORMWATER – SOILS AND CONSTRUCTION. LANDCOM, 2004.
5. ANY REFERENCE TO THE IECA WHITE BOOKS (2008) REFERS TO IECA 2008. BEST PRACTICE EROSION AND SEDIMENT CONTROL. BOOKS 1–6.INTERNATIONAL EROSION CONTROL ASSOCIATION (AUSTRALASIA). PICTON NSW.
6. ANY MATERIAL DEPOSITED IN ANY CONSERVATION AREA FROM WORKS ASSOCIATED WITH THE DEVELOPMENT SHALL BE REMOVED IMMEDIATELY BY MEASURES INVOLVING MINIMAL GROUND AND/OR VEGETATION DISTURBANCE AND NO MACHINERY, OR FOLLOWING DIRECTIONS BY COUNCIL AND/OR WITHIN A TIMEFRAME ADVISED BY COUNCIL.

THE ESCP

7. THE ESCP AND ITS ASSOCIATED ESC MEASURES SHALL BE CONSTANTLY MONITORED, REVIEWED, AND MODIFIED AS REQUIRED TO CORRECT DEFICIENCIES. COUNCIL HAS THE RIGHT TO DIRECT CHANGES IF, IN ITS OPINION, THE MEASURES THAT ARE PROPOSED OR HAVE BEEN INSTALLED ARE INADEQUATE TO PREVENT POLLUTION.
8. PRIOR TO ANY ACTIVITIES ONSITE, THE RESPONSIBLE PERSON(S) IS TO BE NOMINATED. THE RESPONSIBLE PERSON(S) SHALL BE RESPONSIBLE FOR THE ESC MEASURES ONSITE. THE NAME, ADDRESS AND 24 HOUR CONTACT DETAILS OF THE PERSON(S) SHALL BE PROVIDED TO COUNCIL IN WRITING. COUNCIL SHALL BE ADVISED WITHIN 48 HOURS OF ANY CHANGES TO THE RESPONSIBLE PERSON(S), OR THEIR CONTACT DETAILS, IN WRITING.
9. AT LEAST 14 DAYS BEFORE THE NATURAL SURFACE IS DISTURBED IN ANY NEW STAGE, THE CONTRACTOR SHALL SUBMIT TO THE CERTIFIER, A PLAN SHOWING ESC MEASURES FOR THAT STAGE. THE DEGREE OF DESIGN DETAIL SHALL BE BASED ON THE DISTURBED AREA.
10. AT ANY TIME DURING CONSTRUCTION, THE ESC MEASURES ONSITE SHALL BE APPROPRIATE FOR THE AREA OF DISTURBANCE AND ITS CHARACTERISTICS INCLUDING SOILS (IN ACCORDANCE WITH THOSE REQUIRED FOR THE SITE AS PER DCP).
11. THE IMPLEMENTATION OF THE ESCP SHALL BE SUPERVISED BY PERSONNEL WITH APPROPRIATE QUALIFICATIONS AND/OR EXPERIENCE IN ESC ON CONSTRUCTION SITES.
12. THE APPROVED ESCP SHALL BE AVAILABLE ON–SITE FOR INSPECTION BY COUNCIL OFFICERS WHILE WORK ACTIVITIES ARE OCCURRING.
13. THE APPROVED ESCP SHALL BE UP TO DATE AND SHOW A TIMELINE OF INSTALLATION, MAINTENANCE AND REMOVAL OF ESC MEASURES.
14. ALL ESC MEASURES SHALL BE APPROPRIATE FOR THE SEDIMENT TYPE(S) OF THE SOILS ONSITE, IN ACCORDANCE WITH THE BLUE BOOK, IECA WHITE BOOKS OR OTHER CURRENT RECOGNISED INDUSTRY STANDARD FOR ESC FOR AUSTRALIAN CONDITIONS.
15. ADEQUATE SITE DATA, INCLUDING SOIL DATA FROM A NATA APPROVED LABORATORY, SHALL BE OBTAINED TO ALLOW THE PREPARATION OF AN APPROPRIATE ESCP, AND ALLOW THE SELECTION, DESIGN AND SPECIFICATION OF REQUIRED ESC MEASURES.
16. ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE APPROVED ESCP (AS AMENDED FROM TIME TO TIME) UNLESS CIRCUMSTANCES ARISE WHERE:
    a) COMPLIANCE WITH THE ESCP WOULD INCREASE THE POTENTIAL FOR ENVIRONMENTAL HARM; OR
    b) CIRCUMSTANCES CHANGE DURING CONSTRUCTION AND THOSE CIRCUMSTANCES COULD NOT HAVE BEEN FORESEEN; OR
    c) COUNCIL DETERMINES THAT UNACCEPTABLE OFF–SITE SEDIMENTATION IS OCCURRING AS A RESULT OF A LAND–DISTURBING ACTIVITY. IN EITHER CASE, THE PERSON(S) RESPONSIBLE MAY BE REQUIRED TO TAKE ADDITIONAL, OR ALTERNATIVE PROTECTIVE ACTION, AND/OR UNDERTAKE REASONABLE RESTORATION WORKS WITHIN THE TIMEFRAME SPECIFIED BY THE COUNCIL.
17. ADDITIONAL ESC MEASURES SHALL BE IMPLEMENTED, AND A REVISED ESCP SUBMITTED FOR APPROVAL TO THE CERTIFIER (WITHIN FIVE BUSINESS DAYS OF ANY SUCH AMENDMENTS) IN THE EVENT THAT:
    a) THERE IS A HIGH PROBABILITY THAT SERIOUS OR MATERIAL ENVIRONMENTAL HARM MAY OCCUR AS A RESULT OF SEDIMENT LEAVING THE SITE; OR
    b) THE IMPLEMENTED WORKS FAIL TO ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES SPECIFIED IN THESE CONDITIONS; OR
    c) SITE CONDITIONS SIGNIFICANTLY CHANGE; OR
    d) SITE INSPECTIONS INDICATE THAT THE IMPLEMENTED WORKS ARE FAILING TO ACHIEVE THE 'OBJECTIVE' OF THE ESCP.
18. A COPY OF ANY AMENDED ESCP SHALL BE FORWARDED TO AN APPROPRIATE COUNCIL OFFICER, WITHIN FIVE BUSINESS DAYS OF ANY SUCH AMENDMENTS.

SITE ESTABLISHMENT INCLUDING CLEARING AND MULCHING

19. NO LAND CLEARING SHALL BE UNDERTAKEN UNLESS PRECEDED BY THE INSTALLATION OF ADEQUATE DRAINAGE AND SEDIMENT CONTROL MEASURES, UNLESS SUCH CLEARING IS REQUIRED FOR THE PURPOSE OF INSTALLING SUCH MEASURES, IN WHICH CASE, ONLY THE MINIMUM CLEARING REQUIRED TO INSTALL SUCH MEASURES SHALL OCCUR.
20. BULK TREE CLEARING AND GRUBBING OF THE SITE SHALL BE IMMEDIATELY FOLLOWED BY SPECIFIED TEMPORARY EROSION CONTROL MEASURES (E.G. TEMPORARY GRASSING OR MULCHING) PRIOR TO COMMENCEMENT OF EACH STAGE OF CONSTRUCTION WORKS.
21. TREES AND VEGETATION CLEARED FROM THE SITE SHALL BE MULCHED ONSITE WITHIN 7 DAYS OF CLEARING.
22. APPROPRIATE MEASURES SHALL BE UNDERTAKEN TO CONTROL ANY DUST ORIGINATING DUE TO THE MULCHING OF VEGETATION ONSITE.
23. ALL OFFICE FACILITIES AND OPERATIONAL ACTIVITIES SHALL BE LOCATED SUCH THAT ANY EFFLUENT, INCLUDING WASH–DOWN WATER, CAN BE TOTALLY CONTAINED AND TREATED WITHIN THE SITE.
24. ALL REASONABLE AND PRACTICABLE MEASURES SHALL BE TAKEN TO ENSURE STORMWATER RUNOFF FROM ACCESS ROADS AND STABILISED ENTRY/EXIT SYSTEMS, DRAINS TO AN APPROPRIATE SEDIMENT CONTROL DEVICE.
25. SITE EXIT POINTS SHALL BE APPROPRIATELY MANAGED TO MINIMISE THE RISK OF SEDIMENT BEING TRACKED ONTO SEALED, PUBLIC ROADWAYS.
26. STORMWATER RUNOFF FROM ACCESS ROADS AND STABILISED ENTRY/EXIT POINTS SHALL DRAIN TO AN APPROPRIATE SEDIMENT CONTROL DEVICE.
27. THE APPLICANT SHALL ENSURE AN ADEQUATE SUPPLY OF ESC, AND APPROPRIATE POLLUTION CLEAN–UP MATERIALS ARE AVAILABLE ON–SITE AT ALL TIMES.
28. ALL TEMPORARY EARTH BANKS, FLOW DIVERSION SYSTEMS, AND SEDIMENT BASIN EMBANKMENTS SHALL BE MACHINE–COMPACTED, SEEDED AND MULCHED WITHIN TEN (10) DAYS OF FORMATION FOR THE PURPOSE OF ESTABLISHING A VEGETATIVE COVER, OR LINED APPROPRIATELY.
29. SEDIMENT DEPOSITED OFF SITE AS A RESULT OF ON–SITE ACTIVITIES SHALL BE COLLECTED AND THE AREA CLEANED/REHABILITATED AS SOON AS REASONABLE AND PRACTICABLE.
30. CONCRETE WASTE AND CHEMICAL PRODUCTS, INCLUDING PETROLEUM AND OIL–BASED PRODUCTS, SHALL BE PREVENTED FROM ENTERING ANY INTERNAL OR EXTERNAL WATER BODY, OR ANY EXTERNAL DRAINAGE SYSTEM, EXCLUDING THOSE ON–SITE WATER BODIES SPECIFICALLY DESIGNED TO CONTAIN AND/OR TREAT SUCH MATERIAL. APPROPRIATE MEASURES SHALL BE INSTALLED TO TRAP THESE MATERIALS ONSITE.
31. BRICK, TILE OR MASONRY CUTTING SHALL BE CARRIED OUT ON A PERVIOUS SURFACE (E.G. GRASS OR OPEN SOIL) AND IN SUCH A MANNER THAT ANY RESULTING SEDIMENT–LADEN RUNOFF IS PREVENTED FROM DISCHARGING INTO A GUTTER, DRAIN OR WATER. APPROPRIATE MEASURES SHALL BE INSTALLED TO TRAP THESE MATERIALS ONSITE.
32. NEWLY SEALED HARD–STAND AREAS (E.G. ROADS, DRIVEWAYS AND CAR PARKS) SHALL BE SWEPT THOROUGHLY AS SOON AS PRACTICABLE AFTER SEALING/SURFACING TO MINIMISE THE RISK OF COMPONENTS OF THE SURFACING COMPOUND ENTERING STORMWATER DRAINS.
33. STOCKPILES OF ERODIBLE MATERIAL SHALL BE PROVIDED WITH AN APPROPRIATE PROTECTIVE COVER (SYNTHETIC OR ORGANIC) IF THE MATERIALS ARE LIKELY TO BE STOCKPILED FOR MORE THAN 10 DAYS.
34. STOCKPILES, TEMPORARY OR PERMANENT, SHALL NOT BE LOCATED IN AREAS IDENTIFIED AS NO–GO ZONES (INCLUDING, BUT NOT LIMITED TO, RESTRICTED ACCESS AREAS, BUFFER ZONES, OR AREAS OF NON–DISTURBANCE) ON THE ESCP.
35. NO MORE THAN 150M OF A STORMWATER, SEWER LINE OR OTHER SERVICE TRENCH SHALL TO BE OPEN AT ANY ONE TIME.
36. SITE SPOIL SHALL BE LAWFULLY DISPOSED OF IN A MANNER THAT DOES NOT RESULT IN ONGOING SOIL EROSION OR ENVIRONMENTAL HARM.
37. WHEREVER REASONABLE AND PRACTICABLE, STORMWATER RUNOFF ENTERING THE SITE FROM EXTERNAL AREAS, AND NON–SEDIMENT LADEN (CLEAN) STORMWATER RUNOFF ENTERING A WORK AREA OR AREA OF SOIL DISTURBANCE, SHALL BE DIVERTED AROUND OR THROUGH THAT AREA IN A MANNER THAT MINIMISES SOIL EROSION AND THE CONTAMINATION OF THAT WATER FOR ALL DISCHARGES UP TO THE SPECIFIED DESIGN STORM DISCHARGE.

SITE MANAGEMENT INCLUDING DUST

38. PRIORITY SHALL BE GIVEN TO THE PREVENTION, OR AT LEAST THE MINIMISATION, OF SOIL EROSION, RATHER THAN THE TRAPPING OF DISPLACED SEDIMENT. SUCH A CLAUSE SHALL NOT REDUCE THE RESPONSIBILITY TO APPLY AND MAINTAIN, AT ALL TIMES, ALL NECESSARY ESC MEASURES.
39. MEASURES USED TO CONTROL WIND EROSION SHALL BE APPROPRIATE FOR THE LOCATION AND PREVENT SOIL EROSION AT ALL TIMES, INCLUDING WORKING HOURS, OUT OF HOURS, WEEKENDS, PUBLIC HOLIDAYS, AND DURING ANY OTHER SHUTDOWN PERIODS.
40. THE APPLICATION OF LIQUID OR CHEMICAL–BASED DUST SUPPRESSION MEASURES SHALL ENSURE THAT SEDIMENT–LADEN RUNOFF RESULTING FROM SUCH MEASURES DOES NOT CREATE A TRAFFIC OR ENVIRONMENTAL HAZARD.
41. ALL CUT AND FILL EARTH BATTERS LESS THAN 3M IN ELEVATION SHALL BE TOPSOILED, AND GRASS SEEDED/HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF GRADING IN CONSULTATION WITH COUNCIL.
42. ONCE CUT/FILL OPERATIONS HAVE BEEN FINALISED IN A SECTION, ALL DISTURBED AREAS THAT ARE NOT BEING WORKED ON SHALL BE STABILISED IN ACCORDANCE WITH TIME LINES IN THE BLUE BOOK.
43. ALL REASONABLE AND PRACTICABLE MEASURES SHALL BE TAKEN TO PREVENT, OR AT LEAST MINIMISE, THE RELEASE OF SEDIMENT FROM THE SITE.
44. SUITABLE ALL–WEATHER MAINTENANCE ACCESS SHALL BE PROVIDED TO ALL SEDIMENT CONTROL DEVICES.
45. SEDIMENT CONTROL DEVICES, OTHER THAN SEDIMENT BASINS, SHALL BE DE–SILTED AND MADE FULLY OPERATIONAL AS SOON AS REASONABLE AND PRACTICABLE AFTER A SEDIMENT–PRODUCING EVENT, WHETHER NATURAL OR ARTIFICIAL, IF THE DEVICE'S SEDIMENT RETENTION CAPACITY FALLS BELOW 75% OF ITS DESIGN RETENTION CAPACITY.
46. ALL EROSION AND SEDIMENT CONTROL MEASURES, INCLUDING DRAINAGE CONTROL MEASURES, SHALL BE MAINTAINED IN PROPER WORKING ORDER AT ALL TIMES DURING THEIR OPERATIONAL LIVES.
47. WASHING/FLUSHING OF SEALED ROADWAYS SHALL ONLY OCCUR WHERE SWEEPING HAS FAILED TO REMOVE SUFFICIENT SEDIMENT AND THERE IS A COMPELLING NEED TO REMOVE THE REMAINING SEDIMENT (E.G. FOR SAFETY REASONS). IN SUCH CIRCUMSTANCES, ALL REASONABLE AND PRACTICABLE SEDIMENT CONTROL MEASURES SHALL BE USED TO PREVENT, OR AT LEAST MINIMISE, THE RELEASE OF SEDIMENT INTO RECEIVING WATERS. ONLY THOSE MEASURES THAT WILL NOT CAUSE SAFETY AND PROPERTY FLOODING ISSUES SHALL BE EMPLOYED. SEDIMENT REMOVED FROM ROADWAYS SHALL BE DISPOSED OF IN A LAWFUL MANNER THAT DOES NOT CAUSE ONGOING SOIL EROSION OR ENVIRONMENTAL HARM.
48. SEDIMENT REMOVED FROM SEDIMENT TRAPS AND PLACES OF SEDIMENT DEPOSITION SHALL BE DISPOSED OF IN A LAWFUL MANNER THAT DOES NOT CAUSE ONGOING SOIL EROSION OR ENVIRONMENTAL HARM.

SEDIMENT BASINS – INSTALLATION, MAINTENANCE AND REMOVAL INCLUDING SEDIMENT TRAPS

49. AS–CONSTRUCTED PLANS SHALL BE PREPARED FOR ALL CONSTRUCTED SEDIMENT BASINS AND ASSOCIATED EMERGENCY SPILLWAYS. SUCH PLANS SHALL VERIFY THE BASIN'S DIMENSIONS, LEVELS AND VOLUMES COMPLY WITH THE APPROVED DESIGN DRAWINGS. THESE PLANS MAY BE REQUESTED BY THE CERTIFIER OR COUNCIL.
50. SEDIMENT BASINS SHALL BE CONSTRUCTED AND FULLY OPERATIONAL PRIOR TO ANY OTHER SOIL DISTURBANCE IN THEIR CATCHMENT.
51. INSTALL AN INTERNAL GATED VALVE, OR SIMILAR, IN ANY OUTLET PIPE ONCE PIPES INSTALLED, OR INSTALL A SACRIFICIAL PIPE FROM BASIN THROUGH WALL TO EXTERNAL OUTLET POINT. THE VALVE SHALL BE CONNECTED TO A RISER MADE FROM SLOTTED PIPE IN THE BASIN. THE VALVE MAY BE OPENED ONCE CAPTURED WATER MEETS WATER QUALITY REQUIREMENTS. THE FINAL SETUP FOR TEMPORARY INTERNAL OUTLET STRUCTURES TO BE CONFIRMED PRIOR TO CONSTRUCTION WITH COUNCIL. THIS SETUP WILL ENABLE DISCHARGE OF TREATED WATER FROM SITE WITHOUT NEED FOR PUMPING.
52. A SEDIMENT STORAGE LEVEL MARKER POST SHALL BE WITH A CROSS MEMBER SET JUST BELOW THE TOP OF THE SEDIMENT STORAGE ZONE (AS SPECIFIED ON THE APPROVED ESCP). AT LEAST A 75MM WIDE POST SHALL BE FIRMLY SET INTO THE BASIN FLOOR.
53. THE SITE MANAGER SHALL OBTAIN THE RELEVANT APPROVALS FROM THE RELEVANT ORGANISATIONS TO DISCHARGE TREATED WATER FROM ANY EXISTING BASINS. ORGANISATIONS MAY INCLUDE, BUT NOT BE LIMITED TO, HUNTER WATER, AND COUNCIL.
54. WHERE MORE THAN ONE STAGE IS TO BE DEVELOPED AT ONE TIME, OR BEFORE THE PRECEDING STAGE IS COMPLETE, THE SEDIMENT BASIN(S) FOR THESE STAGES SHALL HAVE SUFFICIENT CAPACITY TO CATER FOR ALL AREA DIRECTED TO THE BASIN(S).
55. PRIOR TO ANY FORECAST WEATHER EVENT LIKELY TO RESULT IN RUNOFF, ANY BASINS/TRAPS SHALL BE DEWATERED TO PROVIDE SUFFICIENT CAPACITY TO CAPTURE SEDIMENT LADEN WATER FROM THE SITE.
56. SUFFICIENT QUANTITIES OF CHEMICALS/AGENTS TO TREAT CAPTURED WATER SHALL BE PLACED SUCH THAT WATER ENTERING THE BASIN MIXES WITH THE CHEMICAL/AGENTS AND IS CARRIED INTO THE BASIN TO SPEED UP CLARIFICATION.
57. ANY BASIN SHALL BE DEWATERED WITHIN THE X–DAY RAINFALL DEPTH USED TO CALCULATE THE CAPACITY OF THE BASIN, AFTER A RAINFALL EVENT.
58. SUFFICIENT QUANTITIES OF CHEMICALS/AGENTS TO TREAT TURBID WATER SHALL BE SECURELY STORED ON–SITE TO PROVIDE FOR AT LEAST THREE COMPLETE TREATMENTS OF ALL BASINS REQUIRING CHEMICALLY TREATMENT ONSITE.
59. PRIOR TO THE CONTROLLED DISCHARGE (E.G. DE–WATERING ACTIVITIES) FROM EXCAVATIONS AND/OR SEDIMENT BASINS, THE FOLLOWING WATER QUALITY OBJECTIVES SHALL BE ACHIEVED:
    a) TOTAL SUSPENDED SOLIDS (TSS) TO A MAXIMUM 50mg/L;
    b) WATER PH BETWEEN 6.5 AND 8.5, UNLESS OTHERWISE REQUIRED BY THE COUNCIL;
    c) TURBIDITY (MEASURED IN NTUS) TO A MAXIMUM OF 60 NTU); AND
    d) EC LEVELS NO GREATER THAN BACKGROUND LEVELS.
60. THE DEVELOPMENT APPROVAL MAY REQUIRE TESTING OF ADDITIONAL WATER QUALITY ELEMENTS PRIOR TO DISCHARGE. E.G. HEAVY METALS.
61. A SAMPLE OF THE RELEASED TREATED WATER SHALL BE KEPT ONSITE IN A CLEAR CONTAINER WITH THE SAMPLE DATE RECORDED ON IT.
62. WATER QUALITY SAMPLES SHALL BE TAKEN AT A DEPTH NO LESS THAN 200MM BELOW THE WATER SURFACE OF THE BASIN.
63. NO ALUMINIUM BASED PRODUCTS MAY BE USED TREAT CAPTURED WATER ONSITE WITHOUT THE PRIOR WRITTEN PERMISSION FROM AN APPROPRIATE COUNCIL OFFICER. THE APPLICANT SHALL HAVE A DEMONSTRATED ABILITY TO USE SUCH PRODUCTS CORRECTLY AND WITHOUT ENVIRONMENTAL HARM PRIOR TO ANY APPROVAL.
64. THE CHEMICAL/AGENT USED IN TYPE D AND TYPE F BASINS TO TREAT CAPTURED WATER CAPTURED IN THE BASIN SHALL BE APPLIED IN CONCENTRATIONS SUFFICIENT TO ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES WITHIN THE X–DAY RAINFALL DEPTH USED TO CALCULATE THE CAPACITY OF THE BASIN, AFTER A RAINFALL EVENT.
65. ALL MANUFACTURERS' INSTRUCTIONS SHALL BE FOLLOWED FOR ANY CHEMICALS/AGENTS USED ONSITE, EXCEPT WHERE APPROVED BY THE RESPONSIBLE PERSON OR AN APPROPRIATE COUNCIL OFFICER.
66. THE APPLICANT SHALL ENSURE THAT ON EACH OCCASION A TYPE F OR TYPE D BASIN WAS NOT DE–WATERED PRIOR TO BEING SURCHARGED BY A FOLLOWING RAINFALL EVENT, A REPORT IS PRESENTED TO AN APPROPRIATE COUNCIL OFFICER WITHIN 5 DAYS IDENTIFYING THE CIRCUMSTANCES AND PROPOSED AMENDMENTS, IF ANY, TO THE BASIN'S OPERATING PROCEDURES.
67. SETTLED SEDIMENT SHALL BE REMOVED AS SOON AS REASONABLE AND PRACTICABLE FROM ANY SEDIMENT BASIN IF:
    a) IT IS ANTICIPATED THAT THE NEXT STORM EVENT IS LIKELY TO CAUSE SEDIMENT TO SETTLE ABOVE THE BASIN'S SEDIMENT STORAGE ZONE; OR
    b) THE ELEVATION OF SETTLED SEDIMENT IS ABOVE THE TOP OF THE BASIN'S SEDIMENT STORAGE ZONE; OR
    c) THE ELEVATION OF SETTLED SEDIMENT IS ABOVE THE BASINS SEDIMENT MARKER LINE.
68. SCOUR PROTECTION MEASURES PLACED ON SEDIMENT BASIN EMERGENCY SPILLWAYS SHALL APPROPRIATELY PROTECT THE SPILLWAY CHUTE AND ITS SIDE BATTERS FROM SCOUR, AND SHALL EXTEND A MINIMUM OF 3M BEYOND THE DOWNSTREAM TOE OF THE BASIN'S EMBANKMENT.
69. SUITABLE ALL–WEATHER MAINTENANCE ACCESS SHALL BE PROVIDED TO ALL SEDIMENT CONTROL DEVICES.
70. MATERIALS, WHETHER LIQUID OR SOLID, REMOVED FROM ANY ESC MEASURES DURING MAINTENANCE OR DECOMMISSIONING, SHALL BE DISPOSED OF IN A MANNER THAT DOES NOT CAUSE ONGOING SOIL EROSION OR ENVIRONMENTAL HARM.
71. ALL SEDIMENT BASINS SHALL REMAIN FULLY OPERATIONAL AT ALL TIMES UNTIL THE BASIN'S DESIGN CATCHMENT ACHIEVES 70% GROUND COVER OR SURFACE STABILISATION ACCEPTABLE TO COUNCIL.
72. THE ESC MEASURES INSTALLED DURING THE DECOMMISSIONING AND REHABILITATION OF A SEDIMENT BASIN SHALL COMPLY WITH SAME STANDARDS SPECIFIED FOR THE NORMAL CONSTRUCTION WORKS.
73. A SEDIMENT BASIN SHALL NOT BE DECOMMISSIONED UNTIL ALL UP–SLOPE SITE STABILISATION MEASURES HAVE BEEN IMPLEMENTED AND ARE APPROPRIATELY WORKING TO CONTROL SOIL EROSION AND SEDIMENT RUNOFF..
74. IMMEDIATELY PRIOR TO THE CONSTRUCTION OF THE PERMANENT STORMWATER TREATMENT DEVICE, APPROPRIATE FLOW BYPASS CONDITIONS SHALL BE ESTABLISHED TO PREVENT SEDIMENT–LADEN WATER ENTERING THE DEVICE.

REVEGETATION/STABILISATION

75. TEMPORARY STABILISATION MAY BE ATTAINED USING VEGETATION, NON REWETTABLE SOIL POLYMERS, OR PNEUMATICALLY APPLIED EROSION CONTROLS.
76. ALL CUT AND FILL EARTH BATTERS LESS THAN 3M IN ELEVATION SHALL BE TOPSOILED, AND GRASS SEEDED/HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF GRADING IN CONSULTATION WITH COUNCIL.
77. ONCE CUT/FILL OPERATIONS HAVE BEEN FINALISED IN A SECTION, ALL DISTURBED AREAS THAT ARE NOT BEING WORKED ON SHALL BE STABILISED IN ACCORDANCE WITH TIME LINES IN THE BLUE BOOK.
78. THE LMCC SEED MIX SHALL BE USED UNLESS STATED ON THE ESCP/SWMP.
79. THE PH LEVEL OF TOPSOIL SHALL BE APPROPRIATE TO ENABLE ESTABLISHMENT AND GROWTH OF SPECIFIED VEGETATION PRIOR TO INITIATING THE ESTABLISHMENT OF VEGETATION.
80. NON REWETTABLE BINDER SHALL BE USED IN ALL HYDROMULCH/HYDROSEED/POLYMER MIXES ON SLOPES OR WORKS ADJACENT TO A WATER COURSE.
81. SOIL AMELIORANTS SHALL BE ADDED TO THE SOIL IN ACCORDANCE WITH AN APPROVED LANDSCAPE PLAN, VEGETATION MANAGEMENT PLAN, AND/OR SOIL ANALYSIS.
82. SURFACE SOIL DENSITY, COMPACTION AND SURFACE ROUGHNESS SHALL BE ADJUSTED PRIOR TO SEEDING/PLANTING IN ACCORDANCE WITH AN APPROVED LANDSCAPE PLAN, VEGETATION MANAGEMENT PLAN, AND/OR SOIL ANALYSIS.
83. PROCEDURES FOR INITIATING A SITE SHUTDOWN, WHETHER PROGRAMMED OR UN–PROGRAMMED, SHALL INCORPORATE REVEGETATION OF ALL SOIL DISTURBANCES UNLESS OTHERWISE APPROVED BY COUNCIL. THE STABILISATION WORKS SHALL NOT RELY UPON THE LONGEVITY OF NON–VEGETATED EROSION CONTROL BLANKETS, OR TEMPORARY SOIL BINDERS.

SITE MONITORING AND MAINTENANCE

84. THE APPLICANT SHALL ENSURE THAT APPROPRIATE PROCEDURES AND SUITABLY QUALIFIED PERSONNEL ARE ENGAGED TO PLAN AND CONDUCT SITE INSPECTIONS AND WATER QUALITY MONITORING THROUGHOUT THE CONSTRUCTION AND MAINTENANCE PHASE.
85. ALL ESC MEASURES SHALL BE INSPECTED AND ANY MAINTENANCE UNDERTAKEN IMMEDIATELY:
    a) AT LEAST DAILY (WHEN WORK IS OCCURRING ON–SITE); AND
    b) AT LEAST WEEKLY (WHEN WORK IS NOT OCCURRING ON–SITE); AND
    c) WITHIN 24HRS OF EXPECTED RAINFALL; AND
    d) WITHIN 18HRS OF A RAINFALL EVENT THAT CAUSES RUNOFF ON THE SITE.
86. WRITTEN RECORDS SHALL BE KEPT ONSITE OF ESC MONITORING AND MAINTENANCE ACTIVITIES CONDUCTED DURING THE CONSTRUCTION AND MAINTENANCE PERIODS, AND BE AVAILABLE TO COUNCIL OFFICERS ON REQUEST.
87. ALL ENVIRONMENTALLY RELEVANT INCIDENTS SHALL BE RECORDED IN A FIELD LOG THAT SHALL REMAIN ACCESSIBLE TO ALL RELEVANT REGULATORY AUTHORITIES.
88. ALL WATER QUALITY DATA, INCLUDING DATES OF RAINFALL, DATES OF TESTING, TESTING RESULTS AND DATES OF WATER RELEASE, SHALL BE KEPT IN AN ON–SITE REGISTER. THE REGISTER IS TO BE MAINTAINED UP TO DATE FOR THE DURATION OF THE APPROVED WORKS AND BE AVAILABLE ON–SITE FOR INSPECTION BY [INSERT NAME OF REGULATORY AUTHORITY] ON REQUEST.
89. AT NOMINATED INSTREAM WATER MONITORING SITES, A MINIMUM OF 3 WATER SAMPLES SHALL BE TAKEN AND ANALYSED, AND THE AVERAGE RESULT USED TO DETERMINE QUALITY.

INSTREAM WORKS

90. ALL INSTREAM WORKS (INCLUDING IN OR ADJACENT TO WATERCOURSES NATURAL OR MANMADE, FLOWING OR NOT) SHALL BE CARRIED OUT IN ACCORDANCE WITH THE IECA WHITE BOOKS.

ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
A	20/2/18	ISSUE FOR DEVELOPMENT APPLICATION	DW	MK	DATUM: N/A CONTOUR INTERVAL: N/A	NOT TO SCALE	

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drawing title:
EROSION & SEDIMENT CONTROL NOTES

location: WOOLWORTHS CAMERON PARK

council: LAKE MACQUARIE

dwg ref: 239402-DA-513

client: Woolworths

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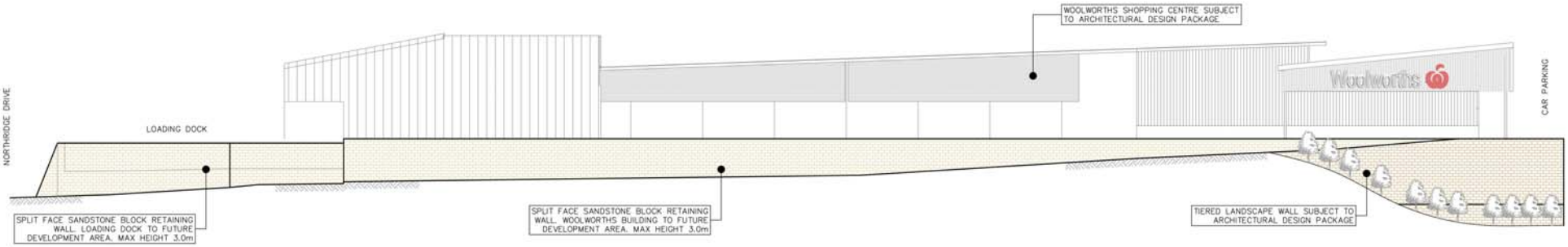
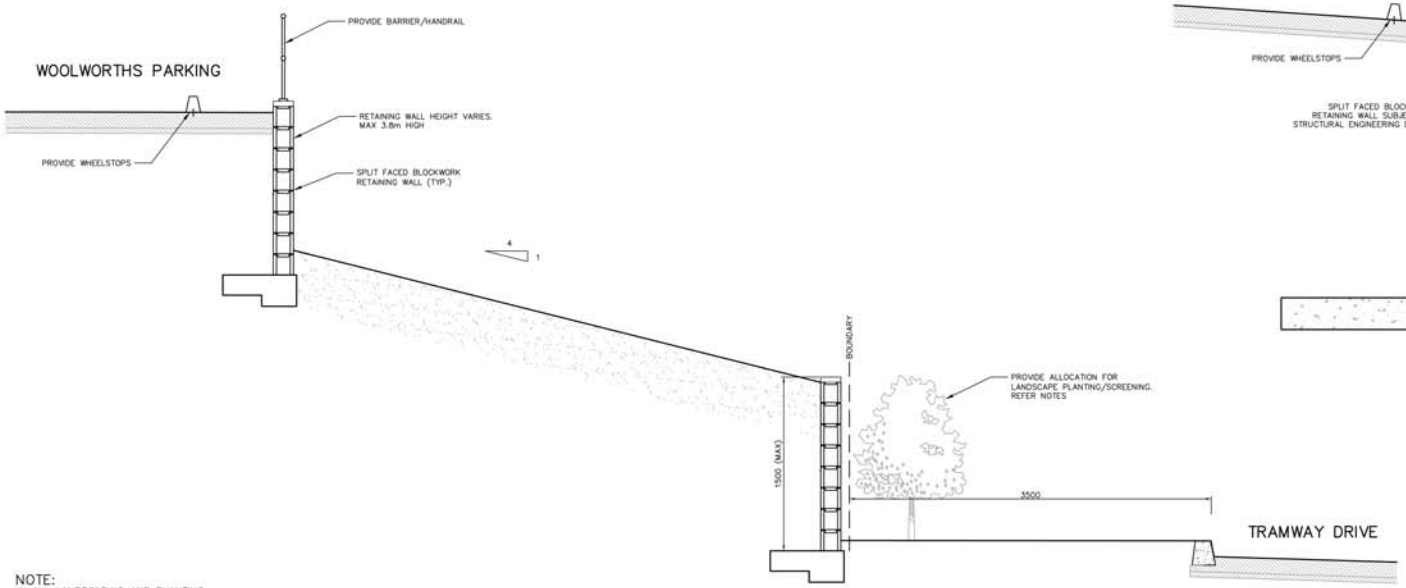
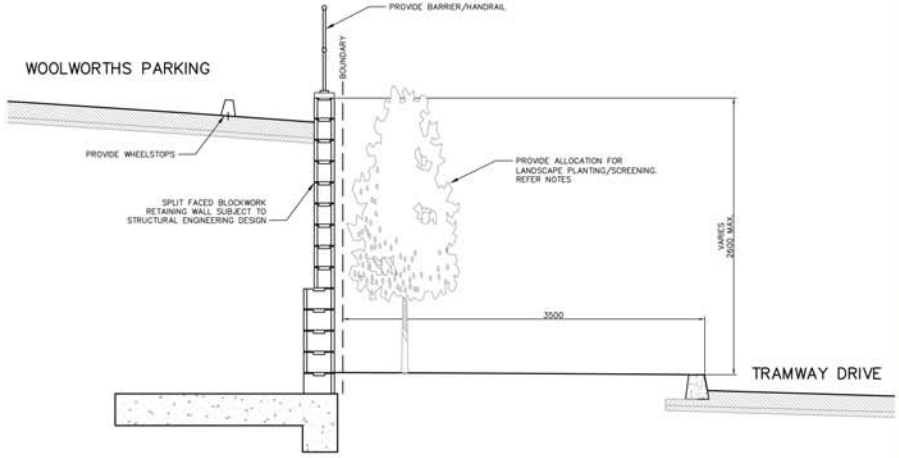


INDICATIVE WESTERN ELEVATION
RETAINING WALL TO TRAMWAY DRIVE AND FUTURE DEVELOPMENT AREA
SCALE 1:150



NOTE:
1. ALL LANDSCAPING AND PLANTING SHALL BE UNDERTAKEN IN ACCORDANCE WITH ARCHITECTURAL DOCUMENTATION PACKAGE.

TYPICAL SECTION THROUGH TIERED LANDSCAPE WALL
SCALE 1:25



TYPICAL SECTION THROUGH RETAINING WALL
SCALE 1:25

ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
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drawing title:
TYPICAL RETAINING WALL DETAILS AND SECTIONS

location: WOOLWORTHS CAMERON PARK
council: LAKE MACQUARIE
dwg ref: 239402-DA-551
client: Woolworths

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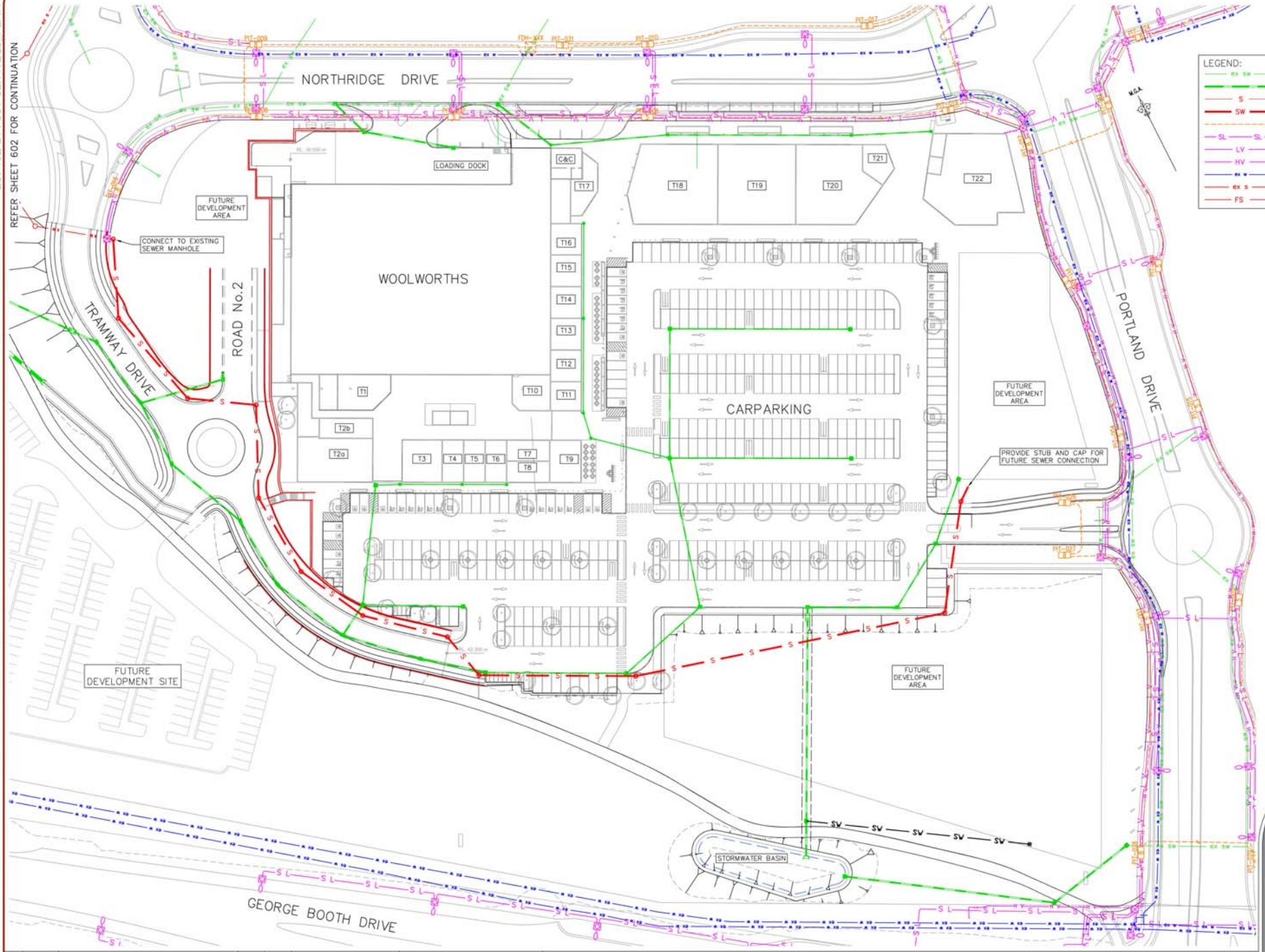

239402-DA-601-SERVICES PLAN

REFER SHEET 602 FOR CONTINUATION

ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
F	20/2/18	ISSUE FOR DEVELOPMENT APPLICATION	DW	MK	DATUM: AHD CONTOUR INTERVAL: N/A	0 12.5 25.0m SCALE: 1:500 (FULL)	

drawing title:

SERVICES PLAN
SHEET 1

location: WOOLWORTHS CAMERON PARK

council: LAKE MACQUARIE

dwg ref: 239402-DA-601

client: Woolworths

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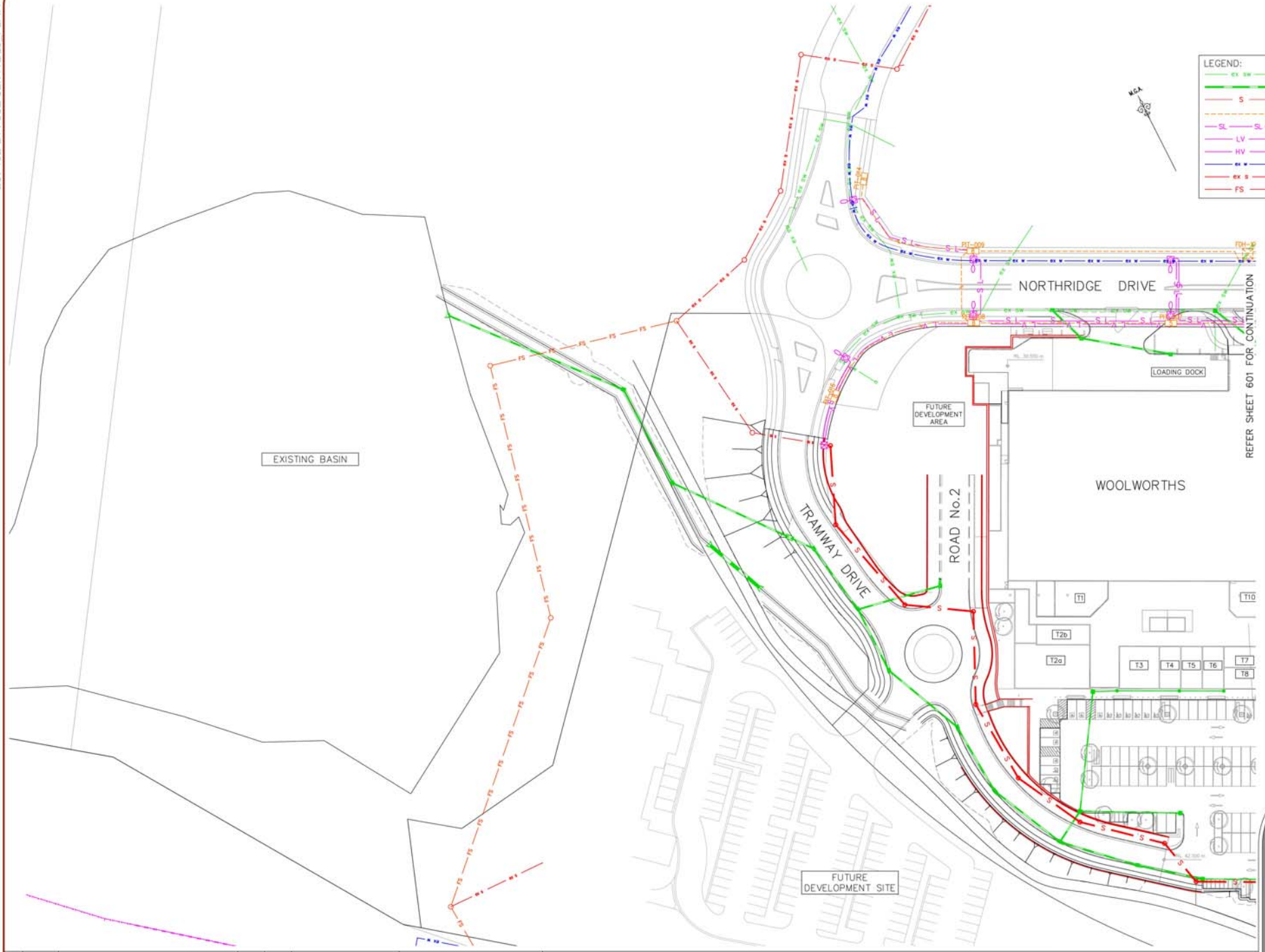
239402-DA-602-SERVICES PLAN



ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
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drawing title:

SERVICES PLAN
SHEET 2

location: WOOLWORTHS CAMERON PARK

council: LAKE MACQUARIE

dwg ref: 239402-DA-602

client: Woolworths

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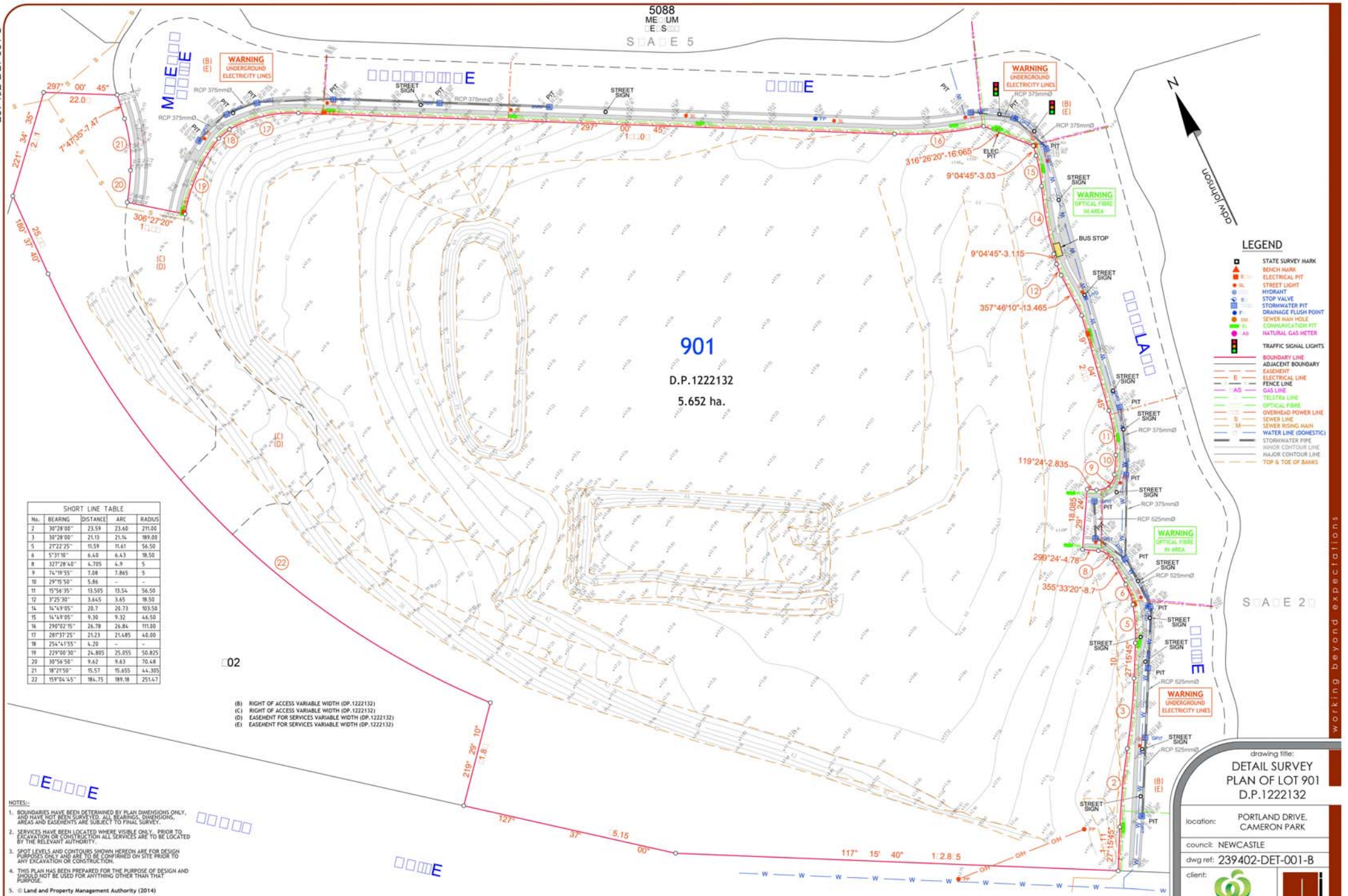
Appendix C

EXISTING SITE



SHORT LINE TABLE

No.	BEARING	DISTANCE	ARC	RADIUS
2	30°28'00"	23.59	23.60	211.00
3	30°28'00"	21.13	21.14	189.00
5	21°22'25"	11.59	11.61	56.50
6	5°31'10"	6.40	6.43	18.50
8	327°28'40"	4.705	4.9	5
9	74°19'55"	7.08	7.865	5
10	29°15'50"	5.86	-	-
11	15°56'35"	13.505	13.54	56.50
12	3°25'30"	3.645	3.65	18.50
14	14°49'05"	20.7	20.73	103.50
15	14°49'05"	9.30	9.32	46.50
16	290°02'15"	26.78	26.84	111.00
17	281°37'25"	21.23	21.485	40.00
18	254°41'55"	4.20	-	-
19	229°00'30"	24.805	25.055	50.825
20	30°56'50"	9.62	9.63	70.48
21	18°21'50"	15.57	15.655	44.305
22	159°04'45"	184.75	189.18	251.47

NOTES:-

1. BOUNDARIES HAVE BEEN DETERMINED BY PLAN DIMENSIONS ONLY, AND HAVE NOT BEEN SURVEYED. ALL BEARINGS, DIMENSIONS, AREAS AND EASEMENTS ARE SUBJECT TO FINAL SURVEY.
2. SERVICES HAVE BEEN LOCATED WHERE VISIBLE ONLY. PRIOR TO EXCAVATION OR CONSTRUCTION ALL SERVICES ARE TO BE LOCATED BY THE RELEVANT AUTHORITY.
3. SPOT LEVELS AND CONTOURS SHOWN HEREON ARE FOR DESIGN PURPOSES ONLY AND ARE TO BE CONFIRMED ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION.
4. THIS PLAN HAS BEEN PREPARED FOR THE PURPOSE OF DESIGN AND SHOULD NOT BE USED FOR ANYTHING OTHER THAN THAT PURPOSE.
5. © Land and Property Management Authority (2014)

ver.	date	comment	surveyed	drawn	checked	pm
B	28/10/16	UPDATE DETAIL SURVEY	LB	RC	TC	TC

co-ordinate information: CO-ORDINATE SYSTEM: MGA 56; ORIGIN OF CO-ORDINATES: SSM 190440; DATE OF SURVEY 12/10/16

level information: DATUM: A.H.D.; ORIGIN OF LEVELS: SSM 190440; CONTOUR INTERVAL: 0.5m

scale (A1 original size): SCALE: 1:500 (FULL)

page: 1 OF 1

drawing title: DETAIL SURVEY PLAN OF LOT 901 D.P.1222132

location: PORTLAND DRIVE, CAMERON PARK

council: NEWCASTLE

dwg ref: 239402-DET-001-B

client: Woolworths the fresh food people

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239402-DET-001-B

Plotted By: Robert Cromarty Plot Date: 01/11/16 11:24:54AM Cad File: N:\239402\DRAWINGS\SURVEY\239402-DET-001-B.DWG

Appendix D

SEDIMENT BASIN SIZING CALCULATIONS

Revised Universal Soil Loss Equation (RUSLE) – BASIN 1

Catchment Area (A)	3	ha	
Settling Zone			
Runoff Coefficient (Cv)	0.64		
85th %, 5 day Rainfall Event (R)	38.9		Table 6.3a, pg 6-24
Settling Zone Volume	**746.88**	**m3**	
Sediment Zone			
Disturbed Site Area (hectares)	3	ha	
Rainfall Erosivity Factor, R	2578		
Soil Erodibility Factor, K	0.07		Table C17
Slope Length Gradient Factor, LS	0.52	Approx 150m@2%	Table A1, pg A-9
Erosion Control Practice Factor, P	1.3		Table A2, pg A-11
Cover Factor, C	1		Figure A5, pg A-12
Sediment Zone Volume	**48**	**m3**	

Total Storage Required (Settling + Sediment + 10%)	**874**	**m3**	

Revised Universal Soil Loss Equation (RUSLE) – BASIN 2

Catchment Area (A)	1.25	ha	
Settling Zone			
Runoff Coefficient (Cv)	0.64		
75th %, 5 day Rainfall Event (R)	38.9		Table 6.3a, pg 6-24
Settling Zone Volume	**311.2**	**m3**	
Sediment Zone			
Disturbed Site Area (hectares)	1.25	ha	
Rainfall Erosivity Factor, R	2578		
Soil Erodibility Factor, K	0.07		Table C17
Slope Length Gradient Factor, LS	0.52	Approx 150m@2%	Table A1, pg A-9
Erosion Control Practice Factor, P	1.3		Table A2, pg A-11
Cover Factor, C	1		Figure A5, pg A-12
Sediment Zone Volume	**20**	**m3**	

Total Storage Required (Settling + Sediment + 10%)	**364**	**m3**	

Appendix E

BASIN MAINTENANCE CHECKLIST

WOOLWORTHS, CAMERON PARK – MAINTENANCE FORM

Location	Cameron park
Description	Constructed ponds and associated infrastructure

SITE VISIT DETAILS

Site visit date: _____

Site visit by: _____

Weather: _____

Purpose of the site visit	Tick Box	Complete Sections
Routine inspection	0	Section 1 only
Routine maintenance	0	Section 1 and 2
Cleanout of sediment	0	Section 1, 2 and 3
Annual inspection	0	Section 1, 2, 3 and 4

SECTION 1 - INSPECTION

Gross pollutant load cleanout required? Yes/No - If yes please see Ecosol Maintenance Schedule

Depth of sediment in forebay: _____m

Cleanout required if depth of sediment >1.0m Yes/No

Any weeds or litter in basin (if Yes, complete Section 2 – Maintenance)	Yes No
Any visible damage to basin? (If Yes, complete Section 4 –Condition)	Yes/No

Inspection comments:

SECTION 2 – GENERAL MAINTENANCE

Were the weeds removed this site visit? Yes/No

Is there litter in the lake or forebay? Yes/No

Was the litter collected this site visit? Yes/No

SECTION 3a – CLEANOUT OF GROSS POLLUTANTS

Have the following been notified of cleanout date?	Yes	No
Coordinator – open space and/or drainage	0	0
Local residents	0	0
Other (specify .....)	0	0

Method of cleaning (excavator or eductor)

Volume of gross pollutant and sediment removed (approximate estimate) m^3

Any visible damage to wetland or SW tailouts? (If yes, complete Section 4 – Condition)	Yes/No

SECTION 3b – CLEANOUT OF SEDIMENT

Have the following been notified of cleanout date?	Yes	No
Coordinator – open space and/or drainage	0	0
Local residents	0	0
Other (specify.....)	0	0

Method of cleaning (excavator or educator)

Volume of sediment removed (approximate estimate) m^3

Any visible damage to wetland or sediment forebay? (If yes, complete Section 4 – Condition)	Yes/No

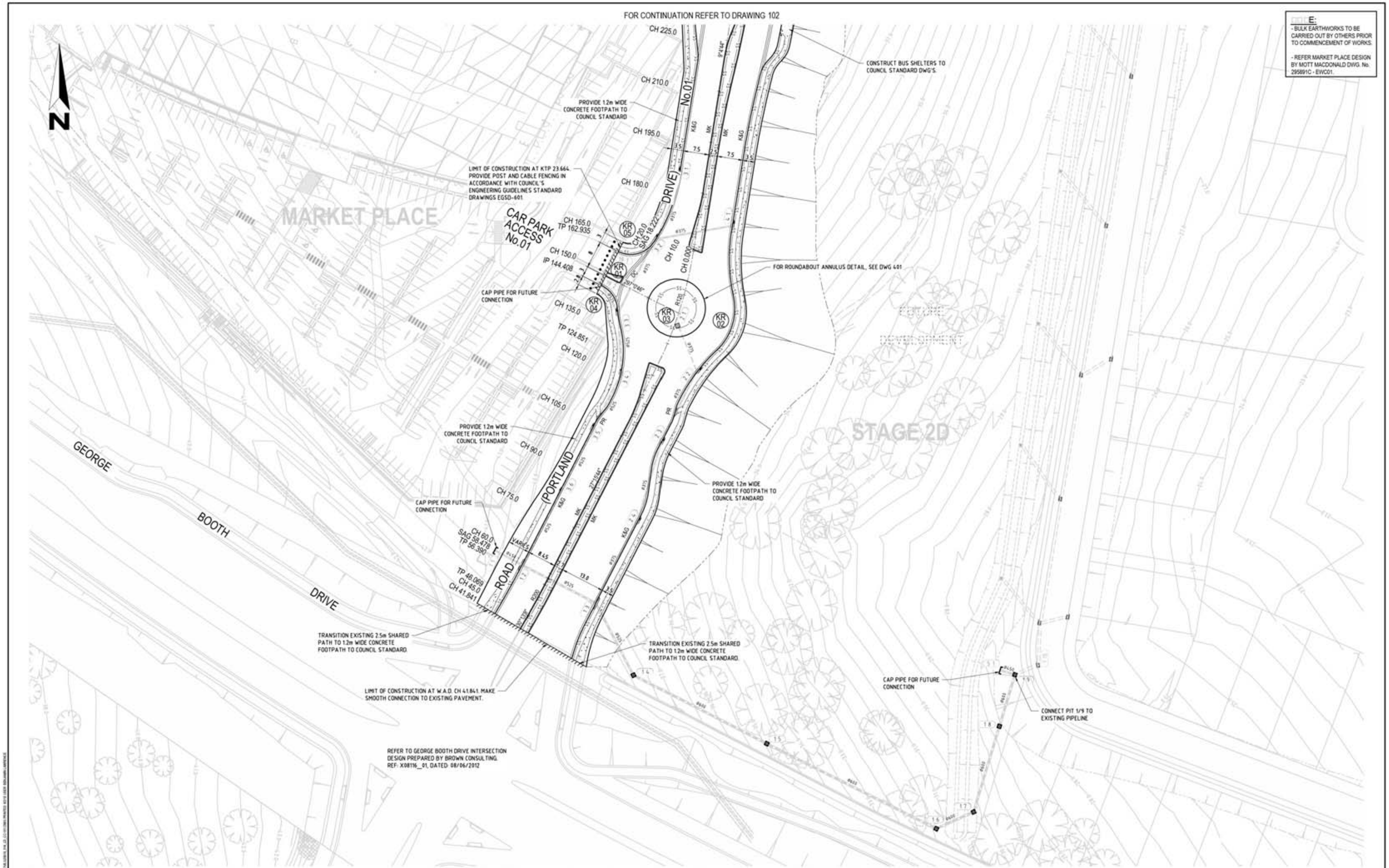
SECTION 4 – CONDITION ASSESSMENT

Component	Checked?		Condition OK?		Remarks
	Yes	No	Yes	No	
Inlet structures					
Outlet structures					
Spillway and spillway channel					
Littoral zone vegetation					
Banks and batter slopes					
Retarding basin embankment					
Surrounding landscaping					

Comments:

Appendix F

EXTRACT FROM "CAMERON GROVE" PLANS, BROWNS CONSULTING



FOR CONSTRUCTION CERTIFICATE

Issue	Drawn	Design	Check	Appd.	Date	Revision Details
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01	AW	DD	CB	SG	2/10/13	ISSUED FOR CONSTRUCTION CERTIFICATE
02	VP	JP	SG		16/07/14	ISSUED WITH COUNCIL AMENDMENTS
03	BL	BL	PF	SAG	25/05/15	UPDATED TO COUNCIL COMMENTS
04	BL	BL	PF	SAG	5/08/15	NOTE ADDED TO RIGID PAVEMENT PLAN REGARDING SURFACE FINISH
05	BL	BL	PF		02/09/15	UPDATED TO REFLECT COMMENTS BY GEOTECHNICAL ENGINEER
First Issue	AW	DD	CB	TT	12/04/13	

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Quality Endorsed Company

Approval:
BY: STUART GREEN
FIEAust. CPEng.
Manager - Urban Development
SIGN:
DATE:

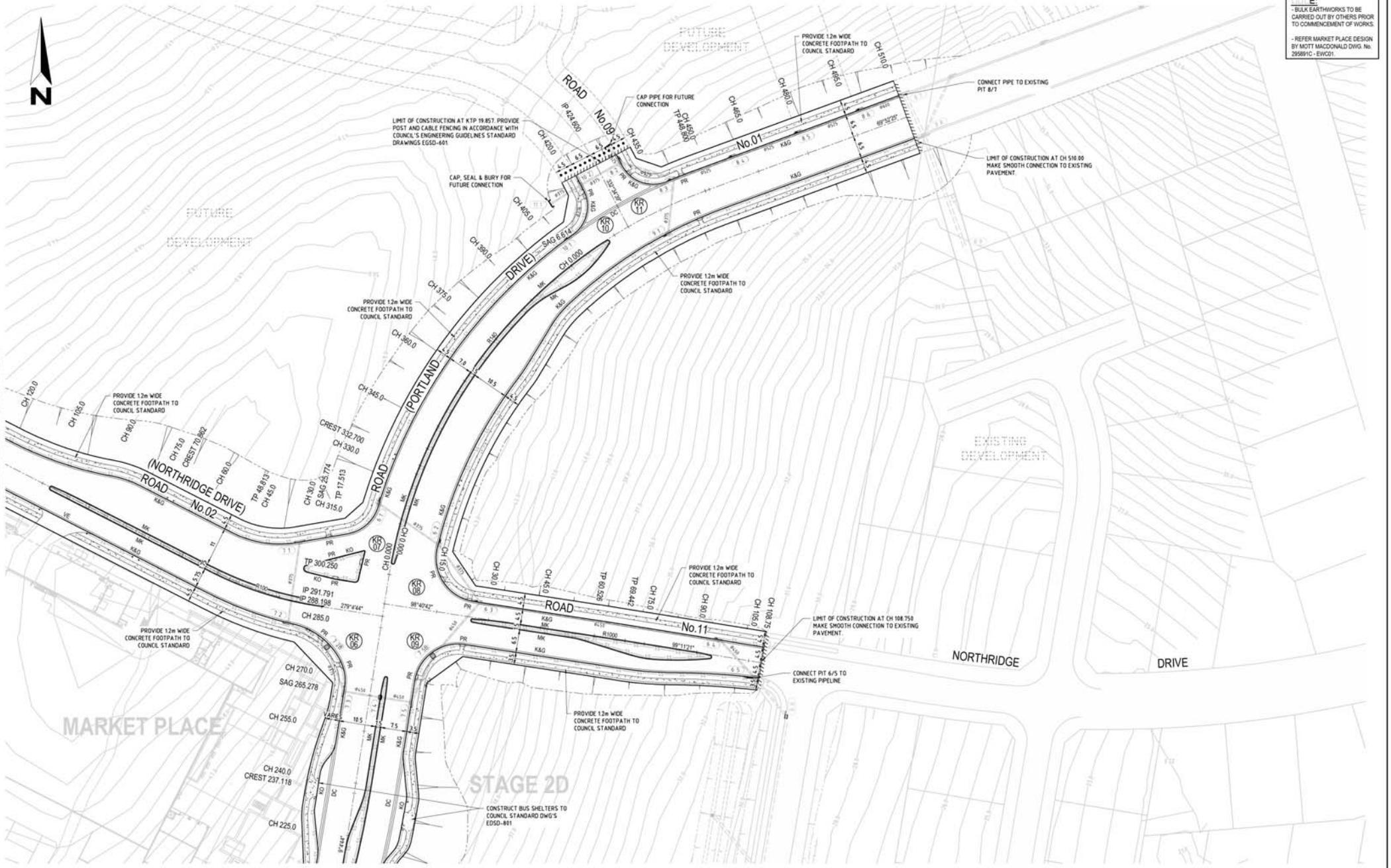
Client: HAMMERSMITH MANAGEMENT PTY LTD

Project: CAMERON GROVE - LINK ROAD
ROAD & DRAINAGE DESIGN

BROWN Smart Consulting

Drawing Title: CIVIL ENGINEERING PLAN
SHEET 01 OF 03

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
L05016.014		CC	101	05



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First Issue	AW	DD	CB	TT		12/04/13	Revision Details

Revisions | Drawn | Design | Check | Appd | Date

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FIEAust. CPEng.
Manager - Urban Development
SIGN:
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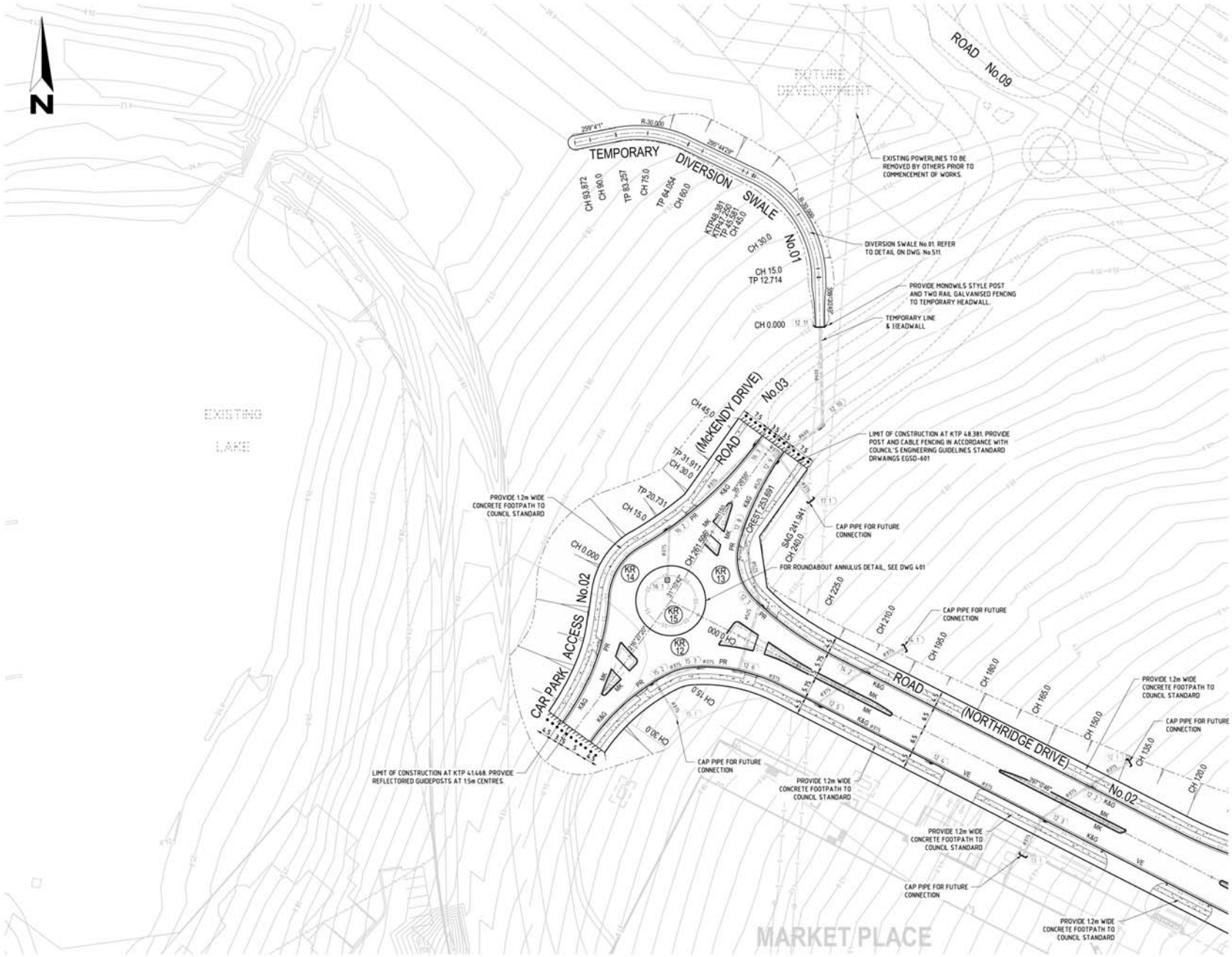
Client: HAMMERSMITH MANAGEMENT PTY LTD

Project: CAMERON GROVE - LINK ROAD
ROAD & DRAINAGE DESIGN

BROWN Smart Consulting

Drawing Title: CIVIL ENGINEERING PLAN
SHEET 02 OF 03

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
L05016.014		CC	102	05



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First Issue	AW	DD	CB	TT		12/04/13	

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Manager - Urban Development
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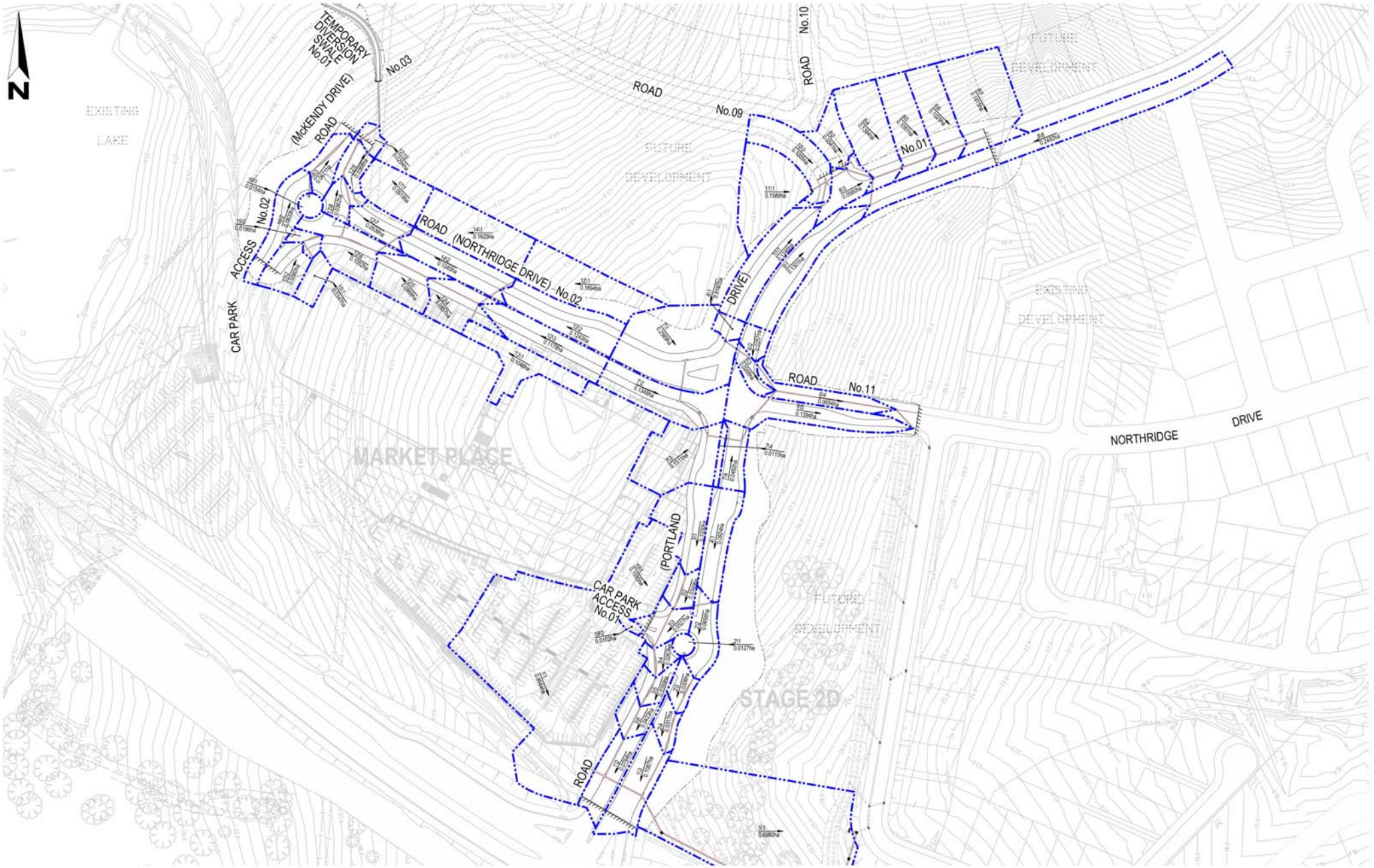
ROAD & DRAINAGE DESIGN

BROWN Smart Consulting

Drawing Title: CIVIL ENGINEERING PLAN
SHEET 03 OF 03

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
L05016.014		CC	103	05



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FIEAust. CPEng.
Manager - Urban Development
SIGN:
DATE:

Client: HAMMERSMITH MANAGEMENT PTY LTD

Project: CAMERON GROVE - LINK ROAD
ROAD & DRAINAGE DESIGN

BROWN Smart Consulting

Drawing Title: CATCHMENT PLAN

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
L05016.014		CC	501	05

NOTE:
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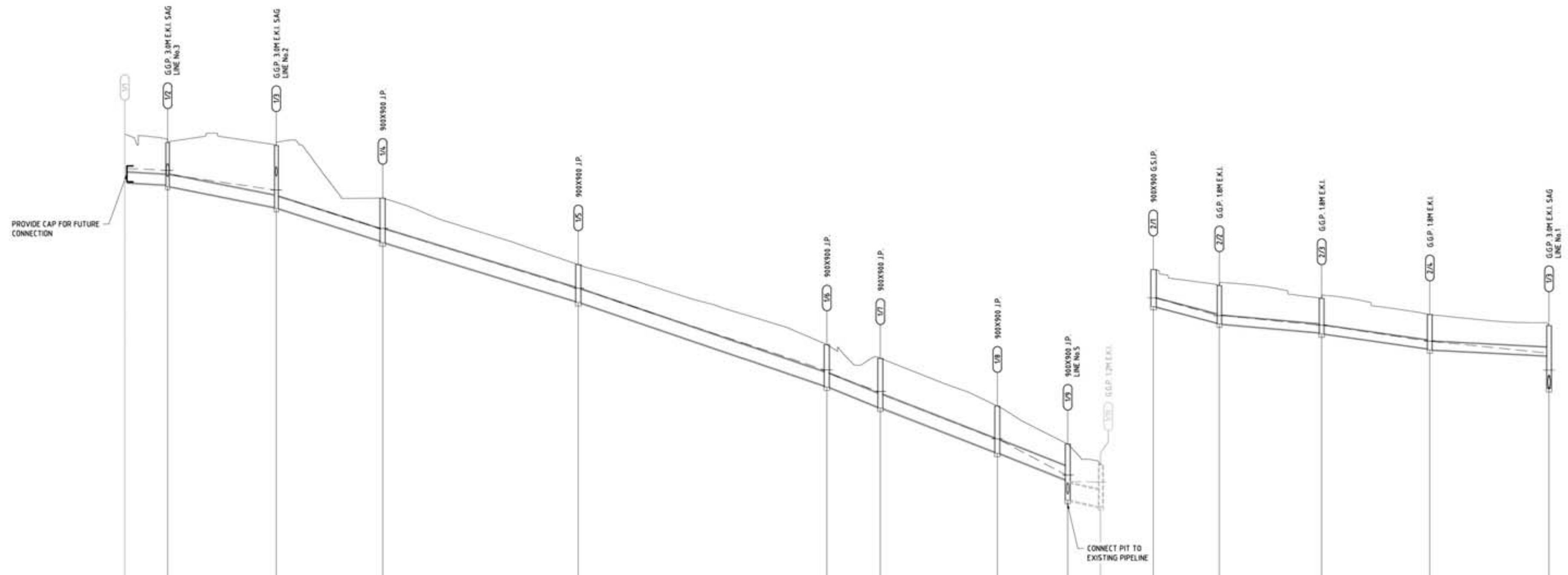

LINE No.1

	1/1–1/2	1/2–1/3	1/3–1/4	1/4–1/5	1/5–1/6	1/6–1/7	1/7–1/8	1/8–1/9	1/9–1/10 (EXISTING WORKS)
PART FULL VELOCITY (m/s)	2.29	4.45	5.50	5.43	5.63	5.83	5.82	5.80	4.96
FULL PIPE VELOCITY (m/s)	1.896	2.302	2.668	2.025	1.988	1.936	1.925	1.901	1.711
DISCHARGE (cu.m/s)	0.302	0.498	0.578	0.573	0.562	0.547	0.544	0.537	0.756
PIPE SIZE (mm) & CLASS	450RRJ2	525RRJ2	525RRJ2	600RRJ2	600RRJ2	600RRJ2	600RRJ2	600RRJ2	750RRJ2
DESIGN GRADE	1%	3.84%	6.12%	6%	6.71%	7.5%	7.5%	7.5%	4%
PIPE LENGTH	9.521	24.157	23.647	43.503	55.131	11.906	26	15.659	7.3

DATUM R.L. 13.0

	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10
DEPTH TO INVERT	2.153	1.88 / 1.955	2.747 / 2.797	1.905 / 1.98	1.636 / 1.686	1.832 / 1.882	2.164 / 2.214	2.043 / 2.093	1.584 / 2.493	1.891 / 1.891
H.G.L. LEVEL	39.284	39.121 / 38.929	38.25 / 37.951	36.535 / 36.504	33.884 / 33.844	30.251 / 30.093	29.293 / 29.15	27.187 / 27.15	25.593 / 25.294	25.266
INVERT LEVEL	38.574	38.479 / 38.404	37.476 / 37.426	35.979 / 35.904	33.294 / 33.244	29.543 / 29.493	28.6 / 28.55	26.6 / 26.55	25.376 / 24.467	24.175 / 24.175
SURFACE LEVEL	40.727	40.358	40.223	37.884	34.93	31.375	30.764	28.643	26.96	26.066
ROAD CHAINAGE		58.478	58.478							
PIPE CHAINAGE	0	9.521	33.678	57.325	100.828	155.958	167.865	193.865	209.524	216.824

LINE No.2

	2/1–2/2	2/2–2/3	2/3–2/4	2/4–1/3
PART FULL VELOCITY (m/s)	1.33	1.56	2.04	1.50
FULL PIPE VELOCITY (m/s)	0.041	0.255	0.349	0.443
DISCHARGE (cu.m/s)	0.004	0.028	0.039	0.049
PIPE SIZE (mm) & CLASS	375RRJ2	375RRJ2	375RRJ2	375RRJ2
DESIGN GRADE	4.95%	1.7%	2.75%	1%
PIPE LENGTH	14.687	22.769	24.028	26.522

DATUM R.L. 21.0

	2/1	2/2	2/3	2/4	1/3
DEPTH TO INVERT	1.637	1.657 / 1.707	1.527 / 1.577	1.513 / 1.563	1.344 / 2.797
H.G.L. LEVEL	41.444	40.669 / 40.667	40.239 / 40.231	39.532 / 39.519	39.005 / 37.951
INVERT LEVEL	41.069	40.342 / 40.292	39.906 / 39.856	39.194 / 39.144	38.879 / 37.426
SURFACE LEVEL	42.706	41.999	41.433	40.708	40.223
ROAD CHAINAGE	140.874	130.908	108.603	85	58.478
PIPE CHAINAGE	0	14.687	37.456	61.484	88.006

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Approval:
BY: STUART GREEN
FIEAust. CPEng.
Manager - Urban Development
SIGN:
DATE:

Client: HAMMERSMITH MANAGEMENT PTY LTD

Project: CAMERON GROVE - LINK ROAD
ROAD & DRAINAGE DESIGN

BROWN Smart Consulting

Drawing Title: DRAINAGE LONGITUDINAL SECTIONS LINE No.1-2

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
L05016.014		CC	502	05

NOTE:

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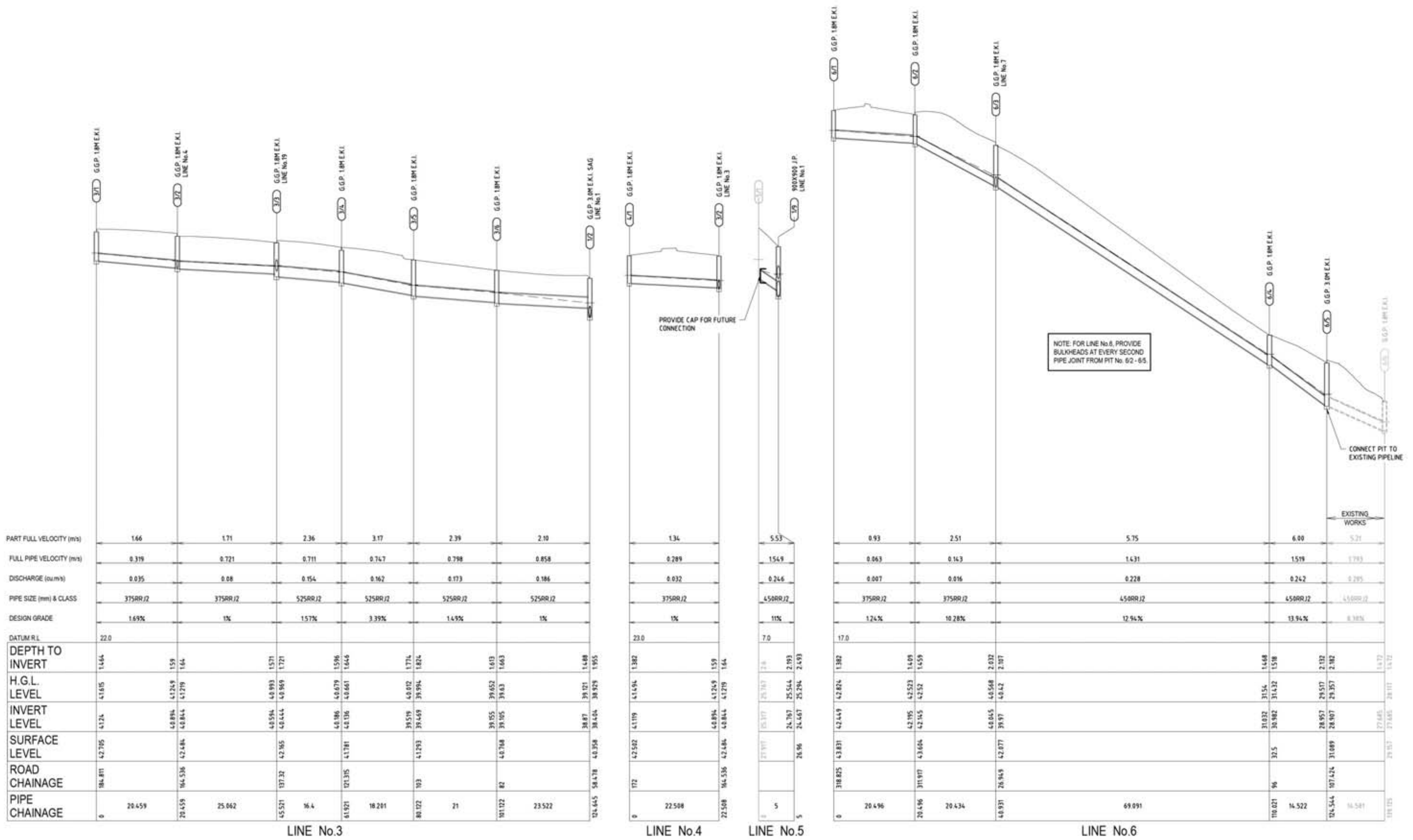

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FIEAust. CPEng.
Manager - Urban Development
SIGN:
DATE:

Client: HAMMERSMITH MANAGEMENT PTY LTD

Project: CAMERON GROVE - LINK ROAD
ROAD & DRAINAGE DESIGN

BROWN Smart Consulting

Drawing Title: DRAINAGE LONGITUDINAL SECTIONS LINE No.3-6

Project No.: L05016.014 | Stage: | Milestone: CC | Dwg No.: 503 | Revision: 05

NOTE:
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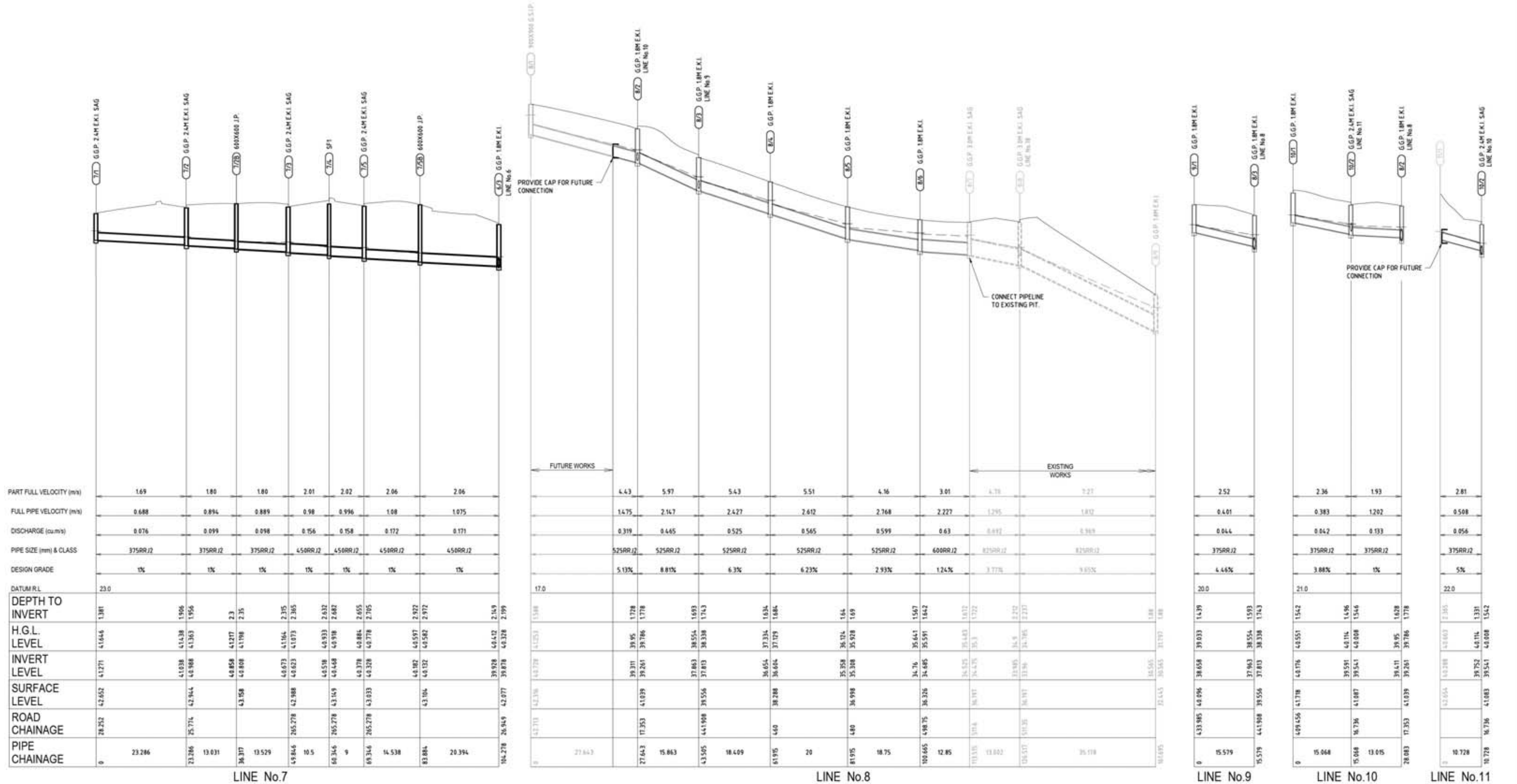

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FIEAust. CPEng.
Manager - Urban Development
SIGN:
DATE:

Client:
HAMMERSMITH MANAGEMENT PTY LTD

Project:
CAMERON GROVE - LINK ROAD
ROAD & DRAINAGE DESIGN

BROWN Smart Consulting

Drawing Title:
DRAINAGE LONGITUDINAL SECTIONS
LINE No.7-11

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
L05016.014		CC	504	05

NOTE:
- ALL DRAINAGE PITS TO BE TO COUNCIL STANDARDS UNLESS OTHERWISE SPECIFIED.

LINE No.12

DATUM R.L. 19.0

Pipe	PART FULL VELOCITY (m/s)	FULL PIPE VELOCITY (m/s)	DISCHARGE (cu.m/s)	PIPE SIZE (mm) & CLASS	DESIGN GRADE	PIPE LENGTH
12/1 – 12/2	2.86	0.541	0.06	375RRJ2	5%	12.753
12/2 – 12/3	3.30	0.912	0.101	375RRJ2	5%	14.765
12/3 – 12/4	3.83	1.595	0.176	375RRJ2	5%	33
12/4 – 12/5	4.48	1.842	0.203	375RRJ2	6.92%	32
12/5 – 12/6	5.01	2.916	0.322	375RRJ2	6.93%	22.741
12/6 – 12/7	2.48	1.814	0.393	525RRJ2	1%	18.487
12/7 – 12/8	2.49	1.888	0.409	525RRJ2	1%	17.645
12/8 – 12/9	2.50	1.929	0.417	525RRJ2	1%	21.988
12/9 – 12/10	2.64	1.78	0.503	600RRJ2	1%	14.021
12/10 – 12/11	2.65	1.792	0.507	600RRJ2	1%	25.27

Pit	DEPTH TO INVERT	H.G.L. LEVEL	INVERT LEVEL	SURFACE LEVEL	ROAD CHAINAGE	PIPE CHAINAGE
12/2	1.291 / 1.341	40.659 / 40.581	40.256 / 40.206	41.546	144	12.753
12/3	1.737 / 1.787	40.026 / 39.793	39.468 / 39.418	41.204	151	27.518
12/4	1.391 / 1.441	38.246 / 38.093	37.768 / 37.718	39.159	184	60.518
12/5	1.415 / 1.465	36.123 / 35.829	35.504 / 35.454	36.919	216	92.518
12/6	1.941 / 2.091	34.682 / 34.363	33.879 / 33.729	35.82	238.796	115.259
12/7	2.265 / 2.315	34.241 / 34.128	33.544 / 33.494	35.809	241.802	133.745
12/8	2.012 / 2.062	34.003 / 33.879	33.318 / 33.268	35.33	24.077	151.39
12/9	1.873 / 1.948	33.715 / 33.622	33.048 / 32.973	34.921	46.25	173.378
12/10	1.835 / 1.885	33.547 / 33.383	32.833 / 32.783	34.668	61	187.399
12/11	1.22 / 1.22	32.914	32.53 / 32.53	33.75		212.67

LINE No.13

DATUM R.L. 22.0

Pipe	PART FULL VELOCITY (m/s)	FULL PIPE VELOCITY (m/s)	DISCHARGE (cu.m/s)	PIPE SIZE (mm) & CLASS	DESIGN GRADE	PIPE LENGTH
13/1 – 12/3	2.49	0.334	0.037	375RRJ2	5%	11.275

Pit	DEPTH TO INVERT	H.G.L. LEVEL	INVERT LEVEL	SURFACE LEVEL	ROAD CHAINAGE	PIPE CHAINAGE
12/3	1.737 / 1.787	40.026 / 39.793	39.468 / 39.418	41.204	151	11.275

LINE No.14

DATUM R.L. 18.0

Pipe	PART FULL VELOCITY (m/s)	FULL PIPE VELOCITY (m/s)	DISCHARGE (cu.m/s)	PIPE SIZE (mm) & CLASS	DESIGN GRADE	PIPE LENGTH
14/1 – 14/2	2.82	0.519	0.057	375RRJ2	5%	12.779
14/2 – 12/5	2.83	0.861	0.095	375RRJ2	3.43%	14.765

Pit	DEPTH TO INVERT	H.G.L. LEVEL	INVERT LEVEL	SURFACE LEVEL	ROAD CHAINAGE	PIPE CHAINAGE
14/2	1.349 / 1.399	36.454 / 36.385	36.06 / 36.01	37.409	209	12.779
12/5	1.415 / 1.465	36.123 / 35.829	35.504 / 35.454	36.919	216	27.544

LINE No.15

DATUM R.L. 18.0

Pipe	PART FULL VELOCITY (m/s)	FULL PIPE VELOCITY (m/s)	DISCHARGE (cu.m/s)	PIPE SIZE (mm) & CLASS	DESIGN GRADE	PIPE LENGTH
15/1 – 15/2	1.02	0.111	0.012	375RRJ2	1%	11.716
15/2 – 15/3	1.34	0.294	0.033	375RRJ2	1%	11.733
15/3 – 12/6	1.42	0.355	0.039	375RRJ2	1%	9.582

Pit	DEPTH TO INVERT	H.G.L. LEVEL	INVERT LEVEL	SURFACE LEVEL	ROAD CHAINAGE	PIPE CHAINAGE
15/2	2.025 / 2.075	34.705 / 34.696	34.192 / 34.142	36.218	18.907	11.716
15/3	1.95 / 2	34.692 / 34.686	34.025 / 33.975	35.974	247.739	23.449
12/6	1.941 / 2.091	34.682 / 34.363	33.879 / 33.729	35.82	238.796	33.032

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Quality Endorsed Company

Approval:
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FIEAust. CPEng.
Manager - Urban Development
SIGN:
DATE:

Client: HAMMERSMITH MANAGEMENT PTY LTD

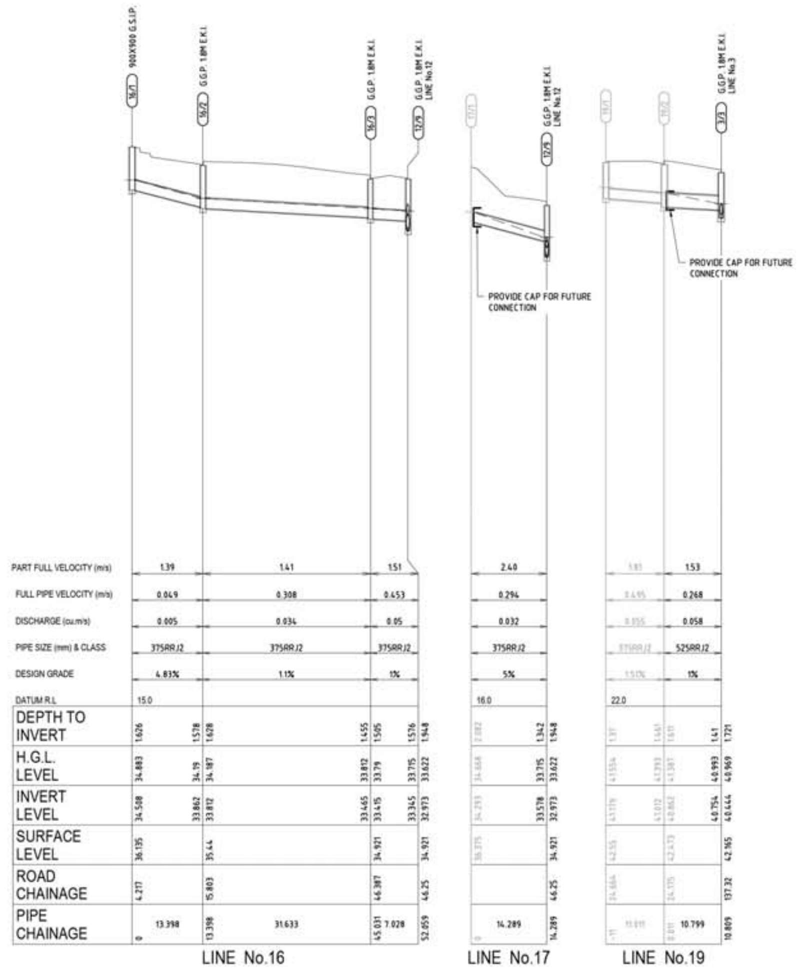
Project: CAMERON GROVE - LINK ROAD
ROAD & DRAINAGE DESIGN

BROWN Smart Consulting

Drawing Title: DRAINAGE LONGITUDINAL SECTIONS LINE No.12-15

Project No.: L05016.014 | Stage: | Milestone: CC | Dwg No.: 505 | Revision: 05

NOTE:
- ALL DRAINAGE PITS TO BE TO COUNCIL STANDARDS UNLESS OTHERWISE SPECIFIED.



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Client: HAMMERSMITH MANAGEMENT PTY LTD

Project: CAMERON GROVE - LINK ROAD
ROAD & DRAINAGE DESIGN

BROWN Smart Consulting

Drawing Title: DRAINAGE LONGITUDINAL SECTIONS LINE No.16, 17 & 19

Project No.: L05016.014 | Stage: | Milestone: CC | Dwg No.: 506 | Revision: 05

12D MODEL - HYDROLOGICAL DESIGN SHEET

MINOR 10 YEAR STORM EVENT

Pit Name (-)	Pit Type (-)	Setout Easting * (m)	Setout Northing * (m)	Setout RL (m)	Grate RL (m)	Road Name (-)	Road Chainage (m)	Catch ID (-)	Time Tc (min)	Intensity I (mm/hr)	Runoff C (-)	Area A (ha)	Full CA (ha)	Full Sum CA (ha)	Full Qc=CIA (L/s)	Partial CA (ha)	Partial Sum CA (ha)	Partial Qc=CIA (L/s)	Catchment Flow Qc (L/s)	Approach Flow Qa (L/s)	Road Capacity (L/s)	Flooded Depth (m)	Flooded Width (m)	Flooded Vel.Dep (sq.m/s)	Road Grade (%)	Road Xfall (%)	Max Pond Depth (m)	Inlet Flow Qg (L/s)	Bypass Flow Qb (L/s)	Bypass Pit (-)
1\1	900x900 G.S.I.P.	368905.23	6356950.12	40.73	40.73			1P	6	149	0.43	0.0654	0.0365	0.7286	301.5	0.0365	0.7286	301.5	301.5	301.5								301.5		1\2
								1I	6	149	0.9	0.769	0.6621			0.6621														
1\2	G.G.P. 3.0m E.K.I. SAG	368934.04	6356945.38	40.36	40.36	ROAD No 1	58.48	1P	6	149	0.43	0.0079	0.0034	0.0677	28	0.0034	0.0677	28	28	28	510.1	0.031					0.18	28		1\3
								1I	6	149	0.9	0.0714	0.0643			0.0643														
1\3	G.G.P. 3.0m E.K.I. SAG	368934.66	6356934.75	40.22	40.22	ROAD No 1	58.48	1P	6	149	0.43	0.0109	0.0046	0.0927	38.4	0.0046	0.0927	38.4	38.4	38.4	488.4	0.038					0.175	38.4		LOST
								1I	6	149	0.9	0.0979	0.0881			0.0881														
1\4	900x900 I.P.	368985.03	6356913.57	37.88	37.88																									-
1\5	900x900 I.P.	368984.71	6356893.66	34.93	34.93																									-
1\6	900x900 I.P.	369034	6356868.96	31.38	31.38																									-
1\7	900x900 I.P.	369084.86	6356873.83	30.76	30.76																									-
1\8	900x900 I.P.	369052.36	6356898.72	28.64	28.64																									-
1\9	900x900 I.P.	369056.88	6356913.72	26.96	25.96																									-
1\10	G.G.P. 1.2m E.K.I.	369063.89	6356916.49	26.07	26.07																									-
2\1	900x900 G.S.I.P.	368957.92	6357015.41	42.53	42.53	ROAD No 1	140.87	1P	6	149	0.43	0.0013	0.0005	0.0109	4.5	0.0005	0.0109	4.5	4.5	4.5					48.8			4.5		2\2
								1I	6	149	0.9	0.0115	0.0103			0.0103														
2\2	G.G.P. 1.8m E.K.I.	368963.91	6357001.77	42	42	ROAD No 1	130.91	1P	6	149	0.43	0.0066	0.0028	0.0561	23.2	0.0028	0.0561	23.2	23.2	24.7					1.8	1.9		24.3	0.4	2\3
								1I	6	149	0.9	0.0592	0.0533			0.0533														
2\3	G.G.P. 1.8m E.K.I.	368955.62	6356981.37	41.43	41.43	ROAD No 1	108.6	1P	6	149	0.43	0.0031	0.0013	0.0261	10.8	0.0013	0.0261	10.8	10.8	11.2	2110.8	0.05	0.79	0.04	2.5	3		11.2		2\4
								1I	6	149	0.9	0.0275	0.0248			0.0248														
2\4	G.G.P. 1.8m E.K.I.	368960.91	6356958.33	40.71	40.71	ROAD No 1	85	1P	6	149	0.43	0.0032	0.0014	0.027	11.2	0.0014	0.027	11.2	11.2	11.2	2077	0.05	0.78	0.04	2.5	3		11.2		2\3
								1I	6	149	0.9	0.0285	0.0256			0.0256														
3\1	G.G.P. 1.8m E.K.I.	368955.87	6357059.46	42.7	42.7	ROAD No 1	184.81	1P	6	149	0.43	0.0103	0.0044	0.0878	36.3	0.0044	0.0878	36.3	36.3	36.3	6779.8	0.081	1.85	0.05	1	3		34	2.4	3\2
								1I	6	149	0.9	0.0927	0.0834			0.0834														
3\2	G.G.P. 1.8m E.K.I.	368952.89	6357040.05	42.48	42.48	ROAD No 1	164.54	1P	6	149	0.43	0.0035	0.0015	0.0298	12.3	0.0015	0.0298	12.3	12.3	14.7	1346.6	0.06	1.58	0.03	1.2	2.1		14.7		3\3
								1I	6	149	0.9	0.0314	0.0283			0.0283														
3\3	G.G.P. 1.8m E.K.I.	368962.03	6357017.79	42.16	42.16	ROAD No 1	137.32	1P	6	149	0.43	0.0026	0.0011	0.0462	19.1	0.0011	0.0462	19.1	19.1	19.1	9050.2	0.062	1.53	0.04	1.7	0.9		19.1		3\4
								1I	6	149	0.9	0.0501	0.0451			0.0451														
3\4	G.G.P. 1.8m E.K.I.	368962.91	6357001.24	41.78	41.78	ROAD No 1	121.31	1P	6	149	0.43	0.0027	0.0011	0.0227	9.4	0.0011	0.0227	9.4	9.4	9.4	7986	0.047	0.67	0.03	2.3	2.4		9.4		3\5
								1I	6	149	0.9	0.024	0.0216			0.0216														
3\5	G.G.P. 1.8m E.K.I.	368934.43	6356984.96	41.29	41.29	ROAD No 1	103	1P	6	149	0.43	0.0036	0.0015	0.0306	12.7	0.0015	0.0306	12.7	12.7	12.7	11665.4	0.052	0.86	0.04	2.5	3		12.7		3\6
								1I	6	149	0.9	0.0323	0.0291			0.0291														
3\6	G.G.P. 1.8m E.K.I.	368924.81	6356966.29	40.77	40.77	ROAD No 1	82	1P	6	149	0.43	0.0042	0.0018	0.0361	14.9	0.0018	0.0361	14.9	14.9	14.9	2968.4	0.055	0.95	0.04	2.5	3		14.9		3\2
								1I	6	149	0.9	0.0361	0.0343			0.0343														
4\1	G.G.P. 1.8m E.K.I.	368974.24	6357044.19	42.5	42.5	ROAD No 1	172	1P	6	149	0.43	0.0092	0.0039	0.0788	32.6	0.0039	0.0788	32.6	32.6	32.6	1307.3	0.079	1.76	0.05	1	3		31.1	1.5	2\2
								1I	6	149	0.9	0.0831	0.0748			0.0748														
5\1	900x900 G.S.I.P.	369052.09	6356915.16	27.92	27.92			1P	6	149	0.43	0.0698	0.0298	0.5952	246.3	0.0298	0.5952	246.3	246.3	246.3								246.3		-
								1I	6	149	0.9	0.6282	0.5654			0.5654														
6\1	G.G.P. 1.8m E.K.I.	368982.58	6357192.42	43.84	43.84	ROAD No 1	318.93	1P	6	149	0.43	0.002	0.0008	0.0168	6.9	0.0008	0.0168	6.9	6.9	6.9	8508.1	0.049	0.76	0.02	1	2.9		6.9		7\1
								1I	6	149	0.9	0.0177	0.0159			0.0159														
6\2	G.G.P. 1.8m E.K.I.	368998.58	6357181.01	43.61	43.61	ROAD No 1	311.92	1P	6	149	0.43	0.0026	0.0011	0.0219	9.1	0.0011	0.0219	9.1	9.1	9.1	2210.6	0.049	0.77	0.03	1.6	3		9.1		6\3
								1I	6	149	0.9	0.0232	0.0208			0.0208														
6\3	G.G.P. 1.8m E.K.I.	369010.96	6357163.93	42.08	42.08	ROAD No 11	26.95	1P	6	149	0.43	0.0027	0.0011	0.0228	9.4	0.0011	0.0228	9.4	9.4	9.4	5001	0.035	0.4	0.05	9	3		9.4		6\4
								1I	6	149	0.9	0.0241	0.0217			0.0217														
6\4	G.G.P. 1.8m E.K.I.	369079.22	6357153.23	32.5	32.5	ROAD No 11	96	1P	6	149	0.43	0.0065	0.0028	0.0558	23.1	0.0028	0.0558	23.1	23.1	23.1	1153.2	0.048	0.74	0.08	13.1	3		23.1		LOST
								1I	6	149	0.9	0.0588	0.053			0.053														
6\5	G.G.P. 3.0m E.K.I.	369089.21	6357143.47	31.09	31.09	ROAD No 11	107.42	1P	6	149	0.43	0.0139	0.0059	0.1189	49.2	0.0059	0.1189	49.2	49.2	49.2	1502.7	0.065	1.06	0.12	11.7	3		48.9	0.3	LOST
								1I	6	149	0.9	0.1255	0.113			0.113														
6\6	G.G.P. 1.8m E.K.I.	369098.51	6357131.62	29.16	29.16																									-
7\1	G.G.P. 2.4m E.K.I. SAG	368959.63	6357181.13	42.65	42.65	ROAD No 2	28.25	1P	6	149	0.43	0.0259	0.011	0.2207	91.4	0.011	0.2207	91.4	91.4	91.4	326.7	0.069					0.15	91.4		7\2
								1I	6	149	0.9	0.233	0.2097			0.2097														
7\2	G.G.P. 2.4m E.K.I. SAG	368956.31	6357158.97	42.94	42.94	ROAD No 2	25.77	1P	6	149	0.43	0.0135	0.0058	0.1149	47.6	0.0058	0.1149	47.6	47.6	47.6	47.4	0.047					0.047	47.4	0.2	7\3
								1I	6	149	0.9	0.1213	0.1092			0.1092														
7\2B	600x600 I.P.	368967.25	6357151.61	43.16	43.16																									-
7\3	G.G.P. 2.4m E.K.I. SAG	368972.57	6357138.92	42.99	42.99	ROAD No 1	265.28	1P	6	149	0.43	0.0151	0.0064	0.1289	53.3	0.0064	0.1289	53.3	53.3	53.5	326.7	0.051					0.15	53.5		7\4
								1I	6	149	0.9	0.136	0.1224			0.1224														
7\4	ST1	368982.49	6357137.34	43.15	43.15	ROAD No 1	265.28	1P	6	149	0.43	0.0011	0.0005	0.0094	3.9	0.0005	0.0094	3.9	3.9	3.9	27	0.019					0.1	3.9		7\5
								1I	6	149	0.9	0.0099	0.0089			0.0089														
7\5	G.G.P. 2.4m E.K.I. SAG	368990.94	6357195.99	42.85	43.03	ROAD No 1	265.28	1P	6	149	0.43	0.0049	0.0021	0.042	17.4	0.0021	0.042	17.4	17.4	17.4	326.7	0.026					0.15	17.4		6\5
								1I	6	149	0.9	0.0443	0.0399			0.0399														
7\5B	600x600 I.P.	368997.53	6357149.09	43.1	43.1																									-
8\1	900x900 G.S.I.P.	369033.94	6357311.49	42.32	42.32	ROAD No 9	42.71	1P	6	149	0.43	0.0905	0.0386	0.7712	319.2	0.0386	0.7712	319.2	319.2	319.2					4.6	3		319.2		8\2
								1I	6	149	0.9	0.9141	0.7327			0.7327														
8\2	G.G.P. 1.8m E.K.I.	369050.61	6357289.65	41.04	41.04	ROAD No 9	17.35	1P	6	149	0.43	0.0054	0.0023	0.0461	19.1	0.0023	0.0461	19.1	19.1	19.1	2025.1	0.053	0.89	0.06	5	3		19.1		8\3
								1I	6	149	0.9	0.0487	0.0438			0.0438														
8\3	G.G.P. 1.8m E.K.I.	369066.34	6357284.77	39.56	39.56	ROAD No 1	441.91	1P	6	149	0.43	0.0058	0.0025	0.0494	20.5	0.0025	0.0494	20.5	20.5	23.8	926	0.05	1.35	0.05	6.7	3		23.6	0.1	8\4
								1I	6	149	0.9	0.0522	0.047			0.047														
8\4	G.G.P. 1.8m E.K.I.	369081.56	6357201.24	38.29	38.29	ROAD No 1	460	1P	6	149	0.43	0.0139	0.0059	0.1189	49.2	0.0059	0.1189	49.2	49.2	49.4	2346.7	0.067	1.38	0.1	7	3		45.2	4.1	8\5
								1I	6	149	0.9	0.1255	0.1129			0.1129														
8\5	G.G.P. 2.8m E.K.I.	369102.33	6357298.12	37	37	ROAD No 1	480	1P	6	149	0.43	0.0108	0.0046	0.0921	38.1	0.0046	0.0921	38.1	38.1	42.9	2063.8	0.067	1.36	0.08	5.4	3		39.4	2.8	8\6
								1I	6	149	0.9	0.0972	0.0875			0.0875														
8\6	G.G.P. 1.8m E.K.I.	369123.94	6357304.57	36.33	36.33	ROAD No 1	498.75	1P	6	149	0.43	0.0103	0.0044	0.0877	36.3	0.0044	0.0877	36.3	36.3	39.2	1317.3	0.075	1.62	0.06	2.3	3		36.1	3	8\7
								1I	6	149	0.9	0.0926	0.0834			0.0834														
8\7	G.G.P. 3.0m E.K.I. SAG	369132	6357308.99	36.2	36.2	ROAD No 1	511.6	1P	6	149	0.43	0.0192	0.0082	0.1633	67.6	0.0082	0.1633	67.6	67.6	72.3	902.4	0.054					0.129	72.3		LOST
								1I	6	149	0.9	0.1724	0.1552			0.1552														
8\8	G.G.P. 3.0m E.K.I. SAG	369135.93	6357297.55	36.2	36.2	ROAD No 1	511.35	1P	6	149	0.43	0.0249	0.0106	0.2125	88	0.0106	0.2125	88	88	91.2	382.6	0.062					0.15	91.2		LOST
								1I	6	149	0.9	0.2243	0.2019			0.2019														
8\9	G.G.P. 1.8m E.K.I.	369149.57	6357264.63	31.27	32.45																									-
9\1	G.G.P. 1.8m E.K.I.	369064.36	6357270.09	40.1	40.1	ROAD No 1	433.98	1P	6	149	0.43	0.013	0.0055	0.1109	45.9	0.0055	0.1109	45.9	45.9	45.9	1388.8	0.066	1.24	0.1	7.3	3		42.7	3.2	8\8
								1I	6	149	0.9	0.1371	0.1054			0.1054														
10\1	G.G.P. 1.8m E.K.I.	369036.87	6357268.22	41.72	41.72	ROAD No 1	409.46	1P	6	149	0.43	0.0125	0.0053	0.1062	44	0.0053	0.1062	44	44	44	10911.8	0.067	1.38	0.09	5.4	2.5		40.6	3.3	8\9
								1I	6	149	0.9	0.1321	0.1009			0.1009														
10\2	G.G.P. 2.4m E.K.I. SAG	369040.15	6357283.53	41.09	41.09	ROAD No 9	16.74	1P	6	149	0.43	0.01	0.0043	0.0857	35.5	0.0043	0.0857	35.5	35.5	35.5	52.4	0.041					0.05	35.5		8\9
								1I	6	149	0.9	0.0904	0.0814			0.0814														
11\1	900x900 G.S.I.P.	369030.64	6357277.65	42.67	42.67			1P	6	149	0.43	0.0159	0.0068	0.1355	56.1	0.0068	0.1355	56.1	56.1	56.1								56.1		10\2
								1I	6	149	0.9	0.143	0.1287			0.1287														
12\1	900x900 G.S.I.P.	368865.43	6357228.23	43.11	43.11			1P	6	149	0.43	0.0169	0.0072	0.1444	59.8	0.0072	0.1444	59.8	59.8	59.8								59.8		12\2
								1I	6	149	0.9	0.1525	0.1372			0.1372														
12\2	G.G.P. 1.8m E.K.I.	368854.16	6357221.49	41.55	41.55	ROAD No 2	144	1P	6	149	0.43	0.0124	0.0053	0.106	43.9	0.0053	0.106	43.9	43.9	43.9	1309	0.037	0.44	0.2	4.6	3		39.8	4	14\2
								1I	6	149	0.9	0.1119	0.1007			0.1007														
12\3	G.G.P. 1.8m E.K.I.	368842.43	6357213.89	41.2	41.2	ROAD No 2	151	1P	6	149	0.43	0.0118	0.005	0.1004	41.6	0.005	0.1004	41.6	41.6	41.6	22	0.01	2.91	0.03	5	3		38.9	2.6	12\4
								1I	6	149	0.9	0.106	0.0954			0.0954														
12\4	G.G.P. 1.8m E.K.I.	368811.03	6357228.87	39.16	39.16	ROAD No 2	184	1P	6	149	0.43	0.0086	0.0037	0.0731	30.2	0.0037	0.0731	30.2	30.2	32.9	2396.1	0.059	1.11	0.08	7	3		32.2	0.7	12\5
								1I	6	149	0.9	0.0771	0.0694			0.0694														
12\5	G.G.P. 1.8m E.K.I.	368784.52	6357283.41	36.92	36.92	ROAD No 2	216	1P	6	149	0.43	0.0087	0.0037	0.0741	30.7	0.0037	0.0741	30.7	30.7	33.3	9357.6	0.059	1.08	0.08	7	3		30.9	0.4	12\6
								1I	6	149	0.9	0.0782	0.0704			0.0704														
12\6	G.G.P. 2.4m E.K.I. SAG	368763.39	6357252.15	35.82	35.82	ROAD No 2	238.8	1P	6	149	0.43	0.0105	0.0045	0.0897	37.1	0.0045	0.0897	37.1	37.1	37.6	343.6	0.042					0.155	37.6		12\7
								1I	6	149	0.9	0.0947	0.0852			0.0852														
12\7	G.G.P. 1.8m E.K.I.	368768.6	6357269	35.81	35.81	ROAD No 2	241.8	1P	6	149	0.43	0.0054	0.0023	0.0457	18.9	0.0023	0.0457	18.9	18.9	20.9					1.8	1.6		20.8	0.1	12\8
								1I	6	149	0.9	0.0482	0.0434			0.0434														
12\8	G.G.P. 1.8m E.K.I.	368764.54	6357286.65	35.33	35.33	ROAD No 3	24.08	1P	6	149	0.43	0.0036	0.0015	0.0309	12.8	0.0015	0.0309	12.8	12.8	12.8	2506.3	0.051	0.99	0.04	3	1.1		12.8		12\9
								1I	6	149	0.9	0.0326	0.0293			0.0293														
12\9	G.G.P. 1.8m E.K.I.	368774.32	6357306.49	34.92	34.92	ROAD No 3	46.25	1P	6	149	0.43	0.0037	0.0016	0.0314	13	0.0016	0.0314	13	13	13	4815	0.017	0.44	0.06	1.3	3		13		12\10
								1I	6	149	0.9	0.0331	0.0298			0.0298														
12\10	G.G.P. 1.8m E.K.I.	368785.49	6357315.11	34.67	34.67	ROAD No 3	61	1P	6	149	0.43	0.002	0.0009	0.0174	7.2	0.0009	0.0174	7.2	7.2	7.2	1011.6	0.048	0.73	0.02	1.3	3		7.2		LOST
								1I	6	149	0.9	0.0184	0.0165			0.0165														
12\11	H.W.	368785.15	6357340.05	33.75	33.75																									-
13\1	900x900 G.S.I.P.	368837.16	6357203.41	43.66	42.64			1P	6	149	0.43	0.0205	0.0045	0.0892	36.9	0.0045	0.0892	36.9	36.9	36.9								36.9		12\3
								1I	6	149	0.9	0.0942	0.0847			0.0847														
14\1	900x900 G.S.I.P.	368807.57	6357257.71	39.14	39.14			1P	6	149	0.43	0.0163	0.0069	0.1386	57.3	0.0069	0.1386	57.3	57.3	57.3								57.3		14\2
								1I	6	149	0.9	0.1463	0.1316			0.1316														
14\2	G.G.P. 1.8m E.K.I.	368796.25	6357251.01	37.41	37.41	ROAD No 2	209	1P	6	149	0.43	0.0105	0.0045	0.0891	36.9	0.0045	0.0891	36.9	36.9	40.9	9384.3	0.063	1.25	0.09	7	3		33	1.9	12\7
								1I	6	149	0.9	0.0941	0.0847			0.0847														

NOTE:

REFER TO SETOUT DETAIL

FOR CONTINUATION REFER TO DRAWING No.508

NOTE:

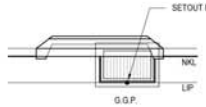
ALL DRAINAGE PITS TO BE TO COUNCIL STANDARDS UNLESS OTHERWISE SPECIFIED.

NOTES:

1. MODELLED USING 12d - RATIONAL METHOD
2. COLEBROOK WHITE ROUGHNESS FACTOR
   RC PIPES - 0.6mm
   PVC PIPES - 0.06mm
3. RRJ2 DENOTES RUBBER RING JOINT CLASS 2 PIPE ALL PVC PIPE TO BE CLASS SH OR EQUIVALENT.
4. THE PRESSURE CHANGE COEFFICIENT 'K' HAS BEEN DETERMINED DETERMINED USING MISSOURI CHARTS AND HARE'S EQUATIONS.
5. PITS DEEPER THAN 1.8m TO BE CONCRETE REINFORCED, REFER LAKE MACQUARIE CITY COUNCIL STD.
6. PITS DEEPER THAN 3.0m ARE STRUCTURALY DESIGNED.
7. STEP IRONS SHALL BE PROVIDED IN ALL PITS DEEPER THAN 1.2m
8. CONCRETE 32MPa COMPRESSIVE STRENGTH AT 28 DAYS.
9. PIT BLOCKAGE FACTORS FOR 100YR ARI
   PITS ON GRADE - 20%
   PITS IN SAG - 50%
10. ALL SETOUT COORDINATES FOR ROAD DRAINAGE (LINTELS) ARE RELATIVE TO A POINT ON THE LIP OF GUTTER ADJACENT TO THE CENTRE OF THE GRATE.
11. ALL SETOUT COORDINATES FOR IAD PITS ARE RELATIVE TO THE CENTRE OF THE GRATE.

PIT TYPE:

G.G.P.	GRATED GULLY PIT
G.S.I.P.	GRATED SURFACE INLET PIT
J.P.	JUNCTION PIT
H.W.	HEADWALL
D.C.	DIRECT CONNECTION
S.P.	SUMP PIT
BEND	BEND IN LINE
GPT	GROSS POLLUTANT TRAP
S.J.	SLOPE JUNCTION



G.G.P.

G.S.I.P.

JUNCTION PIT

PIT SETOUT POINT LOCATIONS

N.T.S.

FOR CONSTRUCTION CERTIFICATE

Rev	First Issue	Drawn	Design	Check	Appd	Date	Revision Details
00	AW	DD	CB	TT		12/04/13	ISSUED FOR 80% REVIEW
01	AW	DD	CB	SG		2/10/13	ISSUED FOR CONSTRUCTION CERTIFICATE
02	VP	JP	SG			16/07/14	ISSUED WITH COUNCIL AMENDMENTS
03	BL	BL	PF	SAG		25/05/15	UPDATED TO COUNCIL COMMENTS
04	BL	BL	PF	SAG		5/08/15	NOTE ADDED TO RIGID PAVEMENT PLAN REGARDING SURFACE FINISH
05	BL	BL	PF			02/09/15	UPDATED TO REFLECT COMMENTS BY GEOTECHNICAL ENGINEER
First Issue	AW	DD	CB	TT		12/04/13	

Approval:
BY: STUART GREEN
FIEAust. CPEng.
Manager - Urban Development
SIGN:
DATE:

Client:
HAMMERSMITH MANAGEMENT PTY LTD

Project:
CAMERON GROVE - LINK ROAD
ROAD & DRAINAGE DESIGN

BROWN
Smart Consulting

Drawing Title:
DRAINAGE CALCULATIONS
SHEET 01 OF 02

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
L05016.014		CC	507	05

12D MODEL - HYDROLOGICAL DESIGN SHEET (cont.)

MINOR 10 YEAR STORM EVENT

FOR CONTINUATION REFER TO DRAWING No.507

Pit Name (-)	Pit Type (-)	Setout Easting *(m)	Setout Northing *(m)	Setout RL (m)	Grate RL (m)	Road Name (-)	Road Chainage (m)	Catch ID (-)	Time Tc (min)	Intensity I (mm/hr)	Runoff C (-)	Area A (ha)	Full CA (ha)	Full Sum CA (ha)	Full Qc=CIA (L/s)	Partial CA (ha)	Partial Sum CA (ha)	Partial Qc=CIA (L/s)	Catchment Flow Qc (L/s)	Approach Flow Qa (L/s)	Road Capacity (L/s)	Flooded Depth (m)	Flooded Width (m)	Flooded Vel.Dep (sq.m/s)	Road Grade (%)	Road Xfall (%)	Max Pond Depth (m)	Inlet Flow Qg (L/s)	Bypass Flow Qb (L/s)	Bypass Pit (-)
15\1	900x900 G.S.I.P.	368748.71	6357238.76	36.38	36.38			1P	6	149	0.43	0.0035	0.0015	0.0296	12.2	0.0015	0.0296	12.2	12.2	12.2								12.2		15\2
								1I	6	149	0.9	0.0312	0.0281			0.0281														
15\2	G.G.P. 1.8m E.K.I.	368742.38	6357249.15	36.22	36.22	Car Park Access No 2	18.91	1P	6	149	0.43	0.0058	0.0025	0.0494	20.5	0.0025	0.0494	20.5	20.5	20.5	332.1	0.058	2.57	0.03	2	1.6		20.5		15\3
								1I	6	149	0.9	0.0522	0.047			0.047														
15\3	G.G.P. 1.8m E.K.I.	368753.74	6357252.91	35.97	35.97	ROAD No 2	247.74	1P	6	149	0.43	0.002	0.0008	0.0167	6.9	0.0008	0.0167	6.9	6.9	6.9	629.5	0.046	1.21	0.02	2	1.3		6.9		12\6
								1I	6	149	0.9	0.0176	0.0159			0.0159														
16\1	900x900 G.S.I.P.	368748.83	6357273.11	36.13	36.13	ROAD No 3	4.22	1P	6	149	0.43	0.0015	0.0007	0.0131	5.4	0.0007	0.0131	5.4	5.4	5.4					2.1			5.4		16\2
								1I	6	149	0.9	0.0139	0.0125			0.0125														
16\2	G.G.P. 1.8m E.K.I.	368746.67	6357287.96	35.44	35.44	ROAD No 3	15.8	1P	6	149	0.43	0.0082	0.0035	0.0699	28.9	0.0035	0.0699	28.9	28.9	28.9					1	1.7		28.1	0.8	16\3
								1I	6	149	0.9	0.0738	0.0664			0.0664														
16\3	G.G.P. 1.8m E.K.I.	368769.41	6357310.16	34.92	34.92	ROAD No 3	46.39	1P	6	149	0.43	0.0047	0.002	0.0401	16.6	0.002	0.0401	16.6	16.6	17.4	211.6	0.063	1.23	0.04	1.5	2.9		17.4		LOST
								1I	6	149	0.9	0.0424	0.0381			0.0381														
17\1	900x900 G.S.I.P.	368783.22	6357294.77	36.37	36.37			1P	6	149	0.43	0.0092	0.0039	0.0783	32.4	0.0039	0.0783	32.4	32.4	32.4								32.4		12\9
								1I	6	149	0.9	0.0827	0.0744			0.0744														
18\1	G.G.P. 3.0m E.K.I.	369233.09	6357346.26	42.8	42.8	ROAD No 1	619.69	1P	6	149	0.43	0.0109	0.0046	0.0928	38.4	0.0046	0.0928	38.4	38.4	38.4					4.6	3		38.4		18\2
								1I	6	149	0.9	0.098	0.0882			0.0882														
18\2	G.G.P. 4.2m E.K.I.	369199.69	6357333.74	40.27	40.27	ROAD No 1	583.66	1P	6	149	0.43	0.0195	0.0083	0.1663	68.8	0.0083	0.1663	68.8	68.8	68.8					9.3	3		68.4	0.4	18\3
								1I	6	149	0.9	0.1755	0.1579			0.1579														
18\3	G.G.P. 4.2m E.K.I.	369171.5	6357323.47	37.66	37.66	ROAD No 1	553.67	1P	6	149	0.43	0.0108	0.0046	0.0922	38.2	0.0046	0.0922	38.2	38.2	38.6					7	3		38.6		18\4
								1I	6	149	0.9	0.0974	0.0876			0.0876														
18\4	G.G.P. 3.0m E.K.I.	369145.36	6357313.89	36.37	36.37	ROAD No 1	525.83	1P	6	149	0.43	0.0176	0.0075	0.1498	62	0.0075	0.1498	62	62	62					2.5	3		60.3	1.7	8\7
								1I	6	149	0.9	0.1581	0.1423			0.1423														
19\1	900x900 G.S.I.P.	368940.51	6357036.68	42.55	42.55	Car Park Access No 1	24.66	1P	6	149	0.43	0.0155	0.0066	0.1322	54.7	0.0066	0.1322	54.7	54.7	54.7								54.7		-
								1I	6	149	0.9	0.1395	0.1256			0.1256														
19\2	900x900 G.S.I.P.	368936.36	6357027.46	42.47	42.47	Car Park Access No 1	24.17	1P	6	149	0.43	0.001	0.0004	0.0087	3.6	0.0004	0.0087	3.6	3.6	3.6								3.6		-
								1I	6	149	0.9	0.0091	0.0082			0.0082														

12D MODEL - HYDRAULICS DESIGN SHEET

MINOR 10 YEAR STORM EVENT

Pipe ID (-)	Pipe Type (-)	Pipe Length (m)	Pipe Size (mm)	Full Pipe Area Af (sq.m)	Pipe Grade (%)	Pipe Grade (1 in)	Full-area Tct (min)	Full-area I (mm/hr)	Full-area Sum CA (ha)	Full-area Qc=CIA (L/s)	Part-area Tct (min)	Part-area I (mm/hr)	Part-area Sum CA (ha)	Part-area Qc=CIA (L/s)	Peak Flow Qrat (L/s)	Net Bypass Flow Qb (L/s)
1\1 to 1\2	RRJ2	9.32	450	0.159	1	100	6	149	0.7286	301.5	6	149	0.7286	301.5	301.5	
1\2 to 1\3	RRJ2	24.16	525	0.216	3.84	26	7.06	140.55	1.269	495.5	6.08	148.21	1.2122	499	499	-1.5
1\3 to 1\4	RRJ2	23.65	525	0.216	6.12	16.3	7.26	138.94	1.4818	571.9	6.86	141.84	1.4639	577.6	577.6	
1\4 to 1\5	RRJ2	43.5	600	0.283	6	16.7	7.45	137.37	1.4818	565.4	6.93	141.42	1.4578	572.7	572.7	
1\5 to 1\6	RRJ2	55.13	600	0.283	6.71	14.9	7.82	134.47	1.4818	553.5	7.13	139.94	1.4463	562.2	562.2	
1\6 to 1\7	RRJ2	11.91	600	0.283	7.5	13.3	8.28	131.34	1.4818	540.6	7.44	137.48	1.4336	547.5	547.5	
1\7 to 1\8	RRJ2	26	600	0.283	7.5	13.3	8.38	130.75	1.4818	538.2	7.54	136.68	1.4336	544.3	544.3	
1\8 to 1\9	RRJ2	15.66	600	0.283	7.5	13.3	8.59	129.45	1.4818	532.8	7.76	134.95	1.4336	537.4	537.4	
1\9 to 1\10	RRJ2	7.3	750	0.442	4	25	8.72	128.67	2.077	742.3	7.75	135.01	2.0156	756	756	
2\1 to 2\2	RRJ2	14.69	375	0.11	4.95	20.2	6	149	0.0109	4.5	6	149	0.0109	4.5	4.5	
2\2 to 2\3	RRJ2	22.77	375	0.11	1.7	58.9	6.12	147.78	0.067	27.5	6	149	0.0668	27.6	27.6	1.1
2\3 to 2\4	RRJ2	24.03	375	0.11	2.75	36.3	6.31	145.88	0.0931	37.7	6.19	147.1	0.0929	37.9	37.9	1.5
2\4 to 1\3	RRJ2	26.52	375	0.11	1	100	6.51	143.93	0.1201	48	6.39	145.1	0.1199	48.3	48.3	1.5
3\1 to 3\2	RRJ2	20.46	375	0.11	1.69	59.1	6	149	0.0878	36.3	6	149	0.0878	36.3	36.3	-2.4
3\2 to 3\3	RRJ2	25.06	375	0.11	1	100	6.19	147.12	0.1963	80.2	6.17	147.3	0.1961	80.2	80.2	-1.5
3\3 to 3\4	RRJ2	16.4	525	0.216	1.57	63.6	6.4	145.04	0.3834	154.5	6.38	145.21	0.3831	154.5	154.5	-1.5
3\4 to 3\5	RRJ2	18.2	525	0.216	3.39	29.5	6.53	143.8	0.4061	162.2	6.52	143.9	0.4059	162.2	162.2	-1.5
3\5 to 3\6	RRJ2	21	525	0.216	1.49	66.9	6.68	142.49	0.4367	173.3	6.67	142.99	0.4365	173.4	173.4	-1.5
3\6 to 1\2	RRJ2	23.52	525	0.216	1	100	6.86	141.84	0.4728	186.3	6.84	141.94	0.4726	186.3	186.3	-1.5
4\1 to 3\2	RRJ2	22.51	375	0.11	1	100	6	149	0.0788	32.6	6	149	0.0788	32.6	32.6	-1.5
5\1 to 1\9	RRJ2	5	450	0.159	11	9.1	6	149	0.5952	246.3	6	149	0.5952	246.3	246.3	
6\1 to 6\2	RRJ2	20.5	375	0.11	1.24	80.7	6	149	0.0168	6.9	6	149	0.0168	6.9	6.9	
6\2 to 6\3	RRJ2	20.43	375	0.11	10.85	9.2	6.17	147.29	0.0387	15.8	6	149	0.0382	15.8	15.8	
6\3 to 6\4	RRJ2	69.09	450	0.159	12.8	7.8	6.87	141.79	0.5774	227.4	6.67	142.95	0.5701	226.4	227.4	
6\4 to 6\5	RRJ2	14.52	450	0.159	13.94	7.2	7.44	137.44	0.6331	241.7	7.25	138.99	0.626	241.7	241.7	
6\5 to 6\6	RRJ2	14.58	450	0.159	8.38	11.9	7.57	136.47	0.752	285.1	7.37	138.03	0.7449	285.6	285.6	-0.3
7\1 to 7\2	RRJ2	23.29	375	0.11	1	100	6	149	0.2207	91.4	6	149	0.2207	91.4	91.4	
7\2 to 7/2B	RRJ2	13.03	375	0.11	1	100	6.19	147.06	0.3356	137.1	6	149	0.3285	136	137.1	-0.2
7/2B to 7\3	RRJ2	13.53	375	0.11	1	100	6.3	145.97	0.3356	136.1	6.11	147.91	0.3285	135	136.1	-0.2
7\3 to 7\4	RRJ2	10.5	450	0.159	1	100	6.42	144.85	0.4645	186.9	6.22	146.79	0.4574	186.5	186.9	
7\4 to 7\5	RRJ2	9	450	0.159	1	100	6.5	143.98	0.4739	189.5	6.31	145.91	0.4667	189.2	189.5	
7\5 to 7/5B	RRJ2	14.54	450	0.159	1	100	6.58	143.53	0.5158	205.7	6.38	145.16	0.5087	205.1	205.7	
7/5B to 6\3	RRJ2	20.39	450	0.159	1	100	6.7	142.81	0.5158	204.6	6.5	143.97	0.5087	205.4	204.6	
8\1 to 8\2	RRJ2	27.64	525	0.216	5.11	19.5	6	149	0.7712	319.2	6	149	0.7712	319.2	319.2	
8\2 to 8\3	RRJ2	15.86	525	0.216	8.81	11.4	6.23	146.66	1.1448	466.4	6.23	146.7	1.1447	466.5	466.5	-3.3
8\3 to 8\4	RRJ2	18.41	525	0.216	6.3	15.9	6.37	145.34	1.3051	526.9	6.36	145.37	1.305	527	527	-3.4
8\4 to 8\5	RRJ2	20	525	0.216	6.23	16	6.52	143.88	1.424	569.1	6.52	143.9	1.4239	569.2	569.2	-7.4
8\5 to 8\6	RRJ2	18.75	525	0.216	2.93	34.2	6.69	142.88	1.5161	601.7	6.68	142.9	1.5161	601.8	601.8	-6.1
8\6 to 8\7	RRJ2	12.85	600	0.283	1.24	80.6	6.84	141.94	1.6039	632.4	6.84	141.97	1.6038	632.5	632.5	-6.3
8\7 to 8\8	RRJ2	13	825	0.535	3.77	26.5	6.95	141.3	1.7672	693.6	6.95	141.32	1.7671	693.7	693.7	-1.6
8\8 to 8\9	RRJ2	35.18	825	0.535	9.65	10.4	7.06	140.54	2.4808	968.5	7.05	140.57	2.4808	968.6	968.6	
9\1 to 8\3	RRJ2	15.58	375	0.11	4.46	22.4	6	149	0.1109	45.9	6	149	0.1109	45.9	45.9	-3.2
10\1 to 10\2	RRJ2	15.07	375	0.11	3.88	25.8	6	149	0.1062	44	6	149	0.1062	44	44	-3.3
10\2 to 8\2	RRJ2	13.01	375	0.11	1	100	6.13	147.74	0.3274	134.4	6.09	148.11	0.3267	134.4	134.4	-3.3
11\1 to 10\2	RRJ2	10.73	375	0.11	5	20	6	149	0.1355	56.1	6	149	0.1355	56.1	56.1	
12\1 to 12\2	RRJ2	12.75	375	0.11	5	20	6	149	0.1444	59.8	6	149	0.1444	59.8	59.8	
12\2 to 12\3	RRJ2	14.76	375	0.11	5	20	6.11	147.94	0.2504	102.9	6	149	0.2478	102.6	102.9	-4
12\3 to 12\4	RRJ2	31	375	0.11	5	20	6.23	146.71	0.4401	179.3	6.12	147.77	0.4375	179.6	179.6	-6.7
12\4 to 12\5	RRJ2	32	375	0.11	6.92	14.5	6.5	143.97	0.5131	205.2	6.4	145.02	0.5106	205.7	205.7	-4.7
12\5 to 12\6	RRJ2	22.74	375	0.11	6.93	14.4	6.77	142.37	0.815	322.3	6.66	143.01	0.8124	322.7	322.7	-2.4
12\6 to 12\7	RRJ2	18.49	525	0.216	1	100	6.96	141.24	1.0004	392.5	6.83	142.05	0.9966	393.3	393.3	-1.9
12\7 to 12\8	RRJ2	17.64	525	0.216	1	100	7.11	140.08	1.0461	407.1	6.98	141.12	1.0424	408.6	408.6	-0.1
12\8 to 12\9	RRJ2	21.99	525	0.216	1	100	7.26	138.91	1.077	415.6	7.03	140.74	1.0679	417.5	417.5	
12\9 to 12\10	RRJ2	14.02	600	0.283	1	100	7.44	137.44	1.3099	500.1	7.22	139.28	1.3008	501.2	501.2	
12\10 to 12\11	RRJ2	25.27	600	0.283	1	100	7.56	136.51	1.3272	503.3	7.06	140.54	1.298	506.7	506.7	
13\1 to 12\3	RRJ2	11.27	375	0.11	5	20	6	149	0.0892	36.9	6	149	0.0892	36.9	36.9	
14\1 to 14\2	RRJ2	12.78	375	0.11	5	20	6	149	0.1386	57.3	6	149	0.1386	57.3	57.3	
14\2 to 12\5	RRJ2	14.76	375	0.11	3.43	29.2	6.11	147.94	0.2277	93.6	6	149	0.2252	93.2	93.6	2.1
15\1 to 15\2	RRJ2	11.72	375	0.11	1	100	6	149	0.0296	12.2	6	149	0.0296	12.2	12.2	
15\2 to 15\3	RRJ2	11.71	375	0.11	1	100	6.1	148.02	0.079	32.5	6	149	0.0785	32.5	32.5	
15\3 to 12\6	RRJ2	9.58	375	0.11	1	100	6.2	147.05	0.0957	39.1	6.1	148.02	0.0952	39.2	39.2	
16\1 to 16\2	RRJ2	13.4	375	0.11	4.83	20.7	6	149	0.0131	5.4	6	149	0.0131	5.4	5.4	
16\2 to 16\3	RRJ2	31.69	375	0.11	1.1	91.3	6.11	147.88	0.083	34.1	6	149	0.0828	34.3	34.3	-0.8
16\3 to 12\8	RRJ2	7.01	375	0.11	1	100	6.18	145.25	0.1232	49.7	6.26	146.36	0.1229	50	50	
17\1 to 12\9	RRJ2	14.29	375	0.11	5	20	6	149	0.0783	32.4	6	149	0.0783	32.4	32.4	
18\1 to 18\2	RRJ2	35.65	375	0.11	6.83	14.6	6	149	0.0928	38.4	6	149	0.0928	38.4	38.4	
18\2 to 18\3	RRJ2	30	375	0.11	8.85	11.3	6.3	146.03	0.2591	105.1	6	149	0.2545	105.3	105.3	-0.4
18\3 to 18\4	RRJ2	27.84	450	0.159	4.85	20.6	6.55	143.72	0.3513	140.3	6.15	146.5	0.3467	141.1	141.1	
18\4 to 8\8	RRJ2	19.46	525	0.216	2.08	48	6.78	142.33	0.5011	198.1	6.48	144.18	0.4965	198.9	198.9	-1.7
19\1 to 19\2	RRJ2	11.03	375	0.11	1.51	66	6	149	0.1322	54.7	6	149	0.1322	54.7	54.7	
19\2 to 3\3	RRJ2	10.8	525	0.216	1	100	6.09	148.08	0.1408	57.9	6	149	0.1388	57.5	57.9	

Pipe ID (-)	Pipe Flow Q (L/s)	Capacity Flow Qcap (L/s)	Q/Qcap Ratio (-)	Full Pipe Vel Vf=Q/Af (m/s)	Norm Depth Vel Vn=Q/An (m/s)	Crit Depth Vel Vc=Q/Ac (m/s)	Capacity Vel Vcap=Qcap/Af (m/s)	US Pit Grate RL (m)	Pipe US IL (m)	Pipe DS IL (m)	DS Pit Grate RL (m)	Cover Limit (m)	Cover Min (m)	Pipe DS Bend (deg)	Pipe DS Drop (m)	US Pit Ku (-)	US Pit Kw (-)	Pipe V'head (m)	P'head Loss (Ku.V'head) (m)	WSE Loss (Kw.V'head) (m)	Pipe T'head Loss (m)	US Pit HGL (m)	Pipe US HGL (m)	Pipe DS HGL (m)	DS Pit HGL (m)	HGL Grade (%)	HGL Grade (1 in)	F'board US (m)
1\1 to 1\2	301.5	323	0.93	1.9	2.29	2.09	2.03	40.73	38.57	38.48	40.36	1.2	1.2	-1.1	0.075	4.5		0.18	0.83		0.08	40.03	39.2	39.12	39.12	0.87	114.6	0.7
1\2 to 1\3	497.5	952.3	0.52	2.3	4.44	2.45	4.4	40.36	38.4	37.48	40.22	1	1.42	35.2	0.05	0.71		0.27	0.19		0.68	39.12	38.93	38.25	38.25	2.81	35.6	1.24
1\3 to 1\4	577.6	1205.3	0.48	2.67	5.5	2.76	5.56	40.22	37.43	35.98	37.88	1.2	0.77	-35.2	0.075	0.82		0.36	0.3		1.42	38.25	37.95	36.54	36.54	5.99	16.7	1.97
1\4 to 1\5	572.7	1691.3	0.34	2.03	5.43	2.3	5.98	37.88	35.9	33.29	34.93	1	1.03	-0.6	0.05	0.15		0.21	0.03		2.62	36.54	36.5	33.88	33.88	6.02	16.6	1.35
1\5 to 1\6	562.2	1789.2	0.31	1.99	5.63	2.28	6.33	34.93	33.24	29.54	31.38	1	1.01	-50.7	0.05	0.2		0.2	0.04		3.59	33.88	33.84	30.25	30.26	6.52	15.3	1.05
1\6 to 1\7	547.5	1891.4	0.29	1.94	5.83	2.24	6.69	31.38	29.49	28.6	30.76	1	0.79	-49.1	0.05	0.82	0.85	0.19	0.16	0.16	0.8	30.26	30.09	29.29	29.3	6.72	14.9	1.12
1\7 to 1\8	544.3	1891.4	0.29	1.93	5.82	2.24	6.69	30.76	28.55	26.6	28.64	1	1.44	0	0.05	0.76	0.77	0.19	0.14	0.15	1.96	29.3	29.15	27.19	27.19	7.55	13.2	1.47
1\8 to 1\9	537.4	1891.4	0.28	1.9	5.8	2.22	6.69	28.64	26.55	25.38	26.96	1	0.98	51.3	0.909	0.2		0.18	0.04		0.03	27.19	27.15	25.59	25.58	9.94	10.1	1.46
1\9 to 1\10	756	2477.5	0.31	1.71	4.96	2.22	5.61	26.96	24.47	24.18	26.07	1	1.12	0		1.67	1.9	0.15	0.25	0.28	0.03	25.58	25.29	25.27	25.27	0.38	265.3	1.38
2\1 to 2\2	4.5	446.6	0.01	0.04	1.33	0.56	4.04	42.53	41.07	40.34	42	1	1	48.8	0.05	4.5		0	0		0.77	41.44	41.44	40.67	40.67	5.27	19	1.09
2\2 to 2\3	28.7	261	0.11	0.26	1.57	0.93	2.36	42	40.29	39.91	41.43	1	1.13	-10.2	0.05	0.65		0	0		0.43	40.67	40.67	40.24	40.24	1.88	53.3	1.33
2\3 to 2\4	39.5	332.7	0.12	0.36	2.05	1.02	3.01	41.43	39.86	39.19	40.71	1	1.12	10.7	0.05	1.44		0.01	0.01		0.7	40.24	40.23	39.53	39.53	2.91	34.4	1.19
2\4 to 1\3	49.8	199.9	0.25	0.45	1.51	1.1	1.81	40.71	39.14	38.88	40.22	1	1	-54.8	1.453	1.22		0.01	0.01		0.41	39.53	39.52	39.01	38.25	1.93	51.7	1.18
3\1 to 3\2	34	260.4	0.13	0.31	1.65	0.98	2.36	42.7	41.24	40.89	42.48	1.2	1.2	6.1	0.05	4.5		0	0.02		0.36	41.64	41.62	41.25	41.25	1.78	56.1	1.07
3\2 to 3\3	78.7	199.9	0.39	0.71	1.71	1.27	1.81	42.48	40.84	40.59	42.16	1	1.16	-28.6	0.15	1.21		0.03	0.03		0.23	41.25	41.22	40.99	40.99	0.91	110.5	1.23
3\3 to 3\4	153	608.4	0.25	0.71	2.36	1.42	2.81	42.16	40.44	40.19	41.78	1	1.19	30	0.05	0.93		0.03	0.02		0.29	40.99	40.97	40.68	40.68	1.76	56.7	1.17
3\4 to 3\5	160.7	894.3	0.18	0.74	3.16	1.44	4.13	41.78	40.14	39.52	41.29	1.2	1.2	0	0.05	0.66		0.03	0.02		0.65	40.68	40.66	40.01	40.01	3.57	28	1.1
3\5 to 3\6	171.9	593	0.29	0.79	2.39	1.48	2.74	41.29	39.47	39.16	40.77	1	1.06	0.1	0.05	0.55		0.03	0.02		0.34	40.01	39.99	39.65	39.65	1.63	61.3	1.28
3\6 to 1\2	184.8	484.5	0.38	0.85	2.09	1.51	2.24	40.77	39.11	38.87	40.36	1	1	-90.1	0.466	0.58		0.04	0.02		0.38	39.65	39.63	39.12	39.12	2.17	46.1	1.12
4\1 to 3\2	31.1	199.9	0.16	0.28	1.33	0.95	1.81	42.5	41.12	40.89	42.48	1	1	-54.3	0.05	4.5		0	0.02		0.24	41.51	41.49	41.25	41.25	1.08	92.3	0.99
5\1 to 1\9	246.3	1076.8	0.23	1.55	5.53	1.86	6.77	27.92	25.32	24.77	26.96	1	1.8	-38.7	0.3	4.5		0.12	0.55		0.22	26.52	25.77	25.54	25.58	4.47	22.4	1.6
6\1 to 6\2	6.9	222.7	0.03	0.06	0.93	0.63	2.02	43.84	42.45	42.2	43.61	1	1	19.4	0.05	4.5		0	0		0.3	42.82	42.82	42.52	42.52	1.47	68.2	1.01
6\2 to 6\3	15.8	662.1	0.02	0.14	2.56	0.79	6	43.61	42.15	39.93	42.08	1.2	1.2	-45.1	0.05	3.18		0	0		2.07	42.52	42.52	40.45	40.46	10.12	9.9	1.08
6\3 to 6\4	227.4	1162	0.2	1.43	5.72	1.79	7.31	42.08	39.88	31.03	32.5	1	1.03	38.3	0.05	1.19	1.25	0.1	0.12	0.13	8.79	40.46	40.33	31.54	31.54	12.72	7.9	1.62
6\4 to 6\5	241.7	1212.7	0.2	1.52	6	1.84	7.63	32.5	30.98	28.96	31.09	1	1	4	0.05	0.93		0.12	0.11		1.91	31.54	31.43	29.52	29.52	13.19	7.6	0.96
6\5 to 6\6	285.3	959.6	0.3	1.79	5.21	2.02	5.91	31.09	28.91	27.68	29.16	1	1.03	0		0.98		0.16	0.16		1.24	29.52	29.36	28.12	28.12	8.5	11.8	1.57
7\1 to 7\2	91.4	199.9	0.46	0.83	1.77	1.34	1.81	42.65	41.27	41.04	42.94	1	1	-66.2	0.05	4.5		0.03	0.16		0.13	41.8	41.65	41.52	41.54	0.56	179.9	0.85
7\2 to 7/2B	136.9	199.9	0.69	1.24	1.94	1.59	1.81	42.94	40.99	40.86	43.16	1.2	1.7	36.8	0.05	1.96	2.28	0.08	0.15	0.18	0.08	41.54	41.36	41.29	41.29	0.58	173.3	1.4
7/2B to 7\3	135.9	199.9	0.68	1.23	1.94	1.58	1.81	43.16	40.81	40.67	42.99	1	1.95	-59.8	0.05	0.47		0.08	0.04		0.06	41.29	41.25	41.19	41.2	0.47	214.7	1.87
7\3 to 7\4	186.9	323	0.58	1.18	2.1	1.63	2.03	42.99	40.62	40.52	43.15	1	1.9	0	0.05	1.64	1.83	0.07	0.12	0.13	0.09	41.2	41.07	40.98	40.98	0.86	116.5	1.79
7\4 to 7\5	189.5	323	0.59	1.19	2.11	1.64	2.03	43.15	40.47	40.38	43.03	1	2.19	-74.1	0.05	0.3		0.07	0.02		0.03	40.98	40.96	40.93	40.95	0.35	287.7	2.17
7\5 to 7/5B	205.7	323	0.64	1.29	2.15	1.7	2.03	43.03	40.33	40.18	43.1	1.2	2.36	16.4	0.05	1.78	2.05	0.09	0.15	0.17	0.17	40.95	40.78	40.6	40.6	1.2	83.5	2.08
7/5B to 6\3	204.6	323	0.63	1.29	2.14	1.7	2.03	43.1	40.13	39.93	42.08	1	1.75	57.4	0.05	0.25		0.08	0.02		0.13	40.6	40.58	40.45	40.46	0.64	157.1	2.5
8\1 to 8\2	319.2	1101.1	0.29	1.47	4.43	1.89	5.09	42.52	40.73	39.31	41.04	1	1.04	-35.5	0.05	4.5		0.11	0.5		1.3	41.75	41.25	39.95	39.95	4.72	21.2	0.56
8\2 to 8\3	463.1	1444.3	0.32	2.14	5.97	2.33	6.67	41.04	39.26	37.86	39.56	1.2	1.26	-37.7	0.05	0.7		0.23	0.16		1.23	39.95	39.79	38.56	38.56	7.75	12.9	1.09
8\3 to 8\4	523.6	1220.5	0.43	2.42	5.43	2.55	5.64	39.56	37.81	36.65	38.29	1	1.1	0.5	0.05	0.73		0.3	0.22		1.01	38.56	38.34	37.33	37.33	5.49	18.2	1
8\4 to 8\5	561.8	1214.1	0.46	2.6	5.5	2.69	5.61	38.29	36.6	35.56	37	1	1.04	0	0.05	0.58		0.34	0.2		1.01	37.33	37.13	36.12	36.12	5.06	19.8	0.96
8\5 to 8\6	595.7	831	0.72	2.75	4.16	2.83	3.84	37	35.31	34.76	36.33	1	0.98	0	0.075	0.51		0.39	0.2		0.28	36.12	35.92	35.64	35.64	1.51	66.3	0.88
8\6 to 8\7	626.2	767	0.82	2.21	3.01	2.44	2.71	36.33	34.68	34.52	36.2	1	0.98	91.1	0.05	0.2		0.25	0.05		0.11	35.64	35.59	35.48	35.54	0.83	120.6	0.69
8\7 to 8\8	692.1	3086.5	0.22	1.29	4.7	2.05	5.77	36.2	34.48	33.98	36.2	1	-0.51	-3.5	0.025	2.14	2.78	0.09	0.18	0.24	0.4	35.54	35.3	34.9	34.9	3.07	32.6	0.66
8\8 to 8\9	968.6	4944.1	0.2	1.81	7.27	2.34	9.25	36.2	33.96	30.57	32.45	1	-1.07	0		0.69		0.17	0.12		2.99	34.9	34.79	31.8	31.8	8.49	11.8	1.3
9\1 to 8\3	42.7	423.8	0.1	0.39	2.49	1.04	3.84	40.1	38.66	37.96	39.56	1	1.04	63.5	0.15	4.5		0.01	0.03		0.48	39.07	39.03	38.56	38.56	3.05	32.7	1.03
10\1 to 10\2	40.6	395.4	0.1	0.37	2.34	1.03	3.58	41.72	40.18	39.59	41.09	1.2	1.23	47.8	0.05	4.5		0.01	0.03		0.44	40.58	40.55	40.11	40.11	2.93	34.2	1.14
10\2 to 8\2	131.1	199.9	0.66	1.19	1.93	1.56	1.81	41.09	39.54	39.41	41.04	1	1.2	47.3	0.15	1.45		0.07	0.1		0.06	40.11	40.01	39.95	39.95	0.43	230.7	0.98
11\1 to 10\2	56.1	449	0.12	0.51	2.81	1.14	4.07	42.67	40.29	39.75	41.09	1.2	1	1.7	0.211	4.5		0.01	0.06		0.55	40.72	40.66	40.11	40.11	5.16	19.4	1.95
12\1 to 12\2	59.8	449	0.13	0.54	2.86	1.16	4.07	43.11	40.89	40.26	41.55	1.2	1.01	-4.9	0.05	4.5		0.01	0.07		0.61	41.34	41.27	40.65	40.65	4.81	20.8	1.77
12\2 to 12\3	98.9	449	0.22	0.9	3.29	1.38	4.07	41.55	40.21	39.47	41.2	1	0.95	61.7	0.05	1.8		0.04	0.07		0.56	40.65	40.58	40.02	40.05	3.81	26.2	0.89
12\3 to 12\4	172.9	449	0.39	1.57	3.81	1.8	4.07	41.2	39.42	37.77	39.16	1	1.01	0	0.05	1.8	2.05	0.13	0.23	0.26	1.55	40.05	39.79	38.25	38.25	4.69	21.3	1.16
12\4 to 12\5	201	528.4	0.38	1.82	4.47	1.98	4.78	39.16	37.72	35.5	36.92	1	1	-4.5	0.05	0.91		0.17	0.15		1.97	38.25	38.09	36.12	36.12	6.16	16.2	0.91
12\5 to 12\6	320.4	528.8	0.61	2.9	5	2.92	4.79	36.92	35.45	33.88	35.82	1	1.17	85.2	0.15	0.68		0.43	0.29		1.15	36.12	35.83	34.68	34.74	5.04	19.8	0.8
12\6 to 12\7	391.3	484.5	0.81	1.81	2.48	2.1	2.24	35.82	33.73	33.54	35.81	1	1.55	-30.6	0.05	1.9	2.27	0.17	0.32	0.38	0.12	34.74	34.36	34.24	34.24	0.65	152.8	1.08
12\7 to 12\8	408.5	484.5	0.84	1.88	2.49	2.15	2.24	35.81	33.49	33.32	35.33	1.2	1.61	39.2	0.05	0.65		0.18	0.11		0.13	34.24	34.13	34	34	0.71	140.3	1.57
12\8 to 12\9	417.5	484.5	0.86	1.93	2.5	2.18	2.24	35.33	33.27	33.05	34.92	1.2	1.46	26.2	0.075	0.65		0.19	0.12		0.16	34	33.88	33.71	33.71	0.74	134.4	1.33
12\9 to 12\10	501.2	688	0.73	1.78	2.64	2.14	2.43	34.92	32.97	32.83	34.67	1	1.2	-53.9	0.05	0.57		0.16	0.09		0.08	33.71	33.62	33.55	33.55	0.54	186.1	1.21
12\10 to 12\11	506.7	688	0.74	1.79	2.65	2.15	2.43	34.67	32.78	32.53	33.75	1	0.58	0	0.3	1	1.04	0.16	0.16	0.17	0.27	33.55	33.38	32.91	32.91	1.85	54	1.11
13\1 to 12\3	36.9	449	0.08	0.33	2.49	1	4.07	42.64	40.03	39.47	41.2	1.2	-1.55	-89.7	0.05	4.5		0.01	0.03		0.39	40.43	40.41	40.02	40.05	3.44	29	2.2
14\1 to 14\2	57.3	449	0.13	0.52	2.82	1.15	4.07	39.14	36.7	36.06	37.41	1.2	1.11	-5.1	0.05	4.5		0.01	0.06		0.62	37.14	37.07	36.45	36.45	4.85	20.6	2
14\2 to 12\5	93.6	371.5	0.26	0.87	2.84	1.37	3.36	37.41	36.01	35.5	36.92	1	1.01	57.2	0.05	1.82		0.04	0.07		0.26	36.45	36.39	36.12	36.12	1.78	56	0.95
15\1 to 15\2	12.2	199.9	0.06	0.11	1.02	0.73	1.81	36.38	34.31	34.19	36.22	1.2	1.77	101	0.05	4.5		0	0		0	34.71	34.7	34.7	34.7	0	22523.5	1.68
15\2 to 15\3	32.5	199.9	0.16	0.29	1.34	0.96	1.81	36.22	34.14	34.02	35.97	1	1.7	22.9	0.05	2		0	0.01		0	34.7	34.7	34.69	34.69	0.03	3526.3	1.51
15\3 to 12\6	39.2	199.9	0.2	0.35	1.42	1.02	1.81	35.97	33.97	33.88	35.82	1	1.67	-76.8	0.15	0.97		0.01	0.01		0	34.69	34.69	34.68	34.74	0.04	2461.1	1.28
16\1 to 16\2	5.4	441.1	0.01	0.05	1.39	0.59	3.99	36.13	34.51	33.86	35.44	1	1	43.1	0.05	4.5		0	0		0.69	34.88	34.88	34.19	34.19	5.18	19.3	1.25
16\2 to 16\3	33.5	209.3	0.16	0.3	1.4	0.97	1.9	35.44	33.81	33.47	34.92	1.2	1.2	80.9	0.05	0.65		0	0		0.37	34.19	34.19	33.81	33.82	1.18	84.5	1.25
16\3 to 12\8	50	199.9	0.25	0.45	1.51	1.1	1.81	34.92	33.42	33.34	34.92	1	1.12	-74.2	0.372	2.13	2.52	0.01	0.02	0.03	0.08	33.82	33.79	33.71	33.71	1.07	93.4	1.1
17\1 to 12\9	32.4	449	0.07	0.29	2.4	0.96	4.07	36.37	34.29	33.58	34.92	1.2	0.89	89	0.606	4.5		0	0.02		0.92	34.69	34.67	33.71	33.71	6.67	15	1.69
18\1 to 18\2	38.4	525.1	0.07	0.35	2.82	1.01	4.75	42.8	41.55	39.12	40.27	1	3.25	0.5	0.055	4.5		0.01	0.03		2.47	41.95	41.92	39.46	39.46	6.92	14.5	0.84
18\2 to 18\3	104.9	597.9	0.18	0.95	4.11	1.42	5.41	40.27	39.06	36.41	37.66	1	1.09	-0.1	0.12	0.5		0.05	0.02		2.66	39.46	39.44	36.77	36.77	8.88	11.3	0.81
18\3 to 18\4	141.1	714.2	0.2	0.89	3.53	1.46	4.49	37.66	36.28	34.94	36.37	1	-0.71	-41.9	0.05	0.91		0.04	0.04		1.26	36.77	36.73	35.48	35.48	4.51	22.2	0.89
18\4 to 8\8	197.2	700.4	0.28	0.91	2.8	1.55	3.24	36.37	34.88	34.48	36.2	1	-0.72	-50.5	0.52	1.63		0.04	0.07		0.49	35.48	35.41	34.9	34.9	2.62	38.2	0.89
19\1 to 19\2	54.7	246.4	0.22	0.5	1.81	1.13	2.23	42.55	41.18	41.01	42.47	1	1	-34.6	0.15	4.5		0.01	0.06		0.16	41.61	41.55	41.39	41.39	1.46	68.3	0.94
19\2 to 3\3	57.9	484.5	0.12	0.27	1.33	1.06	2.24	42.47	40.86	40.75	42.16	1.2	0.97	27.4	0.311	1.5		0	0.01		0.58	41.39	41.39	40.99	40.99	3.66	27.3	1.08

NOTE:
ALL DRAINAGE PITS TO BE TO COUNCIL STANDARDS UNLESS OTHERWISE SPECIFIED.

12D MODEL - 100yr OVERLAND FLOW

100 YEAR HYDRAULIC DATA

Pit	Bypass Pit	Choke	Intensity (mm/h)	Base Inflow (Cumecs)	Catchment Flow (Cumecs)	Inlet Flow (Cumecs)	Pipe Flow (Cumecs)	Bypass Flow (Cumecs)	Flooded Depth (m)	Flooded Velocity (m/s)	Max V.d. (m.m/s)	Flooded Width (m)
1\1	1\2	0.8	178	0	0.401859	0.321487	0.321487	0.080372				
1\2	1\3	0.5	178	0	0.037323	0.122834	0.666863	0	0.113496			
1\3	LOST	0.5	178	0	0.051136	0.055349	0.788195	0	0.069865			
1\4		0.8		0			0.782019					
1\5		0.8		0			0.770656					
1\6		0.8		0			0.757927					
1\7		0.8		0			0.755247					
1\8		0.8		0			0.749394					
1\9		0.8		0			1.052737					
2\1	2\2	0.8	178	0	0.005995	0.004796	0.004796	0.001199				
2\2	2\3	0.8	178	0	0.030958	0.031775	0.036498	0.012508				
2\3	2\4	0.8	178	0	0.014393	0.02102	0.057135	0.005881	0.065193	0.853664	0.055653	1.31172
2\4	1\3	0.8	178	0	0.014893	0.01656	0.073063	0.004213	0.060491	0.811931	0.049114	1.145121
3\1	3\2	0.8	178	0	0.048421	0.034038	0.034038	0.014383	0.08853	0.683191	0.060483	2.085374
3\2	3\3	0.8	178	0	0.016427	0.023774	0.088327	0.007037	0.072125	0.582101	0.041984	2.268699
3\3	3\4	0.8	178	0	0.025441	0.024801	0.188377	0.007677	0.070676	0.700013	0.049474	1.981713
3\4	3\5	0.8	178	0	0.012539	0.016155	0.203142	0.004061	0.060345	0.811485	0.048969	1.094314
3\5	3\6	0.8	178	0	0.016887	0.016688	0.218129	0.004261	0.060642	0.813268	0.049318	1.150192
3\6	1\2	0.8	178	0	0.019912	0.019034	0.234991	0.005139	0.063267	0.836615	0.05293	1.238228
4\1	2\2	0.8	178	0	0.043439	0.031314	0.031314	0.012125	0.0858	0.666334	0.057171	1.98992
5\1		0.8	178	0	0.328296	0.328296	0.328296	0				
6\1	7\1	0.8	178	0	0.00925	0.0074	0.0074	0.00185	0.053973	0.490415	0.026469	0.929214
6\2	6\3	0.8	178	0	0.012105	0.009684	0.016941	0.002421	0.054313	0.63477	0.034476	0.931887
6\3	6\4	0.8	178	0	0.012591	0.01201	0.304723	0.003002	0.042845	1.416395	0.060685	0.5534
6\4	LOST	0.8	178	0	0.030752	0.026751	0.323293	0.007004	0.054372	1.73316	0.094235	0.959345
6\5	LOST	0.8	178	0	0.065584	0.05031	0.368787	0.015274	0.070661	1.980858	0.139969	1.221322
7\1	7\2	0.5	178	0	0.121746	0.123596	0.123596	0	0.126009			
7\2	7\3	0.5	178	0	0.06339	0.023702	0.145885	0.039688	0.047467			
7/2B		0.8		0			0.145095					
7\3	7\4	0.5	178	0	0.071078	0.110766	0.253879	0	0.11782			
7\4	7\5	0.5	178	0	0.005165	0.005165	0.25806	0	0.040731			
7\5	6\5	0.5	178	0	0.023153	0.023153	0.279916	0	0.046834			
7/5B		0.8		0			0.27856					
8\1	8\2	0.8	178	0	0.425404	0.340323	0.340323	0.085081				
8\2	8\3	0.8	178	0	0.025454	0.061962	0.522858	0.048573	0.08907	1.535091	0.13673	2.103471
8\3	8\4	0.8	178	0	0.027273	0.068873	0.629603	0.061229	0.077706	1.565306	0.121634	3.009705
8\4	8\5	0.8	178	0	0.065577	0.069316	0.693246	0.05749	0.087967	1.797556	0.158125	2.093741
8\5	8\6	0.8	178	0	0.050818	0.061157	0.747891	0.047151	0.088047	1.550102	0.136482	2.069172
8\6	8\7	0.8	178	0	0.048396	0.055172	0.796328	0.040375	0.096883	1.067983	0.10347	2.365491
8\7	LOST	0.5	178	0	0.090088	0.151219	0.94047	0.008133	0.129288			
8\8	LOST	0.5	178	0	0.117216	0.135974	1.303906	0	0.121106			
9\1	8\8	0.8	178	0	0.061173	0.042415	0.042415	0.018757	0.072263	1.580748	0.11423	1.423134
10\1	8\3	0.8	178	0	0.058604	0.04035	0.04035	0.018254	0.072925	1.372947	0.100122	1.57401
10\2	8\3	0.5	178	0	0.047248	0.02619	0.125468	0.036002	0.050292			
11\1	10\2	0.8	178	0	0.074718	0.059774	0.059774	0.014944				
12\1	12\2	0.8	178	0	0.079669	0.063735	0.063735	0.015934				
12\2	14\2	0.8	178	0	0.058452	0.046616	0.109773	0.02777	0.044963	6.217968	0.279577	0.53213
12\3	12\4	0.8	178	0	0.0554	0.043525	0.191223	0.021716	0.01205	3.024824	0.036449	2.947025
12\4	12\5	0.8	178	0	0.04031	0.042829	0.230804	0.019197	0.071669	1.532263	0.109815	1.519957
12\5	12\6	0.8	178	0	0.040889	0.041889	0.382967	0.018197	0.071011	1.521647	0.108054	1.49791
12\6	12\7	0.5	178	0	0.049497	0.070923	0.497121	0	0.089817			
12\7	12\8	0.8	178	0	0.025212	0.040409	0.533328	0.020707				
12\8	12\9	0.8	178	0	0.017016	0.028326	0.557752	0.009397	0.068288	0.909028	0.062076	1.82918
12\9	12\10	0.8	178	0	0.017296	0.026559	0.669928	0.008774	0.025274	4.359154	0.110174	0.640139
12\10	LOST	0.8	178	0	0.00959	0.014689	0.681148	0.003674	0.064912	0.595891	0.038681	1.285258
13\1	12\3	0.8	178	0	0.049205	0.039364	0.039364	0.009841				
14\1	14\2	0.8	178	0	0.076426	0.061141	0.061141	0.015285				
14\2	12\7	0.8	178	0	0.049171	0.056322	0.116937	0.035904	0.080418	1.674945	0.134696	1.813362
15\1	15\2	0.8	178	0	0.016322	0.013057	0.013057	0.003264				
15\2	15\3	0.8	178	0	0.027266	0.023601	0.036499	0.006929	0.06326	0.600086	0.037961	3.134611
15\3	12\6	0.8	178	0	0.009208	0.012908	0.049205	0.003228	0.05573	0.521042	0.029038	2.354672
16\1	16\2	0.8	178	0	0.00724	0.005792	0.005792	0.001448				
16\2	16\3	0.8	178	0	0.038567	0.029441	0.035152	0.010573				
16\3	LOST	0.8	178	0	0.022145	0.024949	0.059398	0.007769	0.075521	0.702209	0.053031	1.655276
17\1	12\9	0.8	178	0	0.043201	0.034561	0.034561	0.00864				
18\1	18\2	0.8	178	0	0.051198	0.040334	0.040334	0.010863				
18\2	18\3	0.8	178	0	0.091707	0.076696	0.11551	0.025874				
18\3	18\4	0.8	178	0	0.05088	0.060374	0.173993	0.016381				
18\4	8\7	0.8	178	0	0.082622	0.070114	0.240787	0.028889				
19\1		0.8	178	0	0.0729	0.0729	0.0729	0				
19\2		0.8	178	0	0.004777	0.004777	0.077398	0				

FOR CONSTRUCTION CERTIFICATE

00	AW	DD	CB	TT	12/04/13	ISSUED FOR 80% REVIEW
01	AW	DD	CB	SG	2/10/13	ISSUED FOR CONSTRUCTION CERTIFICATE
02	VP	JP	SG		16/07/14	ISSUED WITH COUNCIL AMENDMENTS
03	BL	BL	PF	SAG	25/05/15	UPDATED TO COUNCIL COMMENTS
04	BL	BL	PF	SAG	5/08/15	NOTE ADDED TO RIGID PAVEMENT PLAN REGARDING SURFACE FINISH
05	BL	BL	PF		02/09/15	UPDATED TO REFLECT COMMENTS BY GEOTECHNICAL ENGINEER
First Issue	AW	DD	CB	TT	12/04/13	
Issue	Drawn	Design	Check	Appd.	Date	Revision Details

Revisions

Quality Endorsed Company

Approval:
BY: STUART GREEN
FIEAust. CPEng.
Manager - Urban Development
SIGN:
DATE:

Client:
HAMMERSMITH MANAGEMENT PTY LTD

Project:
CAMERON GROVE - LINK ROAD
ROAD & DRAINAGE DESIGN

BROWN Smart Consulting

Drawing Title:
DRAINAGE CALCULATIONS
SHEET 02 OF 02

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
L05016.014		CC	508	05

BN Architecture Urban Design Masterplanning Graphics Interiors

16th February 2018

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Thomas Rethati
Woolworths Limited
1 Woolworths Way,
Bella Vista
NSW 2153

Dear Thomas,

RE: DA/1178/2017 Cameron Park Shopping Centre:
– Visual Impact Statement Addendum

With regards to the additional information requested by Lake Macquarie Council in their letter 23.10.17, the following items relating to the Visual Impact statement were raised and the respective responses are noted in *italics*.

1. Scenic Values: Having regard to Section 2.2 (Scenic Values) of Development Control Plan (DCP) 2014, Council's Landscape Architect, Robyn Pollock, has reviewed the proposed development and submitted Visual Impact Assessment (VIA) and advised the development is zoned B2 (Local Centre) where the legibility of the development within the residential setting is an important consideration. There is information omitted from the photomontages that do not give a full indication of the visual impact. The concerns are:

a. The photo montages do not show future development fronting Portland Drive - the proposed development impacts along this road is indeterminate.
– As the nature and character of the Future developments sites is undetermined at present and would be subject to separate development applications.

b. The pylon signage located in the VIA dominates the two prominent corners and there is no accompanying information regarding size, materials etc.
– Pylon sign information was included in the Architectural package on Drawing A100.91 [DA-B], however in recognition of Council's comments, the sizes of the Pylon signs have been reduced, and the plan has been amended accordingly.

c. The pylon sign shown along the southern George Booth Drive frontage is not assessed for visual impact and is not supported.
– Both Pylon signs adjacent to George Booth Drive are illustrated in the previously issued VIA on p.14 [View 1 Proposed George Booth Dr looking East]

d. The far western 'future development site' will require significant retaining to achieve buildability on this site. The visual impact of these retaining walls is to be included in the VIA.
- The far western 'Future developments site' is undetermined at present and could be developed in numerous ways which may or may not require significant retaining to Tramway drive, therefore the visual impact would need to be determined as part of a

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separate development application.

e. The retaining proposed adjoining Tramway Drive proposes 1000mm planted edge to screen a 2500mm plus wall. This is too narrow to support vegetation and not supported.
– noted, our understanding is that the Civil drawings have increased the width of the planted edge.

Additional information relating to the application and referencing the Architectural Design were also noted in the letter from Lake Macquarie Council- the Design responses are noted below.

- Page 10 (2nd para) there is a 'kink' in the walkway between T17 and T18 which does not offer a clear of line of sight.
  – clear lines of sight are achievable in 30-40m lengths of the development , with longer vistas achievable above table height across the seating areas.

- Page 10 (5th para) – the open space between T21 and T22 would benefit from a break in the roof.
  – there are significant breaks in the roof canopy between T21 and T22 as indicated on the submitted Roof Plan A06.10 [DA-D] and also illustrated on the 3D visualtion drawing A100.81 [DA-D]

Should the Council have any further requests for information or clarifications, please let us know and we will review and respond accordingly.

Kind regards,

Mike Fairhurst
Associate Director

Cameron Park Village
Landscape Concept Design

Project H8-16041
Rev. E
Date FEB 2018
ISSUE DA Submission

habit8

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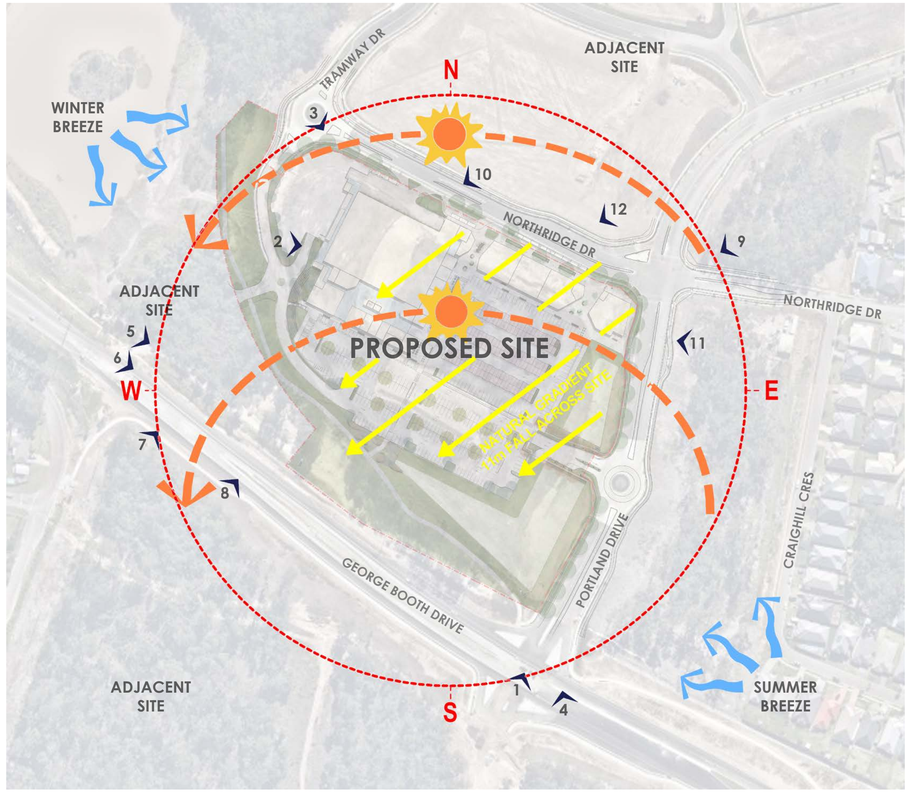

SITE ANALYSIS PLAN

N.T.S

CONTEXT PHOTOS


VIEW 1


VIEW 2


VIEW 7


VIEW 8


VIEW 3


VIEW 4


VIEW 9


VIEW 10


VIEW 5


VIEW 6


VIEW 11


VIEW 12

LANDSCAPE DESIGN REPORT

THE SITE

The site is identified as 309 George Booth Drive Cameron Park NSW, it is located within the Lake Macquarie Local Government Area. The real property description is: LOT 901 DP1222132. 1092785. The site is predominantly zoned B2 'Local Centre' on Lake Macquarie LEP 2014 map 4650_COM_LZN_008B_020_20140915.

The site sits adjoining the historical Wallsend steam tram line and is part of a future bicycle connection through the region. Bordered by 3 main arterial roads the site's proposed landscape needs to address each of the road frontages balancing the specific requirements for regional traffic visiting and residing in surrounding residential areas and the practical requirements for vehicular, truck and pedestrian use which all have specific requirements for safety, practicality and access.

SITE EUROPEAN HISTORY (SOURCED FROM EJE STATEMENT OF HERITAGE IMPACT, JUNE 2017)

West Wallsend was one of a series of townships named after the town of Wallsend, itself named for the town of the same name on the River Tyne in Northumberland. The mining and marketing of coal was the common denominator. The Newcastle-Wallsend Coal Company was well known, and other companies sought to take advantage of this not only to raise capital on the London money market but to make favourable qualitative associations. West Wallsend, New Wallsend and Young Wallsend are other examples of this strategy. While a number of settlers had taken up grants in the local area it was not until 1885, when the West Wallsend Coal Company was formed to explore for coal in the area, that closer settlement began to take place. Lots within the original subdivision were first sold in August 1887; Carrington, Hyndes, Robertson and Brooks streets were mostly named after early settlers together with the Colonial Governor, Lord Carrington. A second subdivision, comprising of Fegan, Edden, Price, South and Watkins streets, occurred in 1901. Fegan, Edden and Watkins streets were named after local politicians. The township grew quickly as mining activity increased. Several other settlements, such as O'Donneltown, Estelville, Fairlytown and Holmesville were named after the families that founded them. Holmesville was to become the most important of these. Ladysmith and Mafeking were small villages that were begun by veterans of the South African war and grew during the Depression era before being abandoned in the 1950s.

Several mining companies joined in exploiting the local coal reserves. The West Wallsend Coal Company's pit commenced production in 1888. A second company, the Monkwearmouth Coal Company, in 1890 opened a colliery of the same name, renaming it 'Seaham' shortly after. West Wallsend Extended (Killingworth) colliery opened in 1892, as did Seaham No. 2 in 1905. There were several smaller pits in the area. The gradual closure of the major collieries as they fell victim to changing markets, and in the case of Killingworth an explosion, gave rise to a very high rate of unemployment in the area from the 1920s until the outbreak of war with Japan. The townships owed their existence to coal mining, and there were few service industries. Many of the families that did not move away, to Lake Macquarie or elsewhere, during this period were affected by poverty.

Although not geographically far distant from Wallsend and Newcastle, the West Wallsend district was isolated by a lack of transport facilities. Horse omnibuses operated from Wallsend, and the West Wallsend Coal Mining Company operated a very limited passenger service along its railway from Cockle Creek. Local pressure for extension of the steam tramway from Wallsend commenced in 1897, and a detailed route plan was prepared. Many public meetings and much Parliamentary lobbying and deliberation occurred over the ensuing years, but it was not until March 1909 that tenders were called for what the railway and tramway commissioners feared would always be a marginal operation. Most of the proposed route, of some seven and a half miles, ran through trackless bushland the inaccessibility of which increased construction costs.

After many difficulties the line opened in September 1910; the total distance from Newcastle was over 15 miles. The opening coincided with the electrification of the Sydney system and the now redundant rolling stock in Sydney were likely used to augment the new line in Newcastle. The line was unfenced except in residential areas. The line was single track, with twenty three stops, five crossing loops as well as a terminal loop and siding adjacent to West Wallsend railway station. A weekday service frequency of 90 minutes was provided between Newcastle and the terminus, in a journey that took nearly an hour and a half. A reduced timetable was offered on weekends. Mail and newspapers, but not parcels, could be consigned, although the prohibition on parcels seems subsequently to have been relaxed. The tram motors, in effect small 0-4-0 (four-coupled wheeled) locomotives, pulled several wooden-seated trailer cars and were fueled with coal rather than the less smoky but more expensive coke used on the suburban lines. The tram service was for two decades an integral part of local culture. The success of local football (soccer) teams, returning by tram, would be announced by tram whistle blasts, leaving time enough for well-wishers to come into the streets to congratulate them as they reached town.

Socially the site currently sits near residential areas and future growth residential zones. The Cameron Park Village project offers the area a small town centre and allows the region to create a community that services the residents and future residents of the area. Apart from providing valuable employment to the area, the proposed development offers a greater amenity for residents for the opportunity to have a more accessible shopping district.

SITE CONTEXT

The site boundary borders the George Booth Drive road reserve. An arborist has identified mature endemic vegetation in this road reserve bordering the Cameron Park site boundary. This vegetation shall largely be retained and does not form part of the Cameron Park Village building works. The previously approved Cycleway (DA 2433/2004) shall weave its way through this vegetation much like the Wallsend Stem tramway did in the early 1900's. There are no major stormwater issues that affect the proposed landscape design in the area. There are however, major level changes throughout the edges and access points of the site. The landscape plan proposes to soften retaining walls and steeper embankments with landscape treatments such as mass planting beds, hydromulching/seeding and by stepping retaining walls where possible to minimise the visual impact. Most of the level changes are contained on the site edges and setbacks in order to create an accessible Village core.

Due to the site levels, the proposed development has minimal impact from surrounding areas and roadways as it sits at the lower levels of the proposed building pad. Where the development is visible, landscape buffer treatments are used to ameliorate visual impacts.

LANDSCAPE DESIGN KEY ISSUES

- **Site Levels**
  - Level changes have been taken up through the boundary and setbacks through planted embankments and stepped retaining walls
  - Pedestrian areas and through site links have been designed to avoid level change to encourage equitable accessibility
  - The heights of retaining walls have been reduced and textured materials proposed to reduce visual impact.
- **Existing Vegetation**
  - Existing vegetation around the perimeter of the site (not affected by earthworks) has been retained where possible
  - Vegetation along the George Booth Drive road reserve cycle path to be largely retained
- **Visual Amenity**
  - Landscape setbacks and buffer areas are to be planted with endemic vegetation including large trees and shrubs to help screen the development from surrounding areas
  - Large trees and shrubs have been proposed in key locations to screen loading docks and entry/exit points where heavier vehicles frequent.
  - Key entry points to the site are planted with avenue style tree planting highlighting site access points while forming an attractive street presence to the development.
- **Community Values**
  - The proposed development has been designed to be an urban village with public domain areas designed to be community spaces
  - The public realm created shall consist of open mall type spaces that contain feature lighting, tree and palm planting, urban seating, possible water features, paving and general urban furniture.
  - Public art referencing the local history, its people and environment shall be incorporated into the public domain and proposed architecture.
- **Connectivity**
  - The site shall be connected to major roads through defined entry points and signage
  - The site shall be connected to the surrounding urban context by tapping into the approved cycleway which follows the old Wallsend Tramway alignment.
  - Through site pedestrian links are maintained
- **Heritage**
  - The sites history has been referenced in the urban fabric through design interventions such as paving in-lays, urban furniture, lighting, landscape materiality and vegetation choices.
  - The approved cycleway (DA 2433/2004) on the perimeter of the site follows the Wallsend steam tramway line and entry links into the proposed Cameron Park Village shall be designed to reference key features of this heritage item.
- **Sustainability**
  - Endemic planting shall be used in the re-vegetation strategy for the sites embankments and buffer areas
  - Low water use planting will be encouraged
  - Stormwater management shall use water sensitive urban design practices where possible.
- **Access and Circulation**
  - The site has strong defined pedestrian access pathways
  - Road entry points are clearly marked with feature landscaping and signage
  - Pedestrian plazas link key tenants and destinations within the Cameron Park Village
  - Local and regional cycle links are strengthened through the approved cycleway and access points into the proposed development site.
- **Boundaries and Buffer Areas**
  - Large trees and shrubs are proposed for key set back areas to screen built form and loading dock areas
  - Other buffer areas are planted out to help stabilise embankments and form a green edge to the development
  - Existing boundary planting has been retained where possible.
- **Commercial Amenity**
  - The site has been designed as a community hub and meeting place
  - Public Domain plaza areas, shaded areas, mall landscapes and a mix of retail shall provide much needed and accessible commercial product for the local community.
  - The site bordered by 3 main roads allows excellent access for the community, exposure for commercial businesses and multiple opportunities for ease of transport and deliveries.
  - The landscape has been designed to have synergy with the commercial requirements of the site where branded landscapes, public domain landscapes and natural landscapes co-exist.

The site layout has gone through numerous urban design reiterations in order to find the most appropriate site design that suits both the clients commercial objectives and council's community and environmental objectives. The site in its current form allows the Village to address major roads through clearly defined access points while utilizing roads to the North for deliveries and commercial vehicle use.

COMPLIANCE WITH LAKE MACQUARIE DCP

The landscape design is compliant with the Lake Macquarie DCP with particular reference to the Landscape Design Guidelines. (March 2015)

LANDSCAPE ARCHITECT DECLARATION

The landscape architect has prepared the Landscape Concept documentation based on research and co-ordination with the Site heritage report, Arborist report, Civil engineering documentation, architectural documentation, Council's DCP and the client's commercial requirements which include circulation, parking, edge treatments, exposure, access, screening, presentation and the incorporation of public art components which reference the site's rich history.

The nominated Registered Landscape Architect is David Vago rla AILA. David has over 18 years' experience in private practice as a landscape architect.

Client	Project	Project No.	Rev.	Drawn	Date	Purpose
Woolworths Australia's fresh food people	**Cameron Park Village**	H8-16041	E	AG	16.06.17	DA Submission
	Title	Drawing No.	Scale	Checked		
	Site Analysis and Design Report	L001	N.T.S@A1	DV		

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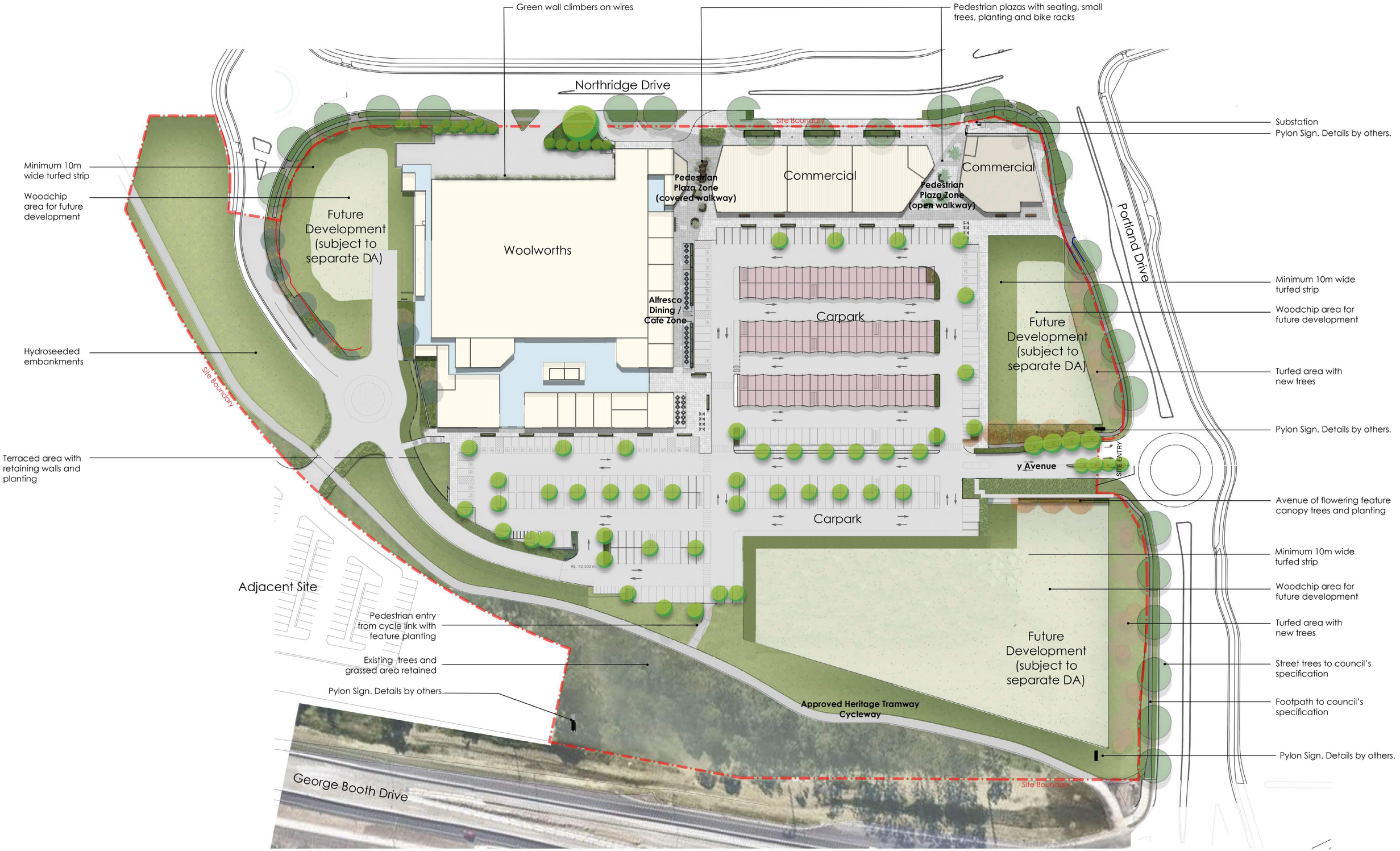

Client	Project	Project No.	Rev.	Drawn	Date	Purpose
Woolworths Australia's fresh food people	**Cameron Park Village**	H8-16041	E	AG	16.02.18	DA Submission
	Title	Drawing No.	Scale	Checked		
	Landscape Section Elevations	L003	1:100@A1	DV		

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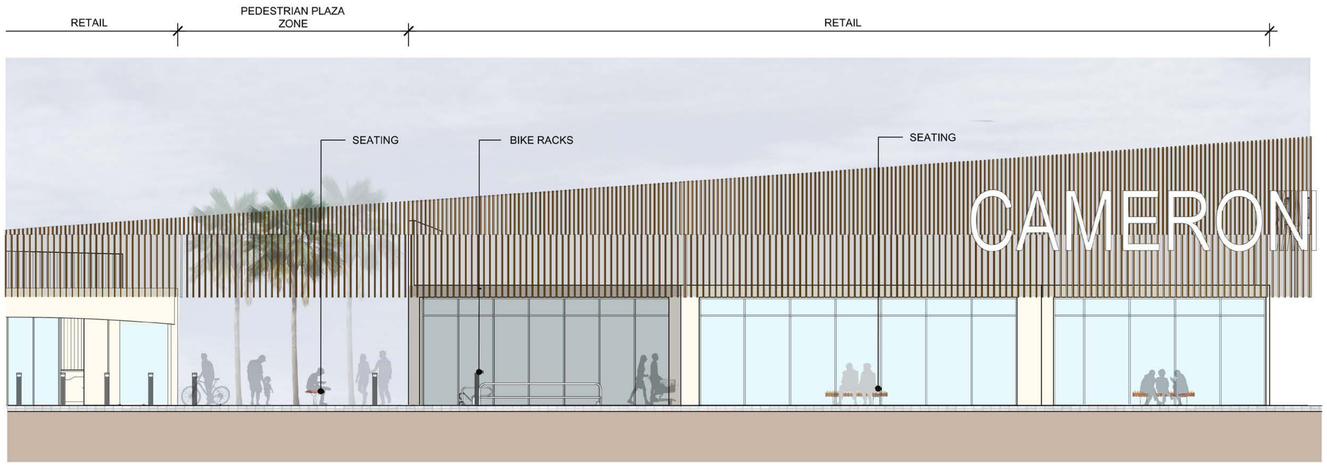
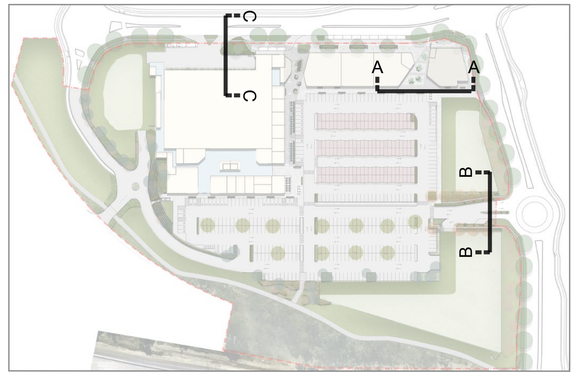
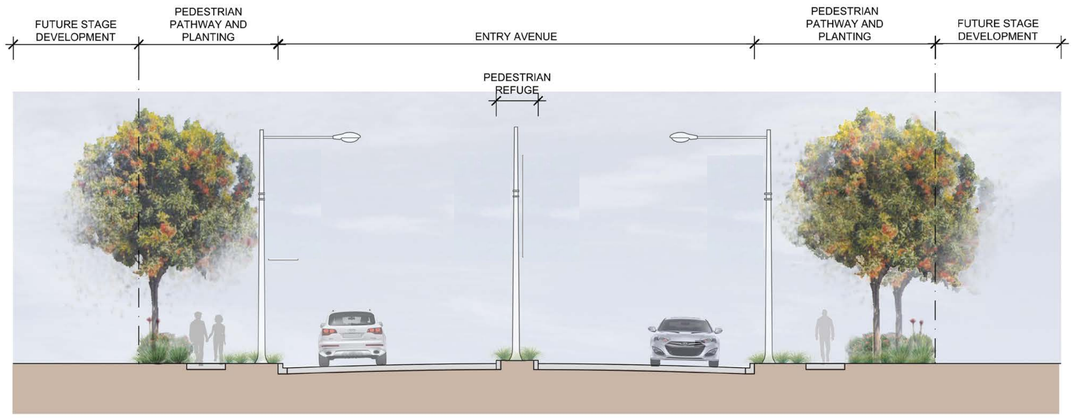


SECTION ELEVATION AA
1:100



KEY PLAN



SECTION ELEVATION BB
1:100

SECTION ELEVATION CC
1:100

DESIGN IMAGES

Pedestrian plaza with feature seating and shade trees

Pedestrian plaza / gathering space

Plant screened loading dock

Green pergola structure to Northridge Drive facade

Feature planting to Portland Drive

Green building facade to Northridge Drive

Mounded landscape to Portland Drive

Heritage tramway cycle link

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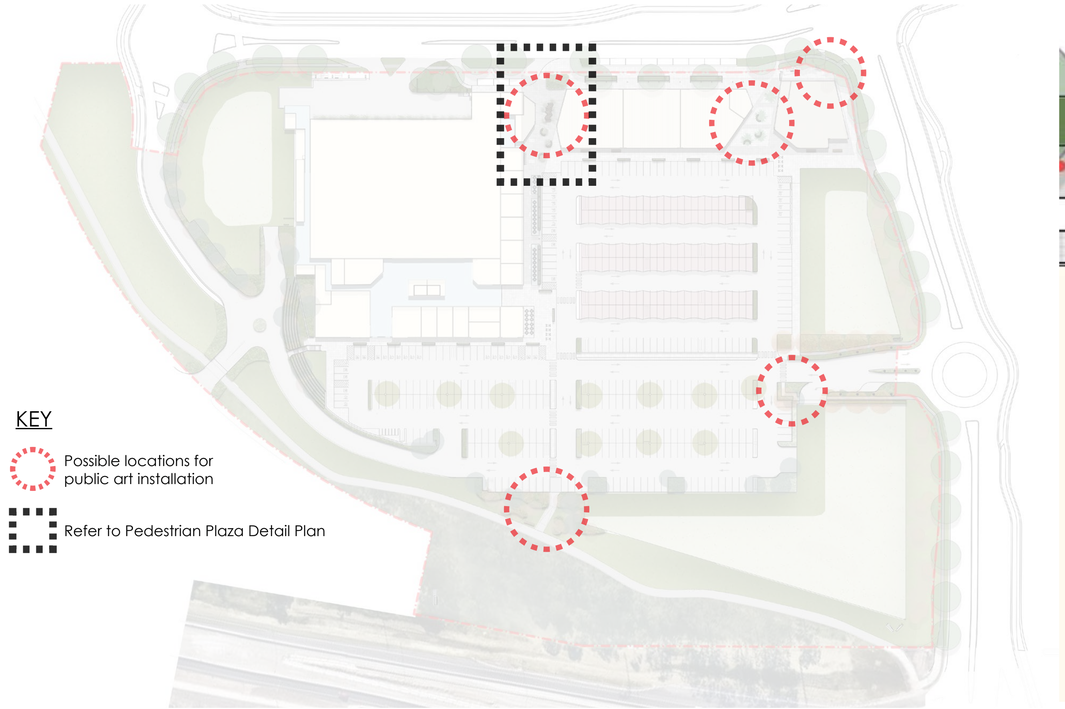

PUBLIC ART STRATEGY PLAN
1:1000@A1

PEDESTRIAN PLAZA DETAIL PLAN
1:200@A1

PUBLIC ART PRECEDENT IMAGES








PUBLIC ART THEME
The West Wallsend Tramline - Transport, Industry and linking Communities.

PUBLIC ART THEME BACKGROUND INFORMATION:
The West Wallsend Steam Tram Line was born out of the request from the people to service an area which suffered from poor public transport coverage. It was an extension of an already established Tram Network that linked Newcastle City with its most populous residential suburbs. When constructed, with a length from Newcastle to West Wallsend of 25 km / 15 miles, it was the longest city to suburb Steam Tram Route in Australia. It maintains that record today though recent network extensions in Melbourne approach the same length.

The West Wallsend Steam Tram Line has special association with the communities from Wallsend to West Wallsend in the early 1900's who lobbied for the construction of the line. The line was important to the community's sense of place as the line gave the community physical connection with the rest of Newcastle. It has ongoing association with the current populations of those centres who have and will continue to associate with the line as it transformed into cycle path.

While clearly not unique, The West Wallsend Steam Tram Line is able to demonstrate the technical characteristics and achievements of tram line design and construction in NSW during the early 1900's. It is able to contribute to an understanding of late 19th to early 20th Century industrial and mining heritage of the region.

The West Wallsend Steam Tram Line is outstanding because of its size, being the largest in Australia, and its setting which includes significant lengths of track through bushland.

SIGNIFICANCE
From 1910-1930 (when private motor cars were rarities), trams provided residents of West Wallsend, Holmesville & Edgeworth with their main means of daily passenger transport to Newcastle. The service made a great impact on the life of residents of the district, by bringing the goods & services of Newcastle within easy reach, & helping overcome the physical isolation of the mining villages. The service helped make West Wallsend the hub of its district. The West Wallsend to Newcastle route (26 km) was reputedly the longest tram route in the state. This was the last Newcastle steam tram route to run, & one of the last steam tram services to operate in NSW (Sutherland - Cronulla closed 1931, Kogarah - Sans Souci closed 1937, Parramatta Park - Redbank Wharf (Private Line) closed 1943).

The steam trams have a strong nostalgic value, & are still fondly remembered in the district.

PUBLIC ART STRATEGY
Adaptive reuse of the West Wallsend Steam Tram Line Heritage Item into a Cycle path is by far the best and most appropriate reuse of the item which was approved separately under DA 2433/2004. The reuse both respects and enhances the significance of the item under a number of criteria enabling those traveling along the path to experience the significant length of the Tram Line as well as interpret its role in connecting and indeed growing communities along the line. The West Wallsend Steam Tram Line has already been converted into cycleway from Wallsend to Glendale TAFE at the site of the former Brush Street Junction. The proposal allows for the continuation of this already successful venture.

The adaptive reuse of the Tram Line adjacent to the proposed development site is undertaken sensitively and with care to respect and enhance the significance of the item. The proposal encourages those viewing the item to understand and interpret its significance and enables those traveling along the cycle path to experience the significance of the Item first hand. For those visitors to the site who do not travel via the Bicycle path, the proposal looks to incorporate the Tram and transport themes into key areas throughout the proposed Cameron Park Village including interpretive landscape elements that form part of the entry and arrival zone and Public plaza zones. These elements shall be a mix of signage, way finding and interactive landscape features such as seating, lighting post styles, paving in-lays, laser cut steel cladding for planter boxes and walls etc.

PUBLIC ART CONCEPT
The proposed Public art concept shall look to reference some of the physical , social and environmental themes associated with the West Wallsend Tram Line.

Items that will drive the physical interpretations on site include:

- Metal tram tacks
- Parts of the Old tram integrated into public art components such as signage
- The use of Bluestone rocks to symbolize “coal”
- Steam tram smoke stack as Landscape follies
- Key dates and figures used in interpretative signage and as paving in-lays
- Shapes associated with tram and transport used in the ground plane
- Design of seats to reflect the seating in trams and at old tram stations
- Connecting communities themes used through abstracted regional maps that may be cast into seats and the ground plane.
- Historical images cast into perspex and glass
- Local industries utilised in fabrication and material sourcing/selection

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Woolworths Australia's fresh food people	**Cameron Park Village**	H8-16041	E	AG	16.02.18	DA Submission
	Title	Drawing No.	Scale	Checked		
	Public Art, Public Domain and Materiality	L004	AS SHOWN @A1	DV		

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PROPOSED PLANT SCHEDULE

	BOTANICAL NAME	COMMON NAME
ARRIVAL TREES		
	Gordonia axillaris	Gordonia
	Corymbia ficifolia	*Red Flowering Gum*
	Lagerstroemia indica	Crape Myrtle
STREET TREES		
	Lophostemon confertus	Brushbox
CARPARK TREES		
	Magnolia grandiflora 'Little Gem'	Little Gem Magnolia
	Pyrus calleryana 'Chanticleer'	'Chanticleer' Callery Pear
	Tristaniopsis laurina 'Luscious'	Luscious Watergum
	Waterhousea floribunda	Weeping Lilly Pilly
MARKER TREES		
	Corymbia maculata	Spotted Gum
	Corymbia eximia	Yellow Bloodwood
	Ficus rubiginosa	Port Jackson
	Pyrus ussuriensis	Manchurian Pear
GENERAL TREES		
	Banksia integrifolia	Coastal Banksia
	Eleaocarpus reticulatus	Blueberry Ash
	Eucalyptus capitellata	Brown Stringybark
	Eucalyptus curtisii	Plunket Mallee
	Eucalyptus microcorys	Tallowwood
	Eucalyptus punctata	Grey Gum
	Eucalyptus sideroxylon 'Rosea'	Ironbark
PALMS		
	Livistona australis	Cabbage Fan-palm
SHRUBS		
	Acacia longifolia subsp. longifolia	Sydney Golden Wattle
	Anigozanthos 'Amber Velvet'	Kangaroo Paw
	Banksia ericifolia subsp. ericifolia	Heath-leaved Banksia
	Banksia spinulosa 'Birthday Candles'	Birthday Candles
	Callistemon salignus'Great Balls of Fire'	Bottlebrush
	Callistemon viminalis 'sim'	Slim Bottlebrush
	Grevillea 'Robyn Gordon'	
	Hymennosporum Lusious	Dwarf Native Frangipani
	Murraya paniculata	Orange Jessamine
	Myoporum parvifolium	Creeping Boobialla
	Nandina domestica 'Gulf stream'	*Gulf Stream Nandina*
	Syzygium australe	Brush Cherry
	Viburnum odoratissimum	Sweet Viburnum
	Westringia zena	Coastal Rosemary
	Westringia fruticosa	Coastal Westringia
GRASSES		
	Carex appressa	Tall Sedge
	Dianella caerulea	Nodding Blue Lily
	Lomandra longifolia	Lomandra
	Poa poiformis	Coastal Poa
	Microlaena stipoides	Weeping Grass
GROUNDCOVER AND CLIMBERS		
	Actinotus helianthi	Flannel Flower
	Dichendra 'silver falls'	Dichendra
	Hibbertia scandens	Climbing Guinea Flower
	Juniperus conferta	*Shore Juniper*
	Pandorea pandorana	Wonga Wonga Vine
	Senecio serpens	*Blue Chalksticks*

TREE IMAGES


Gordonia axillaris


Lagerstroemia indica


Livistona australis


Pyrus calleryana 'Chanticleer'


Pyrus ussuriensis


Waterhousea floribunda

SHRUB IMAGES


Anigozanthos 'Amber Velvet'


Banksia spinulosa 'Birthday Candles'


Hymennosporum Lushious


Murraya paniculata


Westringia zena

GRASSES AND GROUNDCOVER IMAGES


Carex appressa


Lomandra longifolia


Poa poiformis


Actinotus helianthi


Dichendra 'silver falls'


Senecio serpens

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Woolworths Australia's fresh food people	**Cameron Park Village**	H8-16041	E	AG	16.02.18	DA Submission
	Title	Drawing No.	Scale	Checked		
	Plant Schedule	L 005	N.T.S	DV		

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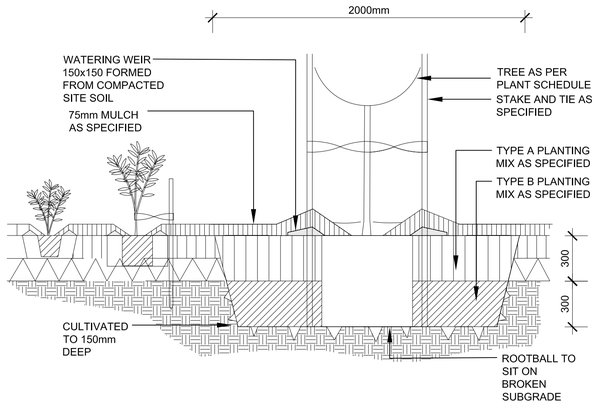
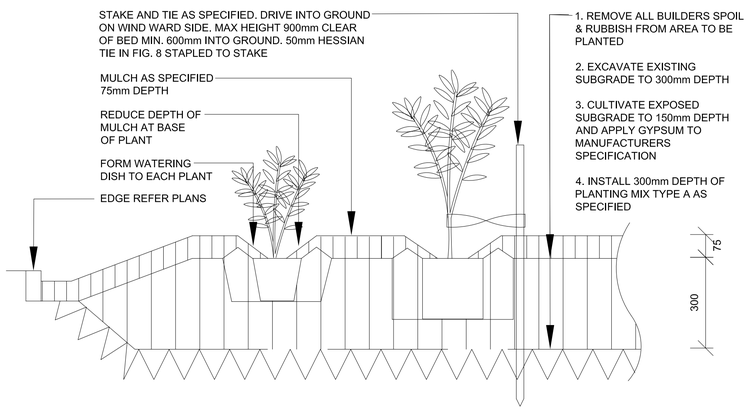
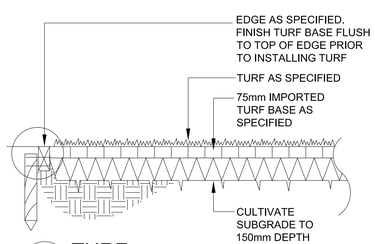


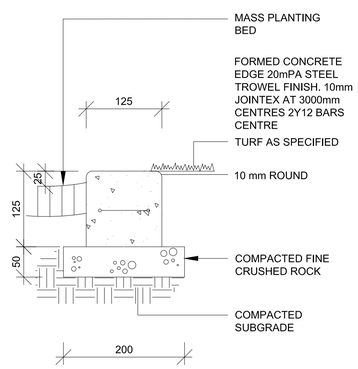
TREE PLANTING IN GARDEN BED
TYPICAL SECTION 1:20



MASS PLANTING BED
TYPICAL SECTION 1:10



TURF
TYPICAL SECTION 1:20



CONCRETE EDGE
TYPICAL SECTION 1:5

SPECIFICATION NOTES

1.0 SERVICES
Before landscape work is commenced. The Landscape Contractor is to establish the position of all service-lines and ensure tree planting is to be carried out at least 3 metres away from these services. Service lids, vents and hydrants shall be left exposed and not covered by any landscape finishes (turfing, paving, garden beds etc.) Finish adjoining surfaces flush with pit lids.

Dial Before You Dig - It is the landscape contractor's full responsibility to complete a full services search and take all required measures to ensure protection of these services including potholing to confirm locations. The client in no way will be held responsible for any damage caused to services as a result of the contract works.

Excavation
Do not excavate by machine within 1m of existing underground services.

2.0 SOILS
MASS PLANTING MIXTURE
Planting Mix Type A shall be: 'Landscape Mix (AS4419)' supplied by Soilco (Ph (02) 4272 9944) or an approved equivalent.
Planting Mix Type B shall be: a mix of 50% site soil and 50% washed coarse river sand supplied by Soilco (Ph (02) 4272 9944) or an approved equivalent.

TURF
Turf Underlay shall be a mix of 40% Double washed river sand, 20% composted Greenwaste, 20% nitro humus, 20% soil equivalent to Greenlife Lawn Top Dressing & Turf Underlay as produced by Australian Native Landscapes or approved equivalent. Spread 100mm of Turf Underlay as specified and finish flush with adjacent finished surface levels.
Provide a one (1)kg sample of imported topsoil mixes, if required, for approval. No imported topsoil shall be delivered to site prior to approval of the sample provided.

TOPDRESSING
Topdress material shall be as specified in AS 4419 - 1999. Topdress material shall be clean washed river sand, free from any clay lumps, clods, weeds, tree roots, sticks, organic matter, rubbish and material toxic to plant growth and the like, and shall have a neutral pH and minimal salt content (measured oven dry of 0.1%).

3.0 MULCH
APPLICATION: Place mulch to the required depth, (refer to drawings) clear of plant stems, and rake to an even surface finishing 25mm below adjoining levels. Ensure mulch is watered in and tamped down during installation.
MULCH TYPE: Shall be COTTAGE MULCH available from Soilco, Ph (02) 4272 9944

4.0 PLANTS
SUPPLY
The Landscape Contractor is responsible for organising the delivery of plant stock to site and checking plant stock prior to accepting delivery on site to ensure the plants supply possess the following characteristics:
- Large healthy root systems, with no evidence of root curl, restriction or damage.
- Vigorous, well established, free from disease and pests, of good form consistent with the species or variety.
- Hardened off, not soft or forced, and suitable for planting in the natural climatic conditions prevailing at the site.
- Trees must, unless required to be multi-stemmed, have a single leading shoot.
- Any plants or trees that are accepted by the landscape contctor that do not meet this specification will be replaced at the contractor's expense.

Replacement: Replace damaged or failed plants with plants of the same type and size.

PLANTING
Do not plant in unsuitable weather conditions such as extremes of heat or cold, wind or rain. Before planting begins, complete cultivation, soil placement, fertilisation etc as previously specified. Before plants are installed all pot sizes shall have their roots pruned with an appropriate, clean, sharp instrument to eliminate any root confusion occurring at edge of pot zone.
Before planting begins, thoroughly water the plants and the planting area. Keep the area and plants moist during planting. Water the plants immediately after planting, and thereafter as required to maintain growth rates free of stress.
The contractor shall give notice, of not less than 24 hours, for inspections as nominated in inspect and hold point schedule

ROOT PRUNING OF TREES
Remove tree from container and root prune 20mm on sides and bottom to ensure all circling roots have been either severed or aligned radially into the surrounding soil. Plant as per detail.

5.0 TURF
Turf shall be of even thickness free from weeds and other foreign matter, lay in stretcher pattern with joints staggered and close butted. Deliver turf on site within 24 hours of being cut, and lay within 36 hours or being cut. Prevent it from drying out between cutting and laying.
Establishment
Watering: Water as necessary to keep soil moist to a depth of 100mm.
Protection: Protect newly turfed areas against traffic until grass is established.
Making Good: Lift failed turf and relay with new turf.
Fertilising: Two weeks after laying, fertilise turf as specified.
Topdressing : When the turf is established, lightly topdress to a depth of 10mm with topdress material as specified. Rub the dressing well into the joints and correct any unevenness of surface
Mowing: When the turf is established, mow at regular intervals to maintain an average height of 50mm.
- TURF TYPE: Kikuyu

Recommended Supplier: A registered Turf grower to be approved by the Landscape Architect.

6.0 FERTILISER
MASS PLANTING AREAS
Type: Nutricote Standard Black 270 Day (16: 4.4: 8.3)
Installation: Evenly distribute 5g per litre (rootball size) of fertiliser onto backfill area around rootball prior to placing mulch.
TREE PLANTING
Type: Nutricote Standard Brown 360 Day blend (16: 4.4: 8.3)
Installation: Distribute 5g per litre (rootball size)of fertiliser into backfill around rootball. Apply in 3 evenly spread layers as hole is filled. First layer is to be half way up the rootball, second layer 3/4 up the rootball and third layer 50-100mm from the soil finished surface level. This application ensures that the nutrients leeches evenly downwards into the soil profile and encourages outward root system growth.
TURF
Kikuyu: Yates Dynamic Lifter Turf Lifter (10: 4: 6)
Installation: Evenly spread and mix 50g of fertiliser per m2 into topsoil prior to placing turf.

7.0 STAKING AND TYING
Stakes shall be straight plantation grown hardwood, free from knots and twists, pointed at one end and sized according to size of plants to be staked.
a. 5-15 litre size plant 1x(1200x25x25mm)
b. 35-75 litre size plant 2x(1500x38x38mm)
c. 100-greater than 200 litre 3x(1800x50x50mm)
Ties shall be 50mm wide hessian webbing or approved equivalent nailed or stapled to stake. Drive stakes a minimum one third of their length, avoiding damage to the root system, on the windward side of the plant.

8.0 HYRDOMULCH
EXTENT OF WORK: Refer to the landscape drawings.
CONTRACTOR'S QUALIFICATIONS: Each tenderer shall submit documentary evidence of his proven ability to carry out this type of work. Such as evidence shall include a list of similar projects satisfactorily completed together with a statement of the qualifications and/or experience of the personnel to be employed on the works.
SITE PREPARATION: Where possible, prior to topsoiling, the areas should be cultivated. After topsoiling, all areas to be seeded shall be sacrificed to provide a reasonably firm but friable seed bed, free of weed or plant growth, large stones or other debris, and the whole left ready for hydromulching.
APPLICATION RATES: The required areas shall be typically treated by the Contractor with the following:
a. Certified Seed - Minimum 56kg per hectare. The seed mix will vary according to the season, seed mix to be supplied for approval.
b. Fertiliser - 250kg to 400kg per hectare. Selection will depend on soil analysis results and client requirement
c. Wood Fibre - Defibrated pinus radiata dyed green. 2.5 tonnes per ha.
d. Binder - Anionic Bitumen Emulsion or Polymer Binder. Anionic Bitumen Emulsion 50/50 bitumen water 1,000-2,000 litres per hectare. Polymer binder maximum 250 litres per hectare.
Note: The seed and fertiliser application rates are a representative sample only of the minimum quantites that should be applied per hectare.
OPERATION: Seed, fertiliser, wood-fibre mulch, water and binder (where required) shall be thoroughly mixed together with water to provide a slurry and then applied under pressure on to the area to be treated by means of hydromulching equipment specifically designed for this purpose and by operators trained in the use of this equipment.
AFTER CARE MAINTENANCE: Where possible, adequate water ensure a continuous vigorous and healthy growth of grass shall be applied regularly. A great deal will depend on natural rainfall, but as a general guide, 25mm of water should be applied to all seeded areas weekly. It is important that the wood fibre mulch be kept moist until germination occurs. After that, sufficient watering must be kept up until a healthy sward of grass is achieved. Six weeks after germination, sulphate of ammonia should be applied by hand or mechanical spreader and well watered into the grass, or it may be applied in solution. After the grass has reached a height of 20mm to 300mm it shall be done by tractor-drawn equipment and clippings shall not be collected.

MAINTENANCE PROGRAM
Maintenance shall mean the care and maintenance of the landscape works by accepted horticultural practice as rectifying any defects that become apparent in the landscape works under normal use. This shall include, but shall not be limited to, watering, mowing, fertilising, reseeding, returfing, weeding, pest and disease control, staking and tying, replanting and plant replacement, cultivation, pruning, aerating, renovating, topdressing, maintaining the site in a neat and tidy condition as follows:

1.0 GENERAL
The Landscape Contractor shall maintain the landscape works for the term of the maintenance (or plant establishment) period to the satisfaction of the Landscape Architect and Client. The Landscape Contractor shall attend to the site on a weekly basis. The maintenance period shall commence at practical completion and continue for a period of twenty Six (26) weeks.

2.0 WATERING
Grass and trees shall be watered regularly so as to ensure continuous healthy growth. Street trees and larger plant stock are to be watered through the top of the rootball to ensure a thorough soaking of the plant rootball. Watering of street trees shall be carried out on a weekly basis throughout the maintenance period regardless of rainfall.

3.0 RUBBISH REMOVAL
During the term of the maintenance period the Landscape Contractor shall remove rubbish that may occur and reoccur throughout the maintenance period. This work shall be carried out regularly so that at weekly intervals the area may be observed in a completely clean and tidy condition.

4.0 REPLACEMENTS
The Landscape Contractor shall replace all plants that are missing, unhealthy or dead at the Landscape Contractor's cost. Replacements shall be of the same size, quality and species as the plant that has failed unless otherwise directed by the Landscape Architect. Replacements shall be made on a continuing basis not exceeding two (2) weeks after the plant has died or is seen to be missing. The landscape contractor is to report any evidence of theft or vandalism to the Landscape Architect within one day of them occurring.

5.0 STAKES AND TIES
The Landscape Contractor shall replace or adjust plant stakes and tree guards as necessary or as directed by the Landscape Architect. Remove stakes and ties at the end of the maintenance period if so directed.

6.0 PRUNING
Trees and shrubs shall be pruned as directed by the Landscape Architect. Pruning will be directed at the maintenance of the dense foliage or miscellaneous pruning beneficial to the condition of the plants. Any damaged growth shall be pruned. All pruned material shall be removed from the site.

7.0 MULCHED SURFACES
All mulched surfaces shall be maintained in a clean and tide condition and be reinstated if necessary to ensure the specified depth outlined in the construction details is maintained. Ensure mulch is kept clear of plant stems at all times.

8.0 PEST AND DISEASE CONTROL
The Landscape Contractor shall spray against insect and fungus infestation with all spraying to be carried out in accordance with the manufacturer's directions. Report all instances of pests and diseases (immediately that they are detected) to the Landscape Architect prior to spraying.

9.0 GRASS AND TURF AREAS
The Landscape Contractor shall maintain all grass and turf areas by watering, weeding, reseeding, rolling, mowing, trimming or other operations as necessary.

Apply lawn fertiliser as specified in fertilisers at the completion of the first and the last mowing, and at times as necessary to maintain healthy grass cover. Carry out last mowing and fertilisation not less than seven (7) days before the end of the maintenance period. Remove grass clippings from site. Grass and turf areas shall be sprayed with approved selective herbicide against broad leafed weeds as required by the Landscape Architect and in accordance with the manufacturer's directions.

No fertiliser is to be used on turf areas.

Grass and turf areas shall be kept mown to maintain a healthy and vigorous sward within the 30-75mm range, average 50mm.

10.0 WEED ERADICATION
Eradicate weeds by environmentally acceptable methods using a non-residual glyphosate herbicide (eg: 'Roundup') in any of its registered formulae, at the recommended maximum rate. Regularly remove by hand, weed growth that may occur or recur throughout grassed, planted and mulched areas. Remove weed growth from an area 1000mm diameter around the base of trees in grassed areas. Continue eradication throughout the course of the works and during the maintenance period.

11.0 SOIL SUBSIDENCE
Any soil subsidence or erosion which may occur after the soil filling and preparation operations shall be made good by the Landscape Contractor at no cost to the client.

12.0 STREET TREE LOCATION
All street tree locations are to be marked out on site for the approval of the project Landscape Architect. Give two days notice to arrange the inspection.

13.0 COMPLETION
Notwithstanding anything to the contrary in the Contract, The Landscape Architect may instruct the Landscape Contractor to perform urgent maintenance works. Should the Landscape Contractor fail to carry out these works within seven (7) days of such a notice, the Principal reserves the right to employ others to carry out such works and charges costs of these works to the Landscape Contractor.

Client	Project	Project No.	Rev.	Drawn	Date	Purpose
Woolworths Australia's fresh food people	**Cameron Park Village**	H8-16041	E	AG	16.02.18	DA Submission

Title	Drawing No.	Scale	Checked
CONSTRUCTION DETAILS, SPECIFICATION NOTES & MAINTENANCE PROGRAM	L006	AS SHOWN@A1	DV

habit8
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STATEMENT OF HERITAGE IMPACT

TITLE

Cameron Park Woolworths
George Booth Drive Cameron Park

Prepared by EJE Heritage
February 2018
11558-SOHI-Issue D.docx

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TABLE OF CONTENTS

1. INTRODUCTION

EJE Heritage has been requested to provide a Heritage Assessment and subsequent Heritage Impact Statement for the proposed development of a Cameron Park Woolworths, Cameron Park NSW, which involves a Woolworths Supermarket, specialty retail / commercial stores, associated car parking and signage. The development will be known as Cameron Park Village.

The initial section of the report places the site within an historical context, and examines the physical condition and context of the site and surroundings. With the history and physical condition and context of the site and surroundings understood, a heritage assessment of the site can be completed using the NSW Heritage Branch guidelines encompassing the Australia ICOMOS *Burra Charter 2013* heritage values: historical significance; aesthetic significance; scientific significance; and social significance.

The Statement of Heritage Impact that follows examines the proposed works, identifying any impacts which the proposal might have on the significance of the heritage items, and any measures which should be taken to mitigate any negative impacts, if these are in fact identified.

The Historical Context section of this report was prepared by David Campbell and Stephen Batey.
This Statement of Heritage Impact was prepared by EJE Heritage. The project team consisted of:

- Barney Collins – (Director), Conservation Architect.
- David Campbell – Heritage Consultant.
- Stephen Batey - Architect.

Unless otherwise acknowledged, photographic images are by EJE Heritage.

This report has been revised to address the commentary made by Lake Macquarie City Council in its request for information dated 23rd October 2017. The information requested and the location of the response are identified in the below table:

Council Comment	Where addressed by SOHI
4.a. The impact of the proposed pylon signs.	Section 5.3. p22-23 & Section 6.0 p25
4.b. The proposed sign on the corner of George Booth Drive and Portland Drive.	Section 5.3. p22 & Section 6.0 p25
4.c. Details of the proposed link and how it will connect to the cycleway.	Section 5.2. p20-22
4.d. Clarification regarding the construction of the cycleway/shared pathway.	Section 5.1. p19

1.1 METHODOLOGY

This report has been undertaken in accordance with the NSW Heritage Office publications, *Assessing Heritage Significance and Statements of Heritage Impact*, together with the Australia ICOMOS, The *Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 2013*.[1]

[1] Burwood: Australia ICOMOS, 2013.

1.2 CONSTRAINTS AND LIMITATIONS

EJE is not qualified to offer structural opinions. This report is not intended to convey any opinion as to the structural adequacy or integrity of the structure, nor should it in any way be construed as so doing. Similarly, the author's observations are limited to the fabric only: he does not comment on the capacity, adequacy, or statutory compliance of any building services.

1.3 HERITAGE LISTINGS

The site is listed as a Heritage Item of local significance in Lake Macquarie Local Environmental Plan 2014, Schedule 5 Part 1, as hereunder:

Suburb	Item	Address	Description	Significance	Item No.
Edgeworth, Cameron Park, West Wallsend	West Wallsend Steam Tram Line	West Wallsend to Newcastle via Wallsend, Holmesville, Estelville, Edgeworth and Glendale		Local	92

The subject site is not within a Heritage Conservation Area.

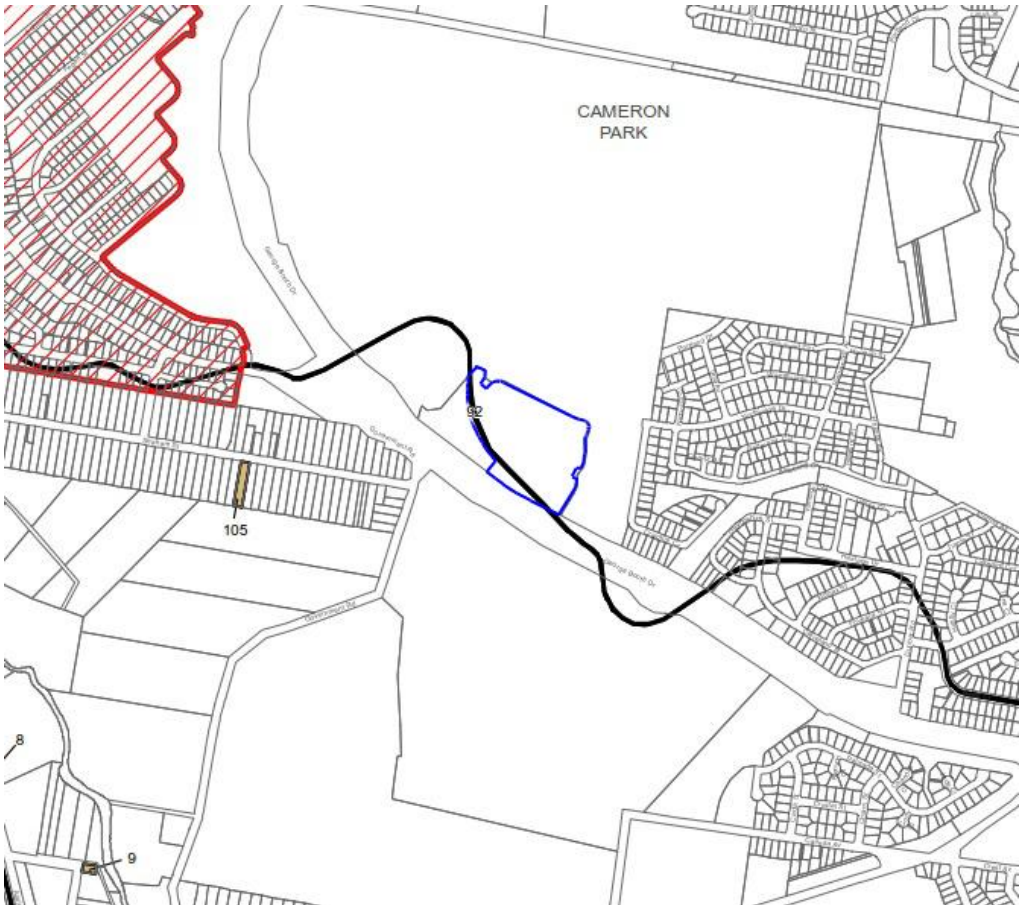

Figure 1: Extract from Lake Macquarie LEP 2014 Heritage Map 4650_COM_HER_008B_020_20160825. Subject site outlined in blue. Heritage Tramline (Item 92) shown heavy through the middle of the diagram. West Wallsend Heritage Conservation Area shown by red hatching to the left of the diagram

The subject site is in proximity to one other Heritage Item of Local significance as detailed hereunder:

Suburb	Item	Address	Description	Significance	Item No.
Holmesville	House	32 Seaham Street	Lot 42, Section B, DP 4479	Local	105

1.4 SITE IDENTIFICATION

The site is identified as 309 George Booth Drive Cameron Park NSW, it is located within the Lake Macquarie Local Government Area. The real property description is: LOT 901 DP 1222132. The site contains a split zone. The majority of the site is zoned B2 'Local Centre' and a narrow strip along the site's eastern boundary is zoned R3 'Medium Density Residential'. A rezoning application is currently being processed by council to rezone the land from R3 to B2 'Local Centre'. All components of the proposed local shopping centre are contained within the B2 'Local Centre' zoning on the site. An extract from the Lake Macquarie LEP 2014 map 4650_COM_LZN_008B_020_20140915 is provided below.

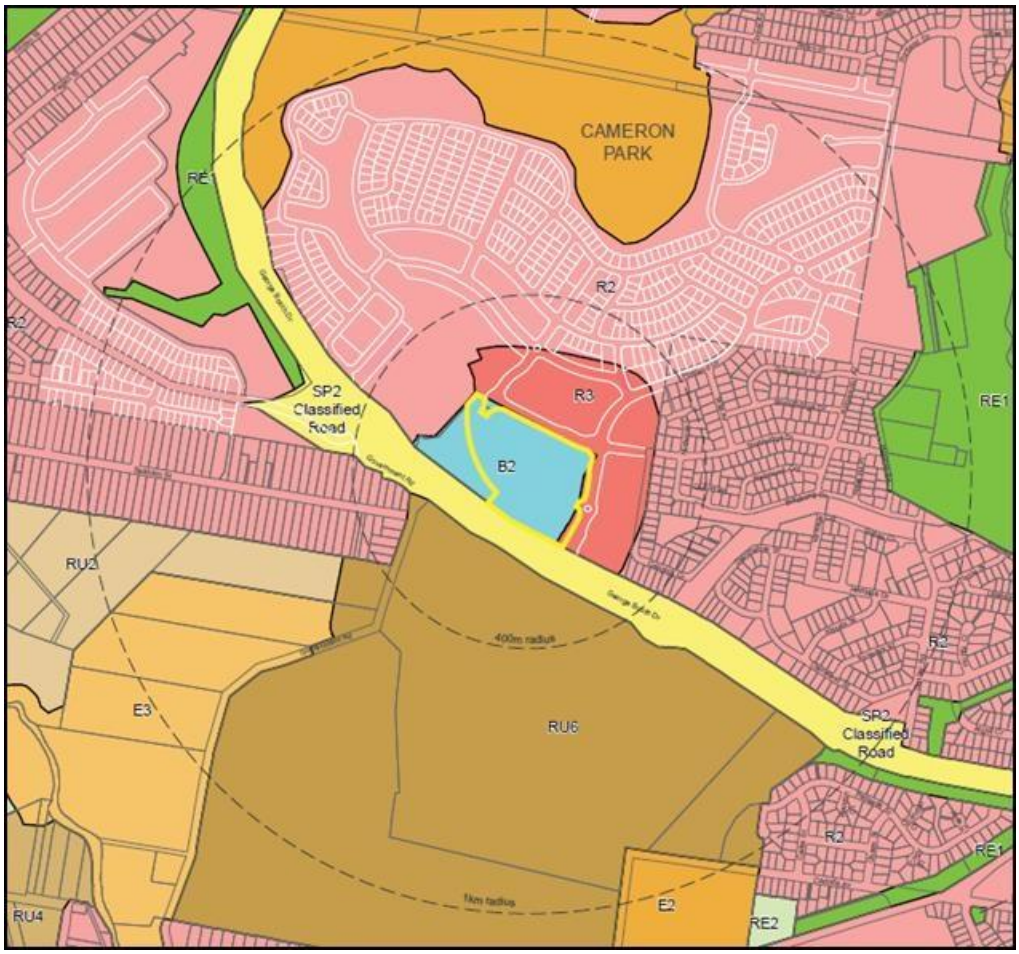

Figure 2: Extract from Lake Macquarie LEP 2014 map 4650_COM_LZN_008B_020_20140915. Subject site is outlined in yellow. Surrounding zones are R3 Medium density residential, R2 Low density Residential and RU6 Transition.

2. HISTORICAL CONTEXT

2.1 Indigenous Heritage and European Incursion

The Awabakal people have lived for at least 23,000 years in and around the Newcastle district. Their country is separated from that of the Worimi by the broad stream of the Hunter River.[2] The Pambulong clan of the Awabakal possessed an area that included what is now known as West Wallsend. Their country was bounded by the Hunter River, the foothills of Mount Sugarloaf, Newcastle West and Lake Macquarie. Although European incursion would eventually lead to the virtual destruction of Indigenous culture, the Awabakal presence remained strong enough for a colonial newspaper to note in 1827 that

> The black population of Newcastle is as great, if not greater, than the white, which cannot be said of any other place in the Colony-they carry wood and water, and in short are the willing servants of the lowest classes, and look for their reward in small pieces of tobacco or a cob of corn. They go perfectly naked, and walk in and out of the houses before the eyes of English females, without creating the slightest notice or concern.[3]

It is fortunate that some details of the culturally and linguistically rich lifestyle of the Pambulong were provided by some of those who remembered it before such information was forever lost.[4] The Pambulong country yielded a rich harvest, including kangaroo, wallaby, goanna, kangaroo rat, emu, koala, bats, lizards, snakes and bandicoot, duck and swan. Shellfish were plentiful along the banks of river and lake, while different species of fish, bogong moths and various kinds of fruit were available in season; fire was used as a hunting, regenerative and signalling tool.[5]

Bora grounds were located between Minmi and Black Hill,[6] while a ceremonial relationship flourished between the Pambulong and the Lake Macquarie, Mount Sugarloaf and Ash Island clans. These would join periodically in coroboree at a ground at what is now Wallsend. There appears, also, to have been an extensive trading and ceremonial relationship with language groups living in far distant areas.[7] The archaeological record suggests that occupation of land for purposes other than hunting was generally restricted to ridge lines and elevated terraces above permanent creek lines. Outcrops of high quality sandstone seem to have been particularly important in the manufacturing and maintenance of tools.[8]

Bowinbah, called Gorman, an Elder of the Pambulong, in October 1842 assisted Biraban in guiding Ludwig Leichhardt from A.W. Scott's Ash Island estate to another of Scott's properties, the Minmi cattle station.[9] Such harmonious relations did not, however, always prevail, and the Pambulong were driven to resistance as Europeans took their land and outraged their womenfolk.[10] Catherine Styles, wife of Henry Styles of 'Styles Grove' near the Big Swamp, on one occasion when her husband was absent feared attack by an Awabakal man she had met while walking near the house. Having invited him inside to obtain provisions, she attacked him

[2] John Turner, *A Pictorial History of Newcastle.* Crows Nest: Kingsclear Books, 1997, pp.2-3.
[3] *Australian*, 31 January 1827.
[4] *Wallsend and Plattsburg Sun*, 10 December 1890. It is upon Dulcie Hartley's discussion of this material that the present analysis is based: see Dulcie Hartley, *Men of their Time: Pioneers of the Hunter River.* Farm Cove: Aquila Agribusiness, 1995, pp87-92.
[5] *Wallsend and Plattsburg Sun*, 17 December 1890.
[6] Ibid, 3 January 1891.
[7] Ibid., 13 December 1890.
[8] Robynne Mills, *An Indigenous and Non-Indigenous Heritage Assessment of the of a Proposed Residential Development at Lot 103 and Lot 105, George Booth Drive at Estelville near Newcastle. Kiama: Mills Archaeological and Heritage Services,* 2007, 4.1-4.6.
[9] M. Aurousseau, *The Letters of F.W. Ludwig Leichhardt*, in Dulcie Hartley, *Men of their Time*, p. 91.
[10] John Maynard, *Callaghan, The University of Newcastle: Whose Traditional Land?*, pp.38-41.

with a sword in an apparent act of self defence.[11] The man, known as Jacky, may merely have been out hunting when met by Mrs Styles; it was his attempt to conceal his spear that aroused the suspicion that he had been lying in wait for her. This incident illustrates the fear and loathing that arrived as good will departed. Elements of the clan may, despite these depredations, have survived as readily identifiable groups until around the time of Federation.[12]

2.2 European Settlement

West Wallsend was one of a series of townships named after the town of Wallsend, itself named for the town of the same name on the River Tyne in Northumberland. The mining and marketing of coal was the common denominator. The Newcastle-Wallsend Coal Company was well known, and other companies sought to take advantage of this not only to raise capital on the London money market but to make favourable qualitative associations. West Wallsend, New Wallsend and Young Wallsend are other examples of this strategy.[13] While a number of settlers had taken up grants in the local area, it was not until 1885, when the West Wallsend Coal Company was formed to explore for coal in the area, that closer settlement began to take place. Lots within the original subdivision were first sold in August 1887; Carrington, Hyndes, Robertson and Brooks streets were mostly named after early settlers together with the Colonial Governor, Lord Carrington. A second subdivision, comprising of Fegan, Edden, Price, South and Watkins streets, occurred in 1901. Fegan, Edden and Watkins streets were named after local politicians. The township grew quickly as mining activity increased.[14]

Several other settlements, such as O'Donneltown, Estelville, Fairlytown and Holmesville were named after the families that founded them. Holmesville was to become the most important of these.[15] Ladysmith and Mafeking were small villages that were begun by veterans of the South African war and grew during the Depression era before being abandoned in the 1950s.

2.3 Mining

Several mining companies joined in exploiting the local coal reserves. The West Wallsend Coal Company's pit commenced production in 1888. A second company, the Monkwearmouth Coal Company, in 1890 opened a colliery of the same name, renaming it 'Seaham' shortly after. West Wallsend Extended (Killingworth) colliery opened in 1892, as did Seaham No. 2 in 1905. There were several smaller pits in the area. The gradual closure of the major collieries as they fell victim to changing markets, and in the case of Killingworth an explosion, gave rise to a very high rate of unemployment in the area from the 1920s until the outbreak of war with Japan. The townships owed their existence to coal mining, and there were few service industries. Many of the families that did not move away, to Lake Macquarie or elsewhere, during this period were affected by poverty.[16]

2.4 Transport and the Steam Trams

Although not geographically far distant from Wallsend and Newcastle, the West Wallsend district was isolated by a lack of transport facilities. Horse omnibuses operated from Wallsend, and the West Wallsend Coal Mining Company operated a very limited passenger service along

[11] *Newcastle Sun*, 23 April 1924, quoted in Dulcie Hartley, *Men of their Time*, p.90.
[12] John Maynard, *Callaghan, The University of Newcastle: Whose Traditional Land?*, pp. 38-41. Awabakal people survived in small family groups in various locations around Newcastle and Lake Macquarie. See John Heath, 'Muloobinbah: The Contribution of Aboriginal People to the Resources of the Hunter Region', in Cynthia Hunter (ed.), *Riverchange: Six New Histories of the Hunter*. Newcastle: Newcastle Region Public Library, 1997, p.57. A local Indigenous family lived near Ladysmith, a settlement outside West Wallsend, in the 1920s and 1930s (reminiscence of the late Les Campbell, formerly resident at Ladysmith).
[13] The appropriation of colliery names had long been common practice on the Newcastle coal field: see John Turner, *Coal Mining in Newcastle, 1801-1900*. Newcastle: Newcastle Region Public Library, p. 64.
[14] *Newcastle Morning Herald*, 4 July 1888.
[15] West Wallsend Public School Centenary Committee, *'Neath Mount Sugarloaf*. West Wallsend: The Committee, 1987, pp.10-17.
[16] For a discussion of these hardships, see West Wallsend Centenary Committee, *Back to Westy.* West Wallsend: The Committee, 1963.

its railway from Cockle Creek. Local pressure for extension of the steam tramway from Wallsend commenced in 1897, and a detailed route plan was prepared.[17] Many public meetings and much Parliamentary lobbying and deliberation occurred over the ensuing years,[18] but it was not until March 1909 that tenders were called for what the railway and tramway commissioners feared would always be a marginal operation. Most of the proposed route, of some seven and a half miles, ran through trackless bushland the inaccessibility of which increased construction costs.[19]

After many difficulties the line opened in September 1910; the total distance from Newcastle was over 15 miles. The opening coincided with the electrification of the Sydney system and the now redundant rolling stock in Sydney were likely used to augment the new line in Newcastle.

The line was unfenced except in residential areas. The line was single track, with twenty three stops, five crossing loops[20] as well as a terminal loop[21] and siding adjacent to West Wallsend railway station. A weekday service frequency of 90 minutes was provided between Newcastle and the terminus, in a journey that took nearly an hour and a half. A reduced timetable was offered on weekends. Mail and newspapers, but not parcels, could be consigned,[22] although the prohibition on parcels seems subsequently to have been relaxed.[23] The tram motors, in effect small 0-4-0 (four-coupled wheeled) locomotives, pulled several wooden-seated trailer cars and were fuelled with coal rather than the less smoky but more expensive coke used on the suburban lines. The tram service was for two decades an integral part of local culture. The success of local football (soccer) teams, returning by tram, would be announced by tram whistle blasts, leaving time enough for well-wishers to come into the streets to congratulate them as they reached town.[24]

Figure 3: A Steam Tram at the West Wallsend Terminus c1914 The Museum Hotel can be seen in the background. *University of Newcastle Cultural Collections*

[17] *Sydney Morning Herald*, 3 December 1906, 4 December 1906; see also David Keenan, Ken McCarthy and Ross Wilson, *Tramways of Newcastle.* Petersham: Transit Press, 1999, p.35.
[18] The New South Wales Parliament's Standing Committee on Public Works held public hearings into the proposal and reported in 1904; see New South Wales Standing Committee on Public Works, *Report together with Minutes of Evidence Relating to the Proposed Tramway from Wallsend to West Wallsend.* Sydney: William Gullick, Government Printer, 1904.
[19] David Keenan, Ken McCarthy and Ross Wilson, *Tramways of Newcastle*, p.35.
[20] Crossing loops were situated at Pitt Town, Summit ,Young Wallsend (now Edgeworth) and Holmesville.
[21] There is no terminal loop shown on the map and no trace can currently be seen.
[22] David Keenan, Ken McCarthy and Ross Wilson, *Tramways of Newcastle*, p.35.
[23] West Wallsend Public School Centenary Committee, *Neath Mount Sugarloaf*, p.62.
[24] The district has traditionally been known for the high quality of these teams; see ibid., p.66.

The tram went from West Wallsend to Wallsend via Holmesville, Estelville, Edgeworth and Glendale. Within West Wallsend the route along Teralba Street is still evident. As can be seen on the map in Figure 4 below, the tram route meandered to either side of Withers Street and George Booth Drive between Holmesville/Estelville and east Edgeworth, almost certainly following the route with the smoothest grade. Within Edgeworth the tram ran alongside Main Road, but there are very few traces of it still in existence there, most having been obliterated in roadworks.

Social life was further improved when another tramway, that ran between Brush Creek Junction and Speer's Point Park, opened in January 1911. This enabled residents of the West Wallsend district to change trams at Brush Creek so as to gain access to this very popular place of resort. The Brush Creek Junction was located just north of the main road from Cardiff adjacent to where the Glendale Technology High School and TAFE campus are now situated. Special trams were rostered to accommodate crowds on special occasions such as the King's Birthday, New Year's Day, Eight Hour Day and Anniversary Day.[25]

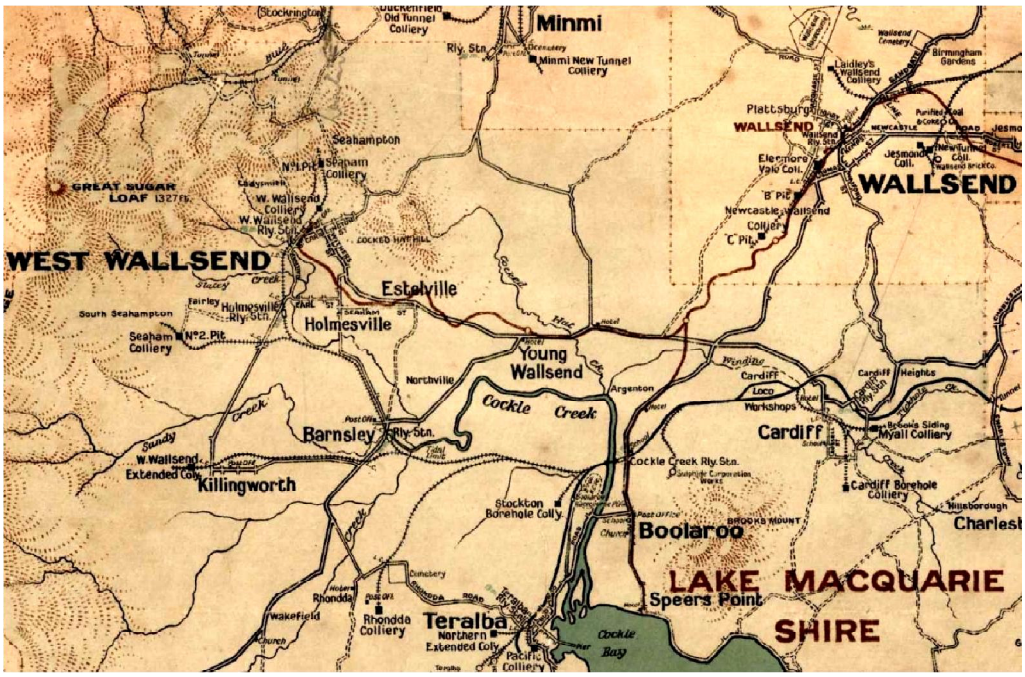

Figure 4: Map showing the routes from Wallsend to Brush Creek Junction and through to West Wallsend and Speers Point. (Red line) From Craigie's General District Map c1920's. *University of Newcastle Cultural Collections*

2.5 Accidents

Some serious accidents occurred on the line between 1913 and 1930, several of them resulting in loss of life. In December 1913 a school boy, Thomas Simpson, was killed in a derailment in which the driver was thrown bodily, together with the entire roof of the tram motor, into the bush. In January 1919 a similar derailment threw a driver, Mordue, fully thirty-five metres from his motor; his conductor was also thrown from one of the trailers. In January 1922, at Jesmond, a West Wallsend tram consisting of a motor and three trailers derailed, the driver being thrown onto an embankment with several passengers injured. A similar accident occurred in June of the same year. Two much more serious incidents took place near Brush Creek Junction. In February 1925 a passenger, Robert Jeffrey, 19, was scalded to death when a motor and single trailer derailed while travelling at speed.[26]

[25] West Wallsend Public School Centenary Committee, *'Neath Mount Sugarloaf*, p.66.
[26] Ibid., pp.48-50.

In January 1928 driver and Salvation Army preacher Alfred (Alfie) McVie, locally famous as 'Hell-Fire Jack' because of his religious enthusiasm, was crushed and scalded to death when his motor and one of two trailers left the rails.[27] While all drivers ran fast down grade to allow their underpowered motors to surmount hilly sections, McVie enjoyed a reputation for courtesy, consideration and safe operation. When an inquest was held, the authorities alluded to his nickname in an attempt to show that the accident had resulted from excessive speed. The coroner thought differently, blaming the poor condition of the track. The responsible ganger, Joseph Hughes of Young Wallsend (now Edgeworth), was demoted although an inadequate maintenance budget seems to have been the real cause.[28] Another derailment, in which there were no casualties, occurred in March 1930, shortly before the suspension of services.[29]

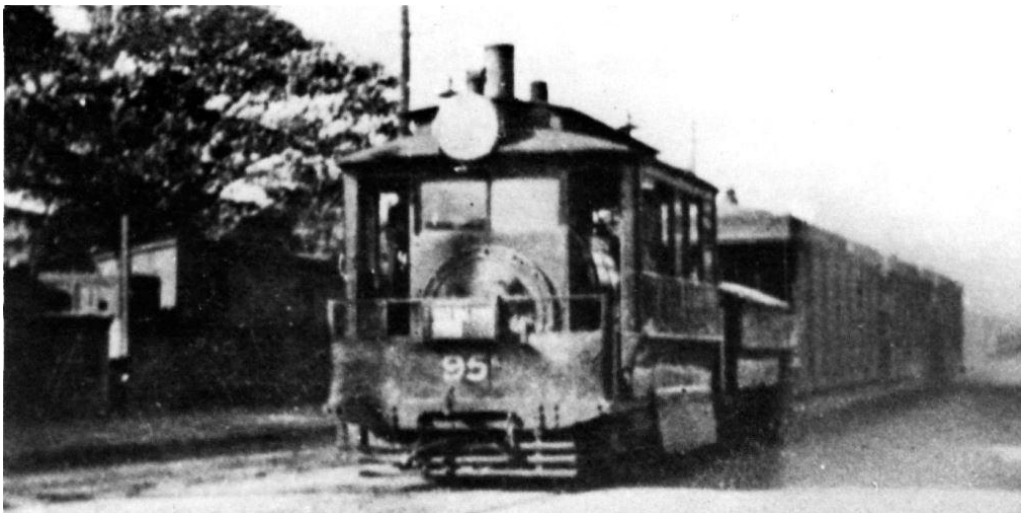

Figure 5: Motor 95 hauling the Hearse car and three passenger tailers on the West Wallsend Extension. Trolley Wire Journal of the Australian Tramway Museums, June 1980.The Hearse Service was an unusual venture commencing in 1896 in Sydney and Newcastle which transported bodies in coffins as well as groups of mourners to Rookwood Cemetery (Sydney) or Sandgate Cemetery (Newcastle) for funeral services. The mourners would be brought home again on a return ticket.

2.6 Obsolescence and Progressive Closure

The electrification of the tramway between Newcastle and Wallsend, completed in January 1926, formed part of a wider scheme that covered most of the system with the ominous exceptions of the lines to West Wallsend and Speer's Point. The maintenance of steam motors and trailers solely to serve these isolated sections had become increasingly expensive; passenger numbers had, in addition, fallen significantly with the increasing popularity of motor cars and the introduction of motor buses and charabancs. In 1928 fare rises ranging between 50% and 80% were imposed on the West Wallsend line; this increased the comparative advantage of private bus operators who were able to charge reduced fares. Even the withdrawal in January 1930 of the railway service from Cockle Creek[30] did not increase passenger numbers.

The formation in October 1930 of the Newcastle and District Transport Trust did not improve the situation. Operating deficits, previously met from consolidated revenue, has now to be borne locally. The Trust was in no position to underwrite such losses, and the suspension of services

[27] *Newcastle Morning Herald* articles reproduced in David Keenan, Ken McCarthy and Ross Wilson, *Tramways of Newcastle*, p.50.
[28] This account of blame and responsibility was orally supplied by a local resident, Mr Ranger, who had been conductor during the ill-fated journey, to researchers for a local public school's centenary publication: see West Wallsend Public School Centenary Committee, *'Neath Mount Sugarloaf*, p. 65.
[29] David Keenan, Ken McCarthy and Ross Wilson, *Tramways of Newcastle*, p.50.
[30] West Wallsend Public School Centenary Committee, *'Neath Mount Sugarloaf, Book 2.* West Wallsend: West Wallsend Public School Centenary Committee, 1988, p.101.

on the West Wallsend line was approved in November 1930. Passengers would, instead, have to change at Wallsend from electric trams to private buses for the remainder of their journey. Public meetings and lobbying by local government authorities met with no result. It was made clear that electrification of the steam lines was not economically feasible, and that termites had infested many sleepers on the West Wallsend section. The Transport Trust was dissolved soon after the dismissal and subsequent electoral defeat of Premier Jack Lang; yet the newly-installed Transport Commissioners were in no mood to compromise, and the line beyond Wallsend was closed to regular traffic on the 2nd of November 1930.

With passenger numbers being the main argument for closure, it is ironic that the buses which replaced the trams struggled to cope with passenger numbers bound for the lake side at Speers Point on public holidays. This was resolved by especially reintroducing the Steam Trams to run between Cockle Creek Railway Station and Speers Point on public holidays. This arrangement lasted until May 1932 when the last of the Speers Point Tram Line closed.

The permanent way itself did not long remain. The track between Brush Creek Junction and West Wallsend was removed by August 1933. The Speer's Point line was lifted by August 1935; the remainder of the permanent way to Wallsend was removed by August 1937. Timber bridges were left to decay. The tramway easement itself, now abandoned, was mostly retained by the government. Some sections, such as that north of George Booth Drive, have since been sold.[31] The remote nature of much of the former line has caused it to fade from public consciousness, but much of it remains, although often overgrown, eroded, or fenced off by residents. In some locations, such as at the intersection of Withers Street and George Booth Drive near West Wallsend, all evidence of the easement has been destroyed by road works.[32]

Figure 6: Remains of a cutting north of George Booth Drive near the subject site. *Wikipedia*

2.7 Heritage Protection and Eventual Reuse.

The City of Lake Macquarie, in 1993, released the results of a commissioned Heritage Study undertaken by Suters Architects Snell. Amongst many other items, the West Wallsend Steam

[31] Andrews.Neil, *Plan of Management: West Wallsend Heritage* Tramway, pp.3-6.
[32] Robynne Mills, *An Indigenous and Non-Indeigenous Heritage Assessment*, 12.2.

Tram Line was identified as having Heritage Significance and was gazetted into the schedule of Heritage Items in Lake Macquarie City. The recommendation of the report for how to treat the defunct Tram Line was as follows:

> *Recommended that the easement be retained where it still exists, & consideration be given to the development of a cycleway along the route to West Wallsend and that some interpretation of the trams and tram route should be undertaken, particularly if a cycleway can be planned.*[33]

The idea of a cycleway was not original to the writers of the report, but had originated at least as early as the late 1970's. Lobbying for a cycleway to join Wallsend to Glendale (the site of the former 'Brush Street Junction') started in earnest in the early 2000's commencing with residents and gaining support of politicians such as the then member for Wallsend, John Mills. A video which was prepared to aid the campaign, showing sections of the track as it was and some footage of the steam trams that used to traverse it can be found at the link below.

https://www.youtube.com/watch?v=wR9FEA5ySoc&feature=player_detailpage

John Mills managed to secure funding of $750,000 in the 2004/2005 state budget for the project and that money was matched in combination between Newcastle and Lake Macquarie Councils to complete the construction of the track. It was opened on the 31st of May 2012 by the Newcastle Lord Mayor John Tate and Lake Macquarie Mayor Greg Piper. Much praise was given to the track which links the west of the two cities and hopes are still held that a track approximating the former tram line to Speers Point will be constructed to link Wallsend with the Lake and the extensive walking/cycling track which traverses all the way from Booragul to Belmont.

There is great potential to extend the cycleway from the Brush Creek Junction through to West Wallsend and future stages of Cameron Park.

[33] West Wallsend Steam Tram Line: Office of Environment and Heritage Datasheet.

3. PHYSICAL CONDITION AND CONTEXT

3.1 THE SITE

The subject site covers an area of 56,520 square metres (5.620ha).

The portion of the site which abuts the West Wallsend Steam Tram Line corridor, is set aside and will be developed in future stages (subject to separate Development Application) by other proprietors for supportive services to the Woolworths facility.

The subject site is located within the Cameron Grove residential estate at Cameron Park, approved under DA 2433 / 2004. The subdivision approval included creation of the subject site to facilitate commercial development. The subdivision approval provided for the management of the West Wallsend Steam Tram Line, which included the preparation of the West Wallsend Heritage Tramway Plan of Management (Andrews Neil 2005).

In accordance with the subdivision approval, substantial works have been undertaken including site vegetation clearing, earthworks, servicing infrastructure and road construction. Construction of the signalised intersection on George Booth Drive is well advanced.

Access to the site is from Portland Drive to the east. Tramway Drive will be extended to provide access from the west, and access will be made available off Northridge Drive to the north for a loading dock and 'Click and Collect' facility. The site is level across the Eastern boundary of the site as well as the Eastern half of the Northern Boundary. The established levels drop down towards Tramway Drive on the West and steep embankments lie between Tramway Drive and the actual Tramway Heritage Item on the extreme Western boundary.

3.2 THE BUILDING

There are no buildings located upon the site.

The corridor for the former West Wallsend Steam Tram Line is located on the southern and western edges of the site. It lies between the cleared area of the site and George Booth Drive. The corridor contains remnants of earthworks and structures including berms, banking and bridges but no complete installations of any kind. There is still a traceable amount of ballast on the site which would have been used beneath the tram rails. There is also a highly eroded portion of tar-sealed pavement within the corridor visible from George Booth Drive. The installation date of the blacktop is unknown at this stage.

The West Wallsend Heritage Tramway Plan of Management records that:

> No removable items associated with the tramway such as sleepers, rails, signals or sleeper pegs remain on site.[34]

3.3 CURRENT USE

On the 3rd of June 2010 Development Consent for a Woolworths retail centre on the subject site was granted comprising of a Woolworths Supermarket, Big W Discount department store, retail shops, associated car parking and landscaping. Since the time of this approval, Woolworths retail strategies have evaluated a changed market. Accordingly Woolworths are seeking to gain approval for a revised design of a smaller scale that is more consistent with a convenience based offer. The proposal has been designed to establish a Local Centre to satisfy the needs of the existing and emerging Cameron Park locality and its surrounds.

[34] Andrews.Neil, *Plan of Management: West Wallsend Heritage* Tramway, p.3

Currently the land is vacant. As noted above, in accordance with the broader Cameron Grove subdivision approval (DA 2433 / 2004), the lot has been graded and shaped with bulk earthworks to create the level parking and development area. Portland Drive and Northridge Drive have been formed, sealed, kerbed and guttered. Installation of traffic signals and street trees is largely complete within the road reserves.

The site is therefore still unused, but ready for development and already has an active development consent for development to occur.

3.4 SURROUNDING CONTEXT

To the North is clear land which is currently having service infrastructure installed for residential subdivision development. Council have recently approved a development application (DA 2215 / 2016) for medium density housing on the land on the northern side of Northridge Drive. Farther north, Council have also approved a Development Application for small lot housing residential development.

To the East is vacant residential land and farther east is the established residential subdivision of Cameron Park. The closest existing houses date from after 2010, those further away are slightly older.

To the South is George Booth Drive which is a main arterial road. Until the opening of the Hunter Expressway on the 22nd of March 2014, it was the main link from Western Newcastle / Lake Macquarie to the Newcastle Freeway, Cessnock and the Hunter Valley Vineyards. Between the site and the shoulder of George Booth Drive is a stand of bushland which largely obscures the site from view while travelling on the road. South of George Booth Drive is native bushland which is the subject of a rezoning proposal to zone the land for residential and environmental conservation purposes.

To the West is the DA approved Harrigan's Hotel (not yet constructed). Farther west is a very large stormwater detention and treatment basin constructed to service part of the broader subdivision.

4. HERITAGE SIGNIFICANCE

The NSW heritage assessment criteria encompass four generic values in the Australian ICOMOS *Burra Charter 2013*: historical significance; aesthetic significance; scientific significance; and social significance.

These criteria will be used in assessing heritage significance of the place.

The basis of assessment used in this report is the methodology and terminology of the *Burra Charter 2013*; James Semple Kerr, *The Conservation Plan: A Guide to the Preparation of Conservation Plans for Places of European Cultural Significance*;[35] and the criteria promulgated by the Heritage Branch of the NSW Office of Environment and Heritage. The *Burra Charter 2013*, Article 26, 26.1, states that:

> *Work on a place should be preceded by studies to understand the place which should include analysis of physical, documentary, oral and other evidence, drawing on appropriate knowledge, skills and disciplines.*

Places and items of significance are those which permit an understanding of the past and enrich the present, allowing heritage values to be interpreted and re-interpreted by current and future generations.

The significance of the place is determined by the analysis and assessment of the documentary, oral and physical evidence presented in the previous sections of this document. An understanding of significance allows decisions to be made about the future management of the place. It is important that such decisions do not endanger its cultural significance.

The *NSW Heritage Manual*, prepared by the former NSW Heritage Branch and Department of Urban Affairs and Planning, outlines the four broad criteria and processes for assessing the nature of heritage significance, along with two added criteria for assessing comparative significance of an item.

Heritage Significance Criteria

The NSW assessment criteria listed below encompass the following four values of significance:

- Historical significance
- Aesthetic significance
- Research/technical significance
- Social significance

[35] (7th ed). Burwood: Australia ICOMOS, 2013.

Listed below are the relevant Heritage Assessment Criteria identified in the Heritage Act:

Criterion (a) An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (b) An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (c) An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).

Criterion (d) An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.

Criterion (e) An item has the potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (f) An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (g) An item is important in demonstrating the principle characteristics of a class of NSW's cultural or natural places; or cultural or natural environments (or a class of the local area's cultural places; or cultural or natural environments).

An Assessment of Significance requires that a level of significance be determined for the place. The detailed analysis uses the levels of significance below:

LOCAL	Of significance to the local government area.
STATE	Of significance to the people of NSW.
NATIONAL	Exhibiting a high degree of significance, interpretability to the people of Australia.

4.1 ANALYSIS OF SIGNIFICANCE

Historical Significance

Criterion (a) *An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).*

The West Wallsend Steam Tram Line was born out of the request from the people to service an area which suffered from poor public transport coverage. It was an extension of an already established Tram Network that linked Newcastle City with its most populous residential suburbs. When constructed, with a length from Newcastle to West Wallsend of 25 km / 15 miles, it was the longest city to suburb Steam Tram Route in Australia. It maintains that record today though recent network extensions in Melbourne approach the same length.

Criterion (b) *An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area).*

While a number of individuals are recognised throughout the history of the operation of the West Wallsend Tram Line, none bear such importance to add to the significance of the item.

Aesthetic And Technical Significance

Criterion (c) *An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).*

While clearly not unique, The West Wallsend Steam Tram Line is able to demonstrate the technical characteristics and achievements of tram line design and construction in NSW during the early 1900's

Social Significance

Criterion (d) *An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons*.

The West Wallsend Steam Tram Line has special association with the communities from Wallsend to West Wallsend in the early 1900's who lobbied for the construction of the line. The line was important to the community's sense of place as the line gave the community physical connection with the rest of Newcastle. It has ongoing association with the current populations of those centres who have and will continue to associate with the line as it is transformed into cycleway.

Research Significance

Criterion (e) *An item has the potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area).*

While clearly not unique, The West Wallsend Steam Tram Line is able to demonstrate the technical characteristics and achievements of tram line design and construction in NSW during the early 1900's. It is able to contribute to an understanding of late 19th to early 20th Century industrial and mining heritage of the region.

Rarity Significance

Criterion (f) *An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).*

When constructed, with a length from Newcastle to West Wallsend of 26 km / 15 miles, the West Wallsend Steam Tram Line was the longest city to suburb Steam Tram Route in Australia. It maintains that record today. Albeit not steam powered, recent tram network expansions in Melbourne only now approach the same length.
It is rare as one of the last operating Steam Tram Lines in NSW and the last to operate outside of Sydney. (Sutherland - Cronulla closed 1931, Kogarah - Sans Souci closed 1937, Parramatta Park - Redbank Wharf (Private Line) closed 1943).
It shows rare evidence of a significant human activity in that there is so little trace of the item left. The tracks and sleepers were all lifted by 1937 and all removable items have all been long removed. What little that does remain comprises merely of earthworks e.g. mounds and or culverts and the remains of bridges.

Representative Significance

Criterion (g) *An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural or natural environments (or a class of the local area's cultural places; or cultural or natural environments).*

The West Wallsend Steam Tram Line is outstanding because of its size, being the largest in Australia, and its setting which includes significant lengths of track through bushland.

4.2 STATEMENT OF SIGNIFICANCE

The following Statement of Significance is that included in the documentation of the Office of Environment and Heritage: Details in *italics* have been added by EJE

From 1910-1930 (when private motor cars were rarities), trams provided residents of West Wallsend, Holmesville & Edgeworth with their main means of daily passenger transport to Newcastle.

The service made a great impact on the life of residents of the district, by bringing the goods & services of Newcastle within easy reach, & helping overcome the physical isolation of the mining villages.

The service helped make West Wallsend the hub of its district.

The West Wallsend to Newcastle route (*26 km*) was reputedly the longest tram route in the state.

This was the last Newcastle steam tram route to run, & one of the last steam tram services to operate in NSW (Sutherland - Cronulla closed 1931, Kogarah - Sans Souci closed 1937, *Parramatta Park - Redbank Wharf (Private Line) closed 1943*).

The steam trams have a strong nostalgic value, & are still fondly remembered in the district.

Level of significance *(as recorded in 1993)*
State Significance - moderate
Regional Significance - high

Local Significance - very high
Group Significance - very high

(Date significance updated by Office of Environment and Heritage: 16 Jun 2008)

5. PROPOSED WORKS

The proposed works address the newly established road of Portland Drive and Northridge Drive and by association also address the Residential subdivision therefore engaging with the community.

5.1 The Plan of Management

The West Wallsend Tram Line Heritage Item is not forgotten by the proposal but is recognised and respected by the proposed works. The proposal follows the recommendations of the West Wallsend Heritage Tramway Plan of Management's recommendations by allowing the alignment of the tramway to be utilised as a cycleway. Actual construction of the cycleway does not form part of the proposed works as this was provided for in the original subdivision approval for Cameron Grove Estate (DA 2433 / 2004) and subsequent Plan of Management. Notwithstanding, if considered necessary by Council, the applicant has indicated that it would be willing to accept a Condition of Consent requiring the construction of the cycleway on the subject site (Lot 901, DP1222132) in association with the proposed works. Construction would be in accordance with the West Wallsend Heritage Tramway Plan of Management and it is considered that any further detail required can be confirmed with council prior to the release of a Construction Certificate.

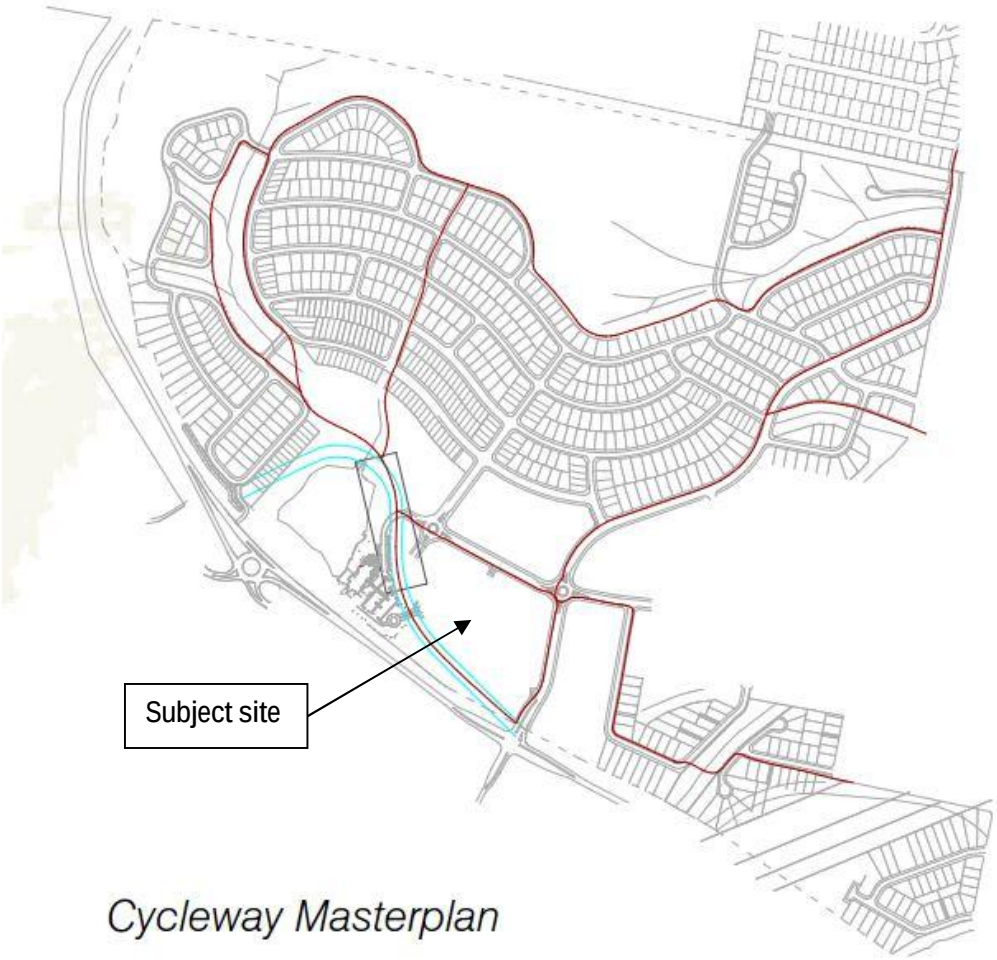

Figure 7: Cycleway Masterplan from the West Wallsend Heritage Tramway Plan of Management page 3. The subject site of this application is bottom centre of the image.

5.2 Links to the Cycleway

The proposed scheme for landscaping includes links from the Woolworths Development site across to the Cycleway which occur at the Southeast corner, central on the southern edge and at the road crossing which will link from Tramway Drive to a future tavern development by others. These links to the tramway will become through site links which will facilitate access to all the facilities on the site. Bicycle Parking is also included within the landscaping proposal which will enable and encourage people to ride to the development.

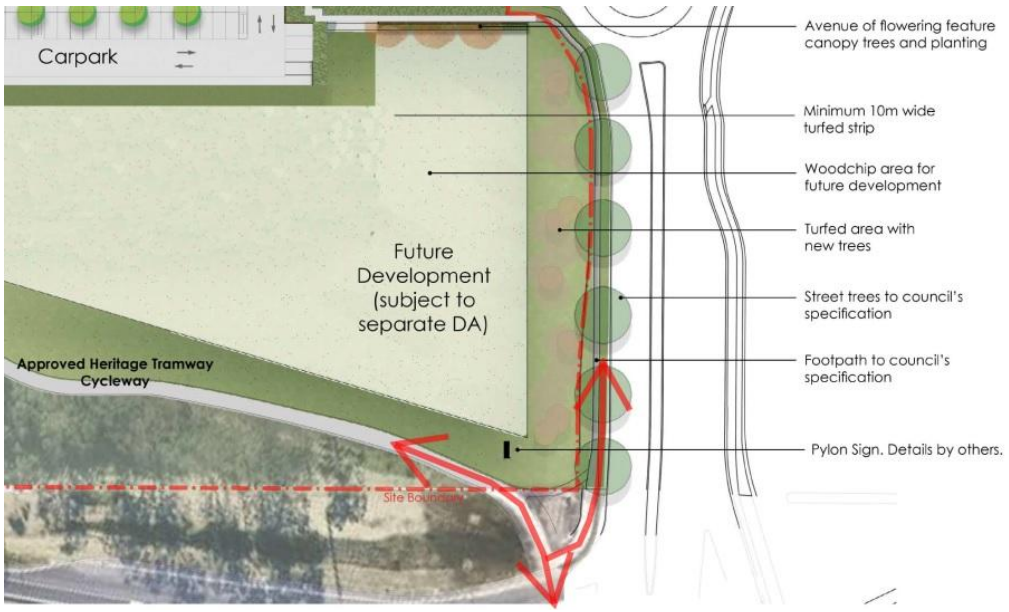

Figure 8: Southeast corner of site. Allowance as been made for the cycleway to extend west from the intersection of George Booth Drive and Portland Drive through bushland and landscaping past an existing embankment created originally for the Tramline. At the intersection, cyclists can travel north along Portland Drive to reach the site or can cross George Booth Drive to access the proposed Cycleway to West Wallsend on the south side of the road.

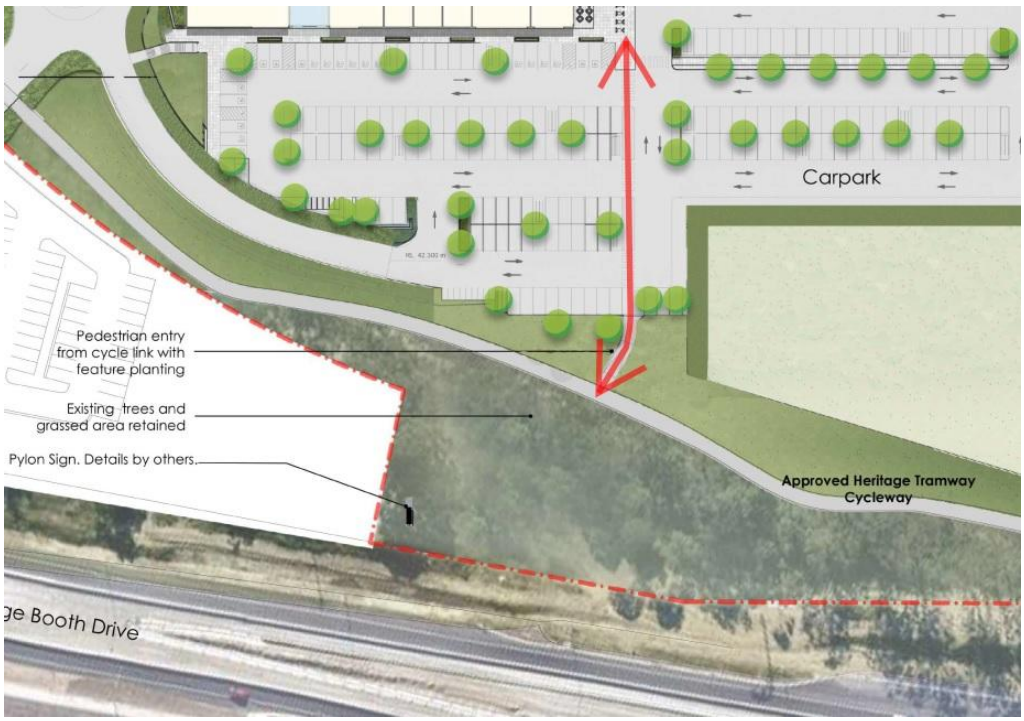

Figure 9: Central to the site is the main proposed link to the Cycleway which provides access through the car park directly into the heart of the development for community engagement.

Figure 10: Western side of site. Allowance has been made for the cycleway to cross the access road to the adjoining Harrigan's Hotel site, and also links to the site of the proposed development.

The West Wallsend Heritage Tramway Plan of Management (Andrews Neil 2005) includes concept details of the finishes for the cycleway as shown in figure 11 below.

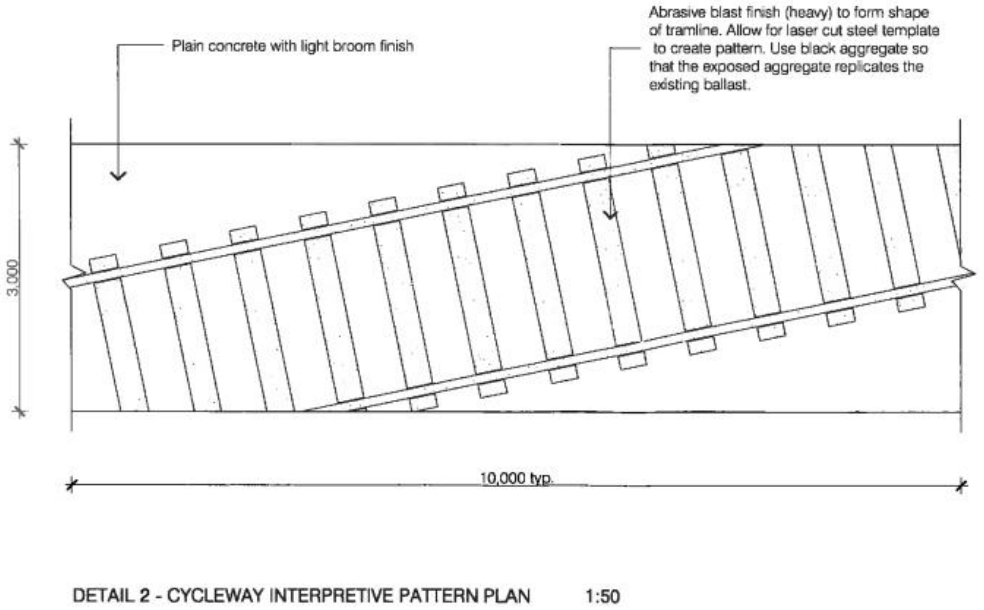

Figure 11: Concept detail from the West Wallsend Heritage Tramway Plan of Management. Showing 3 metre width and broom finished concrete. Stencilled train-track images are conceptually shown in random locations within the plan of management and do not follow the entire course of the former Tram Line.

The proposed detail and finishes for the connections between the cycleway and the proposed development are shown to match the recommendations in width and finish so as to fully integrate the cycleway with the proposed development and ensure that it becomes a natural destination along the route of the cycleway.

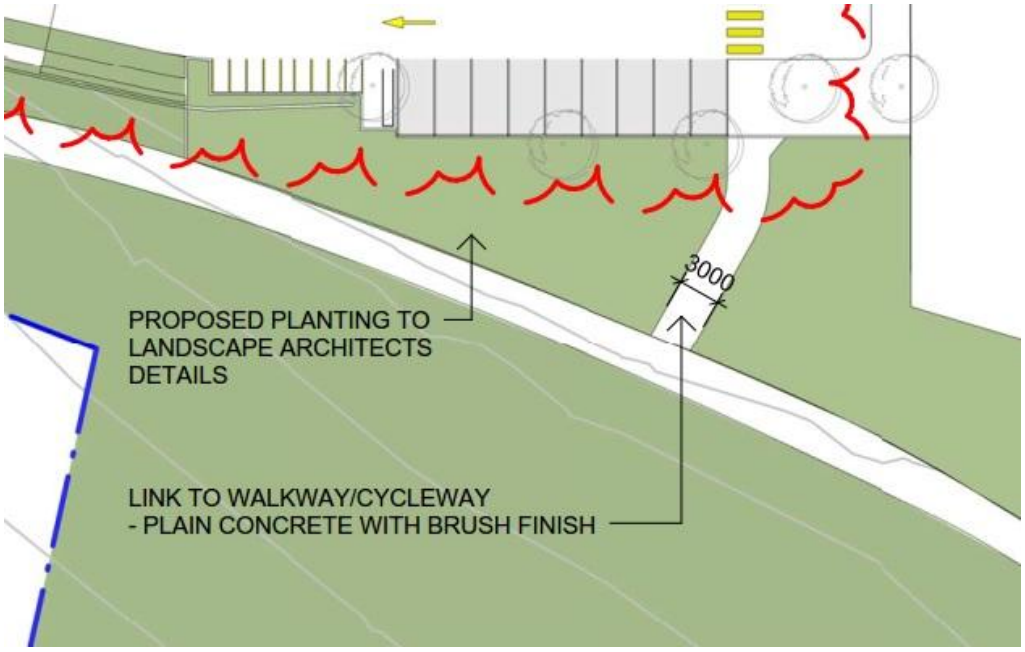

Figure 12: extract from the proposed development site plan. *BN Group Architects*

5.3 Site Identification

Two Pylon signs are proposed along the boundary with George Booth Drive. The first is at the intersection of George Booth Drive and Portland Drive in an area which is already cleared to provide views enabling the safe navigation of the intersection and also views to the subject site reinforcing its function as the commercial centre of the community as intended within the Lake Macquarie LEP 2014. The Cycleway (following the former Steam Tram Line alignment) runs adjacent to this Pylon Sign and is required to be at this location to follow the route of the Tram Line but also to 'connect to the new signalised intersection' as conditioned in the previously approved DA/2433/2004 for the site. The Pylon sign at this location does not encroach into the curtilage of the item and does not affect any of the remnant banks or infrastructure associated with the item. The Pylon sign becomes only a marker point for the location of the proposal, not an intrusive object that might block views for those traversing the route of the tram line. It is considered that it will have negligible impact upon the aesthetic significance of the item, no impact upon the remnant fabric of the item and will enhance the historic and social significance of the item by marking a commercial destination and local centre along the route of the cycleway / former tram line.

The second Pylon sign is proposed for the Southwest corner of the site adjacent to George Booth Drive and the lot for the approved tavern (DA/1612/2008). The sign will not encroach on the curtilage of the heritage item and will not affect any banks or other remnant infrastructure from the item. The sign will be separated from the item by a distance containing established trees and will hardly be visible. It will have no appreciable impact on the item.

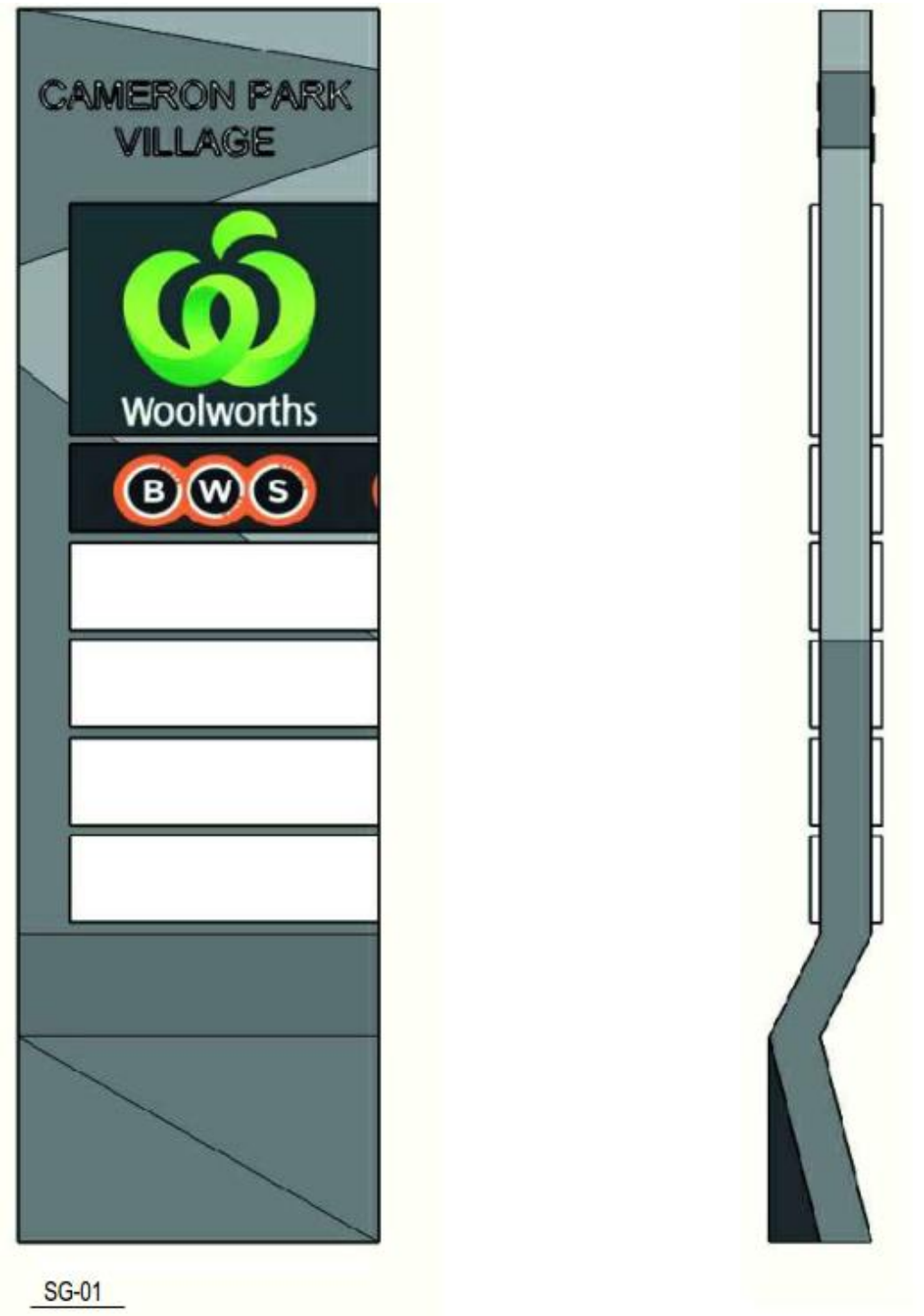

Figure 13: Elevations of proposed Pylon Signs to be 10 metres tall. *BN Group Architects*

The Pylon signs themselves are proposed to be 10 metres tall and have been reduced in height from the 12 metres which was initially proposed. The purpose of the signs is to mark the position of the proposal and signify its function as the commercial centre of the Cameron Park community. They need to be able to perform that function while being visible and legible to motorists travelling along George Booth Drive. These factors are what govern the size and position of the signs. The Pylon Signs will display information not just for the Woolworths and BWS tenancies but include the other tenancies within the development again reinforcing the commercial function of the development and contributing toward the social significance of the former Tram Line by marking a commercial destination and local centre along the course of its route.

6. STATEMENT OF HERITAGE IMPACT

This is the Statement of Heritage Impact for:	Cameron Park Woolworths
Date:	This statement was completed in June 2017 amended in February 2018
Address and Property Description:	309 George Booth Drive, Cameron Park NSW. Lot 901, DP 1222132
Prepared by:	EJE Group
Prepared for:	Fabcot Pty Ltd

The following aspects of the proposal respect or enhance the heritage significance of the item or area for the following reasons:

The proposal has been designed to complement the conversion of the West Wallsend Steam Tram Line into a cycleway, which is by far the optimum use for the Heritage Tram line. The Tram line is significant because of its length which is best experienced by travelling along the route. The Tram line is also significant for connecting the communities of Wallsend with West Wallsend along with the others in between. This is also best understood by actually travelling along the route and experiencing those communities which the Tram line served.

The Statement of Significance for the West Wallsend Steam Tram Line states the following:

> *The service made a great impact on the life of residents of the district, by bringing the goods & services of Newcastle within easy reach, & helping overcome the physical isolation of the mining villages.*

The proposed development enhances the significance of the West Wallsend Steam Tram Line by providing goods and services within easy reach of the community, providing a local centre for the community, and associating it with the former Steam Tram Line.

The layout of the buildings, internal roads and car parking respects the significance of the West Wallsend Steam Tram Line as the Car Park and other open spaces are adjacent to the Tram Line and provide opportunity to view the line and observe cyclists using the Cycleway for a good distance. Conversely, when travelling on the Tram Line by bicycle, the view from the Tram line will be of open landscaped spaces into the site. There are no blank walls presented to the Tram Line which might have the effect of shutting it off from the community engagement.

The links from the development to the West Wallsend Steam Tram Line also enhance the significance of the Item. Communities along the Steam Tram Line grew up around the stops and stations along the line and the same is to occur with this proposal. The links act like stops along the line which will enable cyclists using the Tram Line to enter, experience and utilise the recreational and community facilities which have grown adjacent to the stops.

The following aspects of the proposal could detrimentally impact on the heritage significance of the item or area for the following reasons:

A small portion of the circulation roadway in the car park is located in relatively close proximity to the Steam Tram Line. The road does not encroach on the alignment of the Steam Tram Line which the future cycleway is shown to follow. The impact of the internal car park circulation road is therefore negligible.

The bulk earthworks undertaken on the site have resulted in a large and high embankment beside the Tram Line on the Western side of the site which impacts the original topography of the site. In a workshop session on the 13th of March 2017, the council has expressed their belief that:

> 'The location of the tramline at north-western end of the site has been obscured and not well considered'[36]

What might be detrimental is actually turned into an opportunity as the landscaping proposed on the embankment will appropriately define the Tramway corridor and restore some of the bushland character which existed upon the site and enable cyclists travelling along the path to experience the sensation of travelling through the bushland areas similar to when the Tram Line was operating.

The proposed Pylon signs at the intersection of George Booth Drive and Portland Drive and part-way along the George Booth Drive boundary have the potential to impact upon the aesthetic significance of the West Wallsend Steam Tram Line. Concession has been made in regards to the visual impact of these signs by reducing their size from 12 metres tall to 10 metres. The purpose of these signs is of course to mark the location of the shopping centre and other facilities associated with it that will ultimately become the 'local centre' of Cameron Park as intended in the zoning of the Local Environmental Plan 2014.

The signs which are located at points in the development will only be perceived as a marker by those travelling along the former Steam Tram Line. The experience for the travellers of the presence of the signs will be fleeting, only noticeable for a brief moment, as they make the journey along the path. Pedestrians and cyclists using the path will either take heed of the signs because they want to stop at that location, or they will ignore them and carry on their journey along the former tram line. The cycleway is of course an item which traverses a great distance and the proposed signs will be visible for a very short length of the overall cycleway. Ultimately the pylon signs, because they are localised at a point on an otherwise extensive length, are viewed very briefly, and serve a purpose as a marker will have only negligible impact upon the West Wallsend Steam Tram Line Item.

The following sympathetic design solutions were considered and discounted for the following reasons:

There are no known sympathetic design solutions which have been discounted.

[36] Draft Urban Design Workshop Minutes – issued by Council on 3rd April 2017

The following actions are recommended to minimise disturbance and/or enhance the interpretation of the heritage significance of the item or area:

Future development plans for the vacant future development site (subject to separate Development Application) at the south eastern corner of the site should continue the currently established methodology of planning open and active spaces along the edge of the site adjacent to the West Wallsend Steam Tram Line and avoid blank walls along this edge.

Depending upon the proposed use of the future development site at the south eastern corner of the site, another link to the Tram Line could be considered along with Bicycle parking to enable cyclists travelling along the line to utilise the facility adjacent.

The extension of Tramway Drive into the western side of the site is considered acceptable, in particular noting that a hotel is approved to be constructed to the south west of the subject site that relies on an extension of Tramway Drive to provide access to it.

7. CONCLUSION

The proposal has been designed to complement the adaptive reuse of the West Wallsend Steam Tram Line Heritage Item into a Cycleway which was approved under DA 2433 / 2004 and which created the Cameron Grove Estate. This adaptive reuse is by far the best and most appropriate reuse of the item. Accordingly, the proposal is considered to be consistent with the West Wallsend Heritage Tramway Plan of Management.

The West Wallsend Steam Tram Line has already been converted into cycleway from Wallsend to Glendale TAFE at the site of the former Brush Street Junction. The proposal allows for the continuation of this already successful venture.

The proposed development is undertaken sensitively and with care to respect and enhance the significance of the item. The proposal encourages those viewing the item to understand and interpret its significance and provides excellent linkages from the development to the cycleway. Careful consideration has been given in the design of the development in regards to not just the major spatial arrangement of functions within the proposal but down to the detail of how it interacts with the broader surrounding residential area, adjacent tavern approval and of course the West Wallsend Steam Tram Line heritage item. The consideration of the design has been extended to the detail level in which the locations of signage and landscaping have been positioned to protect and enhance the significance and the remnants of the former tram line.

What little detrimental impact the development might have upon the significance of the item is either ameliorated or converted into opportunity by the careful design of the proposal. There is consequently negligible impact upon the item and that is far outweighed by the positive effects created by a development that will complement the conversion of the item to a cycleway and establish links from the cycleway to the site, and revive the former purpose of the Tram Line in linking settlements along its route and bringing goods and services within easy reach of those communities.

EJE Heritage recommend the proposal for approval for the positive effect it will have to enhance the significance and facilitate the interpretation of the West Wallsend Steam Tram Line Heritage Item.

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Newspapers

Newcastle Morning Herald.

Newcastle Sun.

Sydney Morning Herald.

Wallsend and Plattsburg Sun.

Journals

Trolley Wire – Journal of the Australian Transport Museums.

Online Resources

Google Maps: https://www.google.com.au/maps

Nearmap (by license) - http://au.nearmap.com/

Sydney Tramway Museum: http://www.sydneytramwaymuseum.com.au

University of Newcastle: *Cultural Collections* - https://www.flickr.com/photos/uon/

NSW Land & Property Information: *Historical Lands Records Viewer* - http://images.maps.nsw.gov.au/

NSW LPI: *NSW Globe* - http://globe.six.nsw.gov.au/

NSW LPI: *Spatial Information Exchange* - http://maps.six.nsw.gov.au/

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21 February 2018

FABCOT PTY LIMITED
C/- ADW Johnson Pty
Ltd 7/335 Hillsborough
Rd WARNERS BAY
NSW 2282

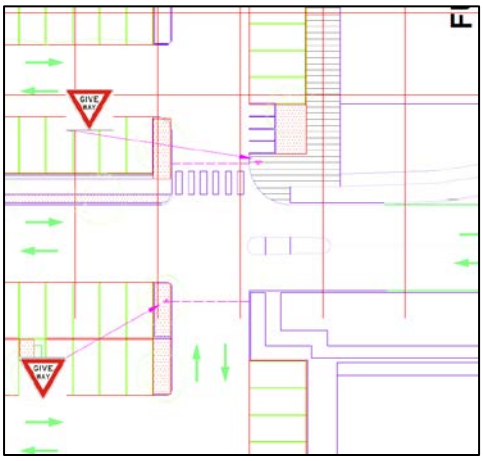
Attention: Thomas Rethati

Re: Lot 901 DP 1222132 309 George Booth Drive, CAMERON PARK NSW 2285
DRAFT Response to Council/RMS

Dear Thomas,

The following table provides our response/commentary to the request for additional information from Lake Macquarie City Council (LMCC) made via letter of 23 October 2017.

Council		
Item:	**Comment:**	**Ason Group Response:**
1.	Design of Parking and Service Areas: In regard to Section 5.2 (Design of Parking and Service Areas) of DCP 2014, concern is raised regarding the amount of at grade car parking dominating the development. As discussed under issue 10, the proposed tree planting within the carpark is problematic as inadequate root volumes have been provided and there is a lack of tree planting.	1. Car parking provision is addressed in the ADW Johnson Submission. 2. Tree planting in the car park has increased and root volumes have increased. This is addressed in the revised architectural and landscaping plans.
2.	Major concern is also raised regarding the proposed location of the service area on Northridge Drive, which is located directly opposite R3 Medium Density Residential zoned land at 255 George Booth Drive, Cameron Park, with a recent development approval (DA/2216/2016) for multi dwelling housing. Control 8 clearly states that "servicing facilities for non-residential uses must be located and designed to protect the amenity of residents". In this regard, Council's Environmental Officers have raised major acoustic amenity concerns (Refer to issue 13 below). Option D.10.3 for servicing the loading dock appears to have the least impact on the Northridge Drive streetscape with truck access through the site and exiting onto Tramway Drive possible. Being the northern orientation there is opportunity to sleeve buildings along Northbridge Drive frontage that activates the streetscape and reduces the dominance of vehicle movements that currently exists along this street. Concern is also raised regarding pedestrian amenity and amenity within the car park. The car park lacks pedestrian permeability and paths.	Loading dock location has been addressed within the ADW Johnson submission and the Urban Design submission (Studio GL). Regarding the Pedestrian Permeability comment: This proposal provides a clear pedestrian connection from north to south and through the retail plaza. In terms of pedestrian access from the east – access is provided in and around T22 as the preferred desire line/route. This is adjacent to the existing bus stop on Portland Drive. Promoting pedestrian movements through the car park (apart from vehicle users) is not best practice and is discouraged. **NB: The alternative loading dock configuration (Option 10.3) is a poor pedestrian amenity outcome.**
3.	Car parking: In regard to Section 5.5 (Car Parking Rates) of DCP 2014 and the proposed over supply of car parking, control 2 requires that where the proposed number of car parking spaces is more than that specified in Table 7, detailed justification must be provided to support a variation including:	The updated architectural plans are provided in Attachment 1. The revised development yield has been addressed against Council parking controls. At a rate of 1 per 40m^2 with a retail area of 7,528m^2 gives a requirement of 188 parking spaces.

	Demonstration that exceeding the designated car parking rates does not detract from the urban design outcomes (streetscape and built form) of the proposal; and A detailed cost benefit analysis demonstrating the benefits to the community is superior than adherence to the rates including consideration of the environmental and economic benefits of using the land for a higher order use; and Parking survey data from existing operations where expansion is proposed. The submitted application has failed to justify the proposed over supply. Furthermore, having regard to the objectives of the control, concern is raised that the oversupply results in substandard urban outcomes, discourages the use of public transport and does not support the efficient use of land.	The development provides 387 spaces in response to the detailed town planning and economic reports. The car parking surplus is addressed in the ADW Johnson submission and a Cost Benefit Analysis has been produced by Location IQ (Economic consultant). These reports are attached separately alongside this submission.
4.	Traffic: Council's Traffic Engineer, Kane Hitchcock, has reviewed the proposed development and raised the following concerns: Pedestrians and Cyclists: If pedestrian crossings are to be used within the car park it should be noted that: "A driver must not stop on a pedestrian crossing that is not at an intersection, or on the road within 20 metres before the crossing and 10 metres after the crossing, unless the driver stops at a place on a length of road, or in an area, to which a parking control sign applies, and the driver is permitted to stop at that place under these Rules". This includes any shoulder of the road as defined in Rule 12 (Car parking bays). As this would result in the removal of a number of car parks and the car park is a low speed area a pavement treatment to define walking paths is acceptable. The crossings indicated opposite Shop T11 appear to have no purpose and are not required. The crossing at the eastern entrance to the centre could result in queuing of traffic into the roundabout on Portland Drive. Consideration of a pedestrian refuge should be given in place of the pedestrian crossing at this location. Accessible (Disabled) Car Parking areas are to comply with AS2890.6. Kerb ramps appear to be obstructed by planter boxes in some instances. Bollards are to be provided in the shared area (AS2890.6, Clause 2.2.1(e)) at a height of 1300mm high (AS2890.1:2004, Clause 2.4.5.3(b) Car Parking Areas and Structures: Priority signage at the eastern entrance to the centre is adequate however, other four-way intersections have not been addressed. Additionally, the geometry of the southern entrance could be ambiguous and priority restrictions are recommended. On-Site Bicycle Facilities: Bicycle parking rates are stated at 32 however, locations on plan appear unable to achieve the stated number.	• All comments can be addressed at design certification for construction certificate in response to suitable Conditions of Consent. • Noted regarding pedestrian crossing to be defined as "walking paths". • Acceptable to provide pedestrian refuge at eastern entrance, which is shown on the amended plans. • Regarding AS2890.6 compliance, refer to access consultant. All spaces comply however any minor variations can be dealt with at the Construction Certificate stage. • Car Parking Areas and Structures: "*Priority signage at the eastern entrance to the centre is adequate however, other four-way intersections have not been addressed*" • Give way priority through signage and line-marking will be implemented at all four-way internal locations in accordance with **Figure 1**. Council are invited to impose a Condition of Consent as such.  Figure 1: Give-way Signage and Line-marking • 32 bicycle racks are provided on the revised plans.

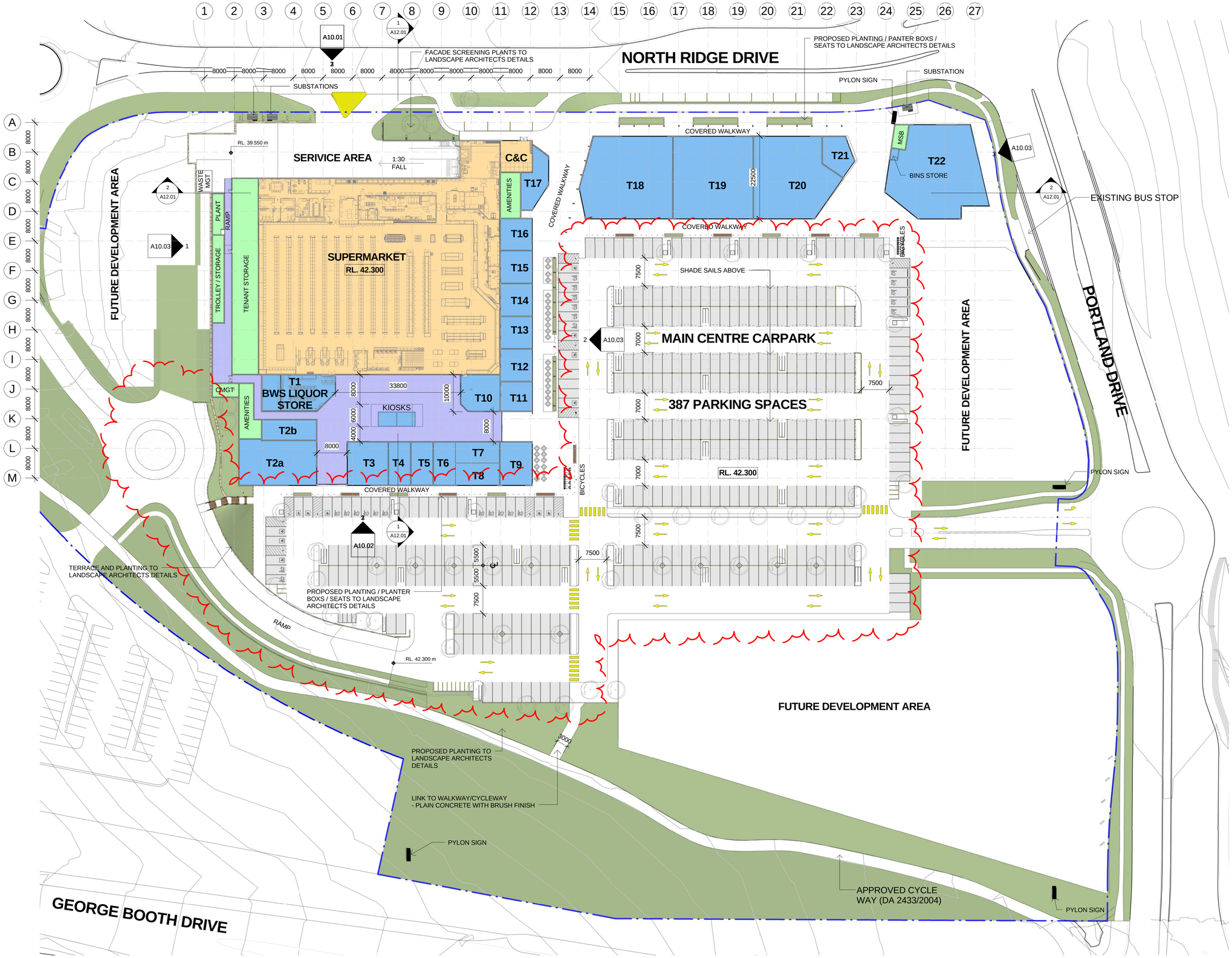
RMS		
5.	Roads and Maritime has reviewed the information provided and requests further information to complete our assessment. It is recommended that an updated Traffic Impact Statement be provided with modelling updated based on 2017 data with a projection to 2027 figures, and submission of the electronic Sidra files. Further information on the proposed future use of Lot 902 DP 1222132 as shown in Drawing A02.01 Rev D.	It is our view that this is an unreasonable request. As discussed in Section 3 of the traffic report, the Site was approved to develop a shopping centre of 18,472m^2 GLFA. The approved development generated 1,090vph during the Thursday afternoon peak hour (4pm – 5pm). It is estimated the proposed development generates reduced traffic volumes when compared to the approved development On this basis, the proposed development, based on the revised yield of 7,528m^2 GFA (or 5,646 GLFA) generates ~ 571vph. As such, the approved and constructed intersection of George Booth Drive and Portland Drive has been designed to accommodate the estimated traffic generation for Cameron Park Village, for the approved development is upheld. If the Proposal resulted in increased traffic volumes, then this would be considered a reasonable request however the additional analysis is not proposed or required from a traffic planning perspective. The intersection has been designed to accommodate an additional 351vph for the remaining development of the Site. If as part of future applications this threshold is exceeded, traffic modelling analysis would be undertaken to assess any net increase. In summary, the Proposal is well within the approved traffic generation limit for this Site.

I trust the above satisfies your current requirements. Should you have any queries, please contact the undersigned.

Yours sincerely,

John Mulhaire
Principal Traffic Engineer – Ason Group
Email: john.mulhaire@asongroup.com.au

Attachment 1



1 PROPOSED - GROUND FLOOR
1 : 500

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

NORTH
1 : 500 0 10 20 30

LEGEND

- = SUPERMARKET
- = RETAIL
- = MISCELLANEOUS
- = MALL
- = FUTURE DEVELOPMENT AREA
- = SITE BOUNDARY

NOTE:

- REFER TO LANDSCAPE ARCHITECTS DRAWINGS FOR DETAILS ON LANDSCAPED AREAS
- REFER TO CIVIL ENGINEERS DRAWINGS FOR DETAILS ON LANDSCAPED AREAS

ISSUE	DATE	DESCRIPTION
DA-K	14/02/2018	FOR DA APPROVAL
DA-J	06/02/2018	FOR DA APPROVAL
DA-H	12/01/2018	FOR DA APPROVAL
DA-G	11/01/2018	FOR DA APPROVAL
DA-F	11/01/2018	FOR DA APPROVAL
DA-E	12/10/2017	FOR DA APPROVAL
DA-D	19/06/2017	FOR DA APPROVAL
DA-C	09/06/2017	FOR DA APPROVAL
DA-B	08/06/2017	FOR DA APPROVAL
DA-A	02/06/2017	FOR REVIEW

Coordinated Reference Drawings

Discipline	Company
SURVEY	
STRUCTURE	
CIVIL	
MECHANICAL	
HYDRAULIC	
ELECTRICAL	
LANDSCAPE	
FIRE	

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Project

CAMERON PARK VILLAGE

No 901, LOT 1222132 NORTHRIDGE DRIVE & PORTLAND DRIVE, CAMERON PARK NSW 2285

Sheet name

PROPOSED FLOOR PLAN - GL

Scale @ A1: As indicated
Project No.: S1641
Drawn By: CF Checked By: MF

A06 SERIES - SETOUT PLANS

Drawing No. A06.01
Stage - Rev DA-K

PRINTED: 19/02/2018 2:59:51 PM

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LOCATIQN

Cameron Park, Lake Macquarie

Economic Impact Assessment

Prepared for Woolworths Limited

February 2018

TABLE OF CONTENTS

INTRODUCTION

This report presents an independent assessment of the demand and market scope for a new supermarket based shopping centre at Cameron Park in the northern part of the Lake Macquarie Local Government Area (LGA), west of Newcastle. The shopping centre is to be known as Cameron Park Village.

A sub-regional shopping centre anchored by a Big W discount department store and a Woolworths supermarket has already been approved at the subject site (DA2207/2007 – but not built). This assessment reflects a smaller development scheme to be anchored by a Woolworths supermarket and shops.

This report has been prepared in accordance with instructions received from Woolworths Limited and is structured and presented in four sections as follows:

- **Section 1** reviews the regional and local context of the proposed Cameron Park Village. An overview of the latest development scheme is also provided.
- **Section 2** details the trade area likely to be served by retail facilities at the proposed Cameron Park Village site. Current and projected population and retail spending levels over the period to 2031 are presented.
- **Section 3** summarises the competitive environment within which the shopping centre would operate.
- **Section 4** outlines an assessment of the sales potential for the proposed development and then presents an economic impact assessment. Likely trading impacts on other retailers throughout the surrounding region are considered, as are the employment and other economic impacts, both positive and negative, of the proposal.
- **Section 5** outlines the key findings of the analysis.

EXECUTIVE SUMMARY

The key findings of this report, regarding the demand and market scope for a supermarket based shopping centre at Cameron Park, include:

i. The proposed Cameron Park Village will be located on the corner of George Booth Drive and Portland Drive in Cameron Park.

ii. The suburb of Cameron Park is situated in the northern portion of the Lake Macquarie Local Government Area, on the western edge of the Newcastle urban area, approximately 19 km west of the Newcastle Central Business District (CBD).

iii. The proposed development will comprise 7,528 sq.m of floorspace, including a Woolworths supermarket (3,800 sq.m), mini-majors (2,036 sq.m) and specialty shops (1,692 sq.m).

iv. The proposed shopping centre will serve a main trade area population of 31,275, including 18,090 persons within the primary west sector. Significant residential development has been occurring within the region since the year 2000. Taking this into account, by 2031 the population within the Cameron Park main trade area is projected to increase by over 11,125 persons to 42,400 persons. This represents an average annual growth rate of around 795 persons, or 2.2%.

v. The socio-economic profile of the main trade area population is typical of a recently developed suburban location, including a young, traditional family based population who are more likely to own their own homes. This trend is expected to continue as new residential development in the area attracts a younger, more affluent, family based population.

vi. It is important that young family based populations are provided with conveniently located food and non-food retail facilities, particularly major full-line supermarket facilities which allow families to complete their weekly supermarket shop in a single location.

vii. The key existing competitive facilities include the four supermarkets currently provided within and immediately beyond the Cameron Park main trade area, namely the Coles anchored Edgeworth Town Square, Aldi at Edgeworth, a free-standing IGA supermarket in the Northlakes estate, as well as Stockland Glendale, which is located 5.3 km to the south-east of the site and includes a range of major tenants (Target and Kmart discount department stores and Coles, Woolworths and Aldi supermarkets).

viii. In terms of future facilities, key developments include the expansion of retail offers at Stockland Glendale and Westfield Kotara, which are approved and under construction, respectively.

ix. Projected sales for the proposed Cameron Park Village are $53.1 million in 2019/20 (i.e. constant 2017 dollar terms), indicating that there is clearly potential to support the proposed retail floorspace of the scale currently planned. All components of the shopping centre are projected to be supportable, even allowing for competitive developments.

x. Key points to note regarding the likely sales impacts from the proposed Cameron Park Village include:

— The largest impact is projected on Stockland Glendale (beyond the main trade area), in the order of $24.5 million or 6.5%. The majority of this impact is likely to fall on the Woolworths and Coles supermarkets which are understood to trade strongly.

— The next largest impacts would likely fall on retail facilities within the Edgeworth Town Centre (within the main trade area), which are projected to be impacted by some $11.5 million in combination, or around 15%. The majority of this impact would fall on Coles and Aldi supermarkets.

— Alternate IGA-based centres within the main trade area, namely at Cameron Park, West Wallsend and Woodrising Shopping Centre are projected to be

impacted by $1.2 million (15%), $1.1 million (10%) and $0.5 million (2.5%), respectively.

— All other competitive impacts would be 10% or less and therefore within the normal competitive range.

— Importantly, any impact from the proposed Cameron Park Village is only likely to be experienced by competitive centres in the short term, reflecting strong future population growth.

xi. A substantial net community benefit will result from the proposed Cameron Park Village. Offsetting the trading impacts on some existing retailers, which will not impact the future viability of any existing or proposed centre, there are very substantial positive impacts including the following:

— Significant improvement in the range of retail facilities that would be available to residents, particularly in terms of convenient full-line supermarket retailing. The proposed Woolworths supermarket would improve choice of location and also allow for price competition.

— Further, the proposed supermarket at the site would represent the only full-line supermarket within around 3.5 km, providing residents with a convenient, local major full-line supermarket at which to undertake a full weekly shop.

— The retail offer would provide a convenient and competitive offer for local residents that would satisfy the significant retail demand, reduce travel time and distance and provide petrol cost savings.

— The addition of a full-line supermarket would also result in the retention of spending currently being directed to other large supermarket facilities at the major shopping centres beyond the main trade area, which can become quite congested during peak times.

— The creation of additional employment which would result from the project, both during the construction period, and more importantly, on an ongoing basis once

the development is complete and operational. In total, some 904 jobs are likely to be created both directly and indirectly as a result of the development of Cameron Park Village.

xii. It is concluded that the combination of the substantial positive economic impacts serves to more than offset the trading impacts that could be anticipated for a small number of existing retail stores in the region. Further, the impacts would not threaten the viability of any centres or limit the expansion of these centres.

1 LOCATION AND PROPOSED DEVELOPMENT

This section reviews the regional and local context of the planned supermarket based shopping centre at Cameron Park. An overview of the latest development scheme is also provided.

1.1 Regional & Local Context

i. The suburb of Cameron Park is situated in the northern portion of the Lake Macquarie Local Government Area (LGA), on the western edges of the Newcastle urban area, approximately 19 km west of the Newcastle Central Business District (CBD) (refer Map 1.1).

ii. The suburb and subject site are located within a growth area as identified by the Hunter Regional Plan 2036 (refer Figure 1.1). The plan identifies that new retail and commercial development:

— is integrated with existing or planned residential development;

— does not undermine existing centres;

— encompasses high quality urban design; and

— considers transport and access requirements.

iii. The suburb of Cameron Park is located in the Lake Macquarie City Council area and is a major designated residential growth precinct. The suburb forms part of the Newcastle-Lake Macquarie *Western Corridor Planning Strategy*, which also includes the suburbs of Minmi, Wallsend, Edgeworth, West Wallsend and Black Hill (refer Figure 1.2), taken from the *Western Corridor Planning Strategy 2010*. It is projected that the area will include around 8,000 dwellings and up to 1,500 hectares of employment lands once fully developed.

iv. There are several residential estates currently under construction within the Cameron Park area, including:

— Northlakes of 1,600 dwellings, and

— Cameron Grove of over 2,000 dwellings.

v. The site for the proposed supermarket based shopping centre will be located on the corner of George Booth Drive and Portland Drive, with construction of the signalised intersection having been completed in mid-2017. The site is also bounded by Northridge Drive in the north and Tramway Drive (to be constructed) to the west and located less than 500 metres from the George Booth Drive/Withers Street/Government Road roundabout.

vi. George Booth Drive forms part of a major network of roads throughout Cameron Park and Edgeworth and connects through to the Pacific Motorway in the north and the Pacific Highway in the south (via Main Road and the Newcastle Inner City Bypass).

vii. Map 1.2 illustrates the local context of the proposed supermarket based shopping centre at Cameron Park, indicating the following:

— The site is located directly north of existing residential developments at Wallsend and Holmesville.

— Cameron Grove Estate is under construction to the immediate north of the site.

— The Appletree Grove release of the Cameron Grove Estate is currently under construction along Withers Street to the west of the site.

— Residents of the Northlakes Estate are situated to the north-east of the site and will be provided with excellent connection via Portland Drive.

viii. The nearest supermarket for Cameron Park residents is a small IGA supermarket of 750 sq.m, situated internally within the Northlakes estate (1.4 km to the north-east of the site). The nearest major full-line supermarket (3,000 sq.m or greater), is situated 2.6 km south-east of the proposed site at Edgeworth Town Square. The Coles supermarket of 3,000 sq.m at Edgeworth would currently be a major weekly supermarket shopping destination for Cameron Park residents.

ix. Overall, the site enjoys an excellent location along the major George Booth Drive, with proximity to the George Booth Drive/Withers Street/Government Road roundabout. The site will be easily accessible by both existing and future residents of not only Cameron Park, but also the surrounding suburbs of Holmesville, West Wallsend, Barnsley and Edgeworth.

x. The development would mainly serve the population to the immediate north of George Booth Drive with some 50% - 60% of customers likely to be attracted from this area. Given the pattern of urban development and the network of supermarkets in the area, most customers from outside the immediate area would be likely to arrive at the shopping centre via George Booth Drive and not drive through the suburb of Northlakes on smaller roads.

MAP 1.1 – CAMERON PARK REGIONAL CONTEXT

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Map produced by Location IQ using MapInfo Pro Australia Pty Ltd and related data sets.

FIGURE 1.1 – EXTRACT FROM HUNTER REGIONAL PLAN 2036 – GREATER NEWCASTLE AREA

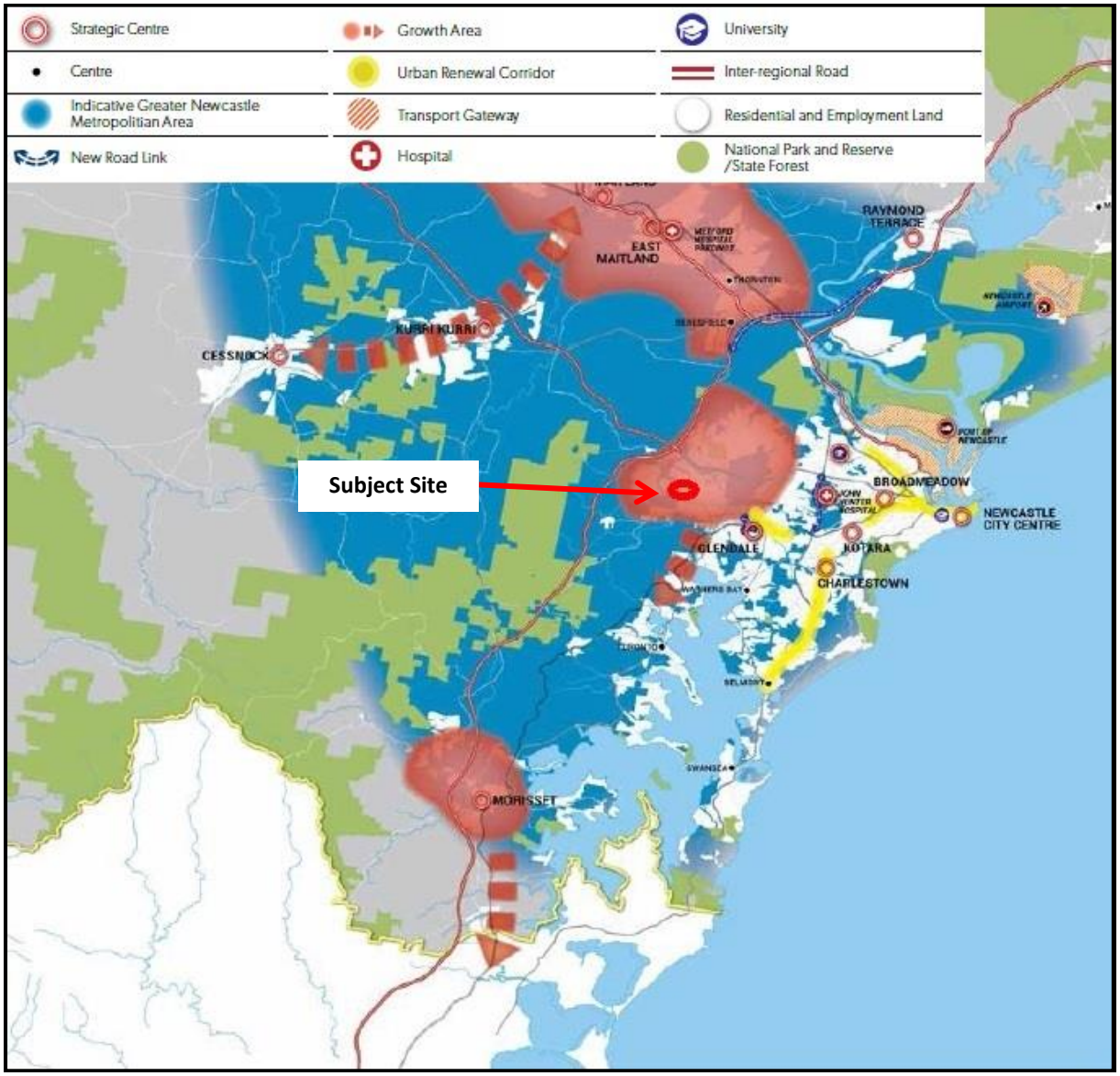
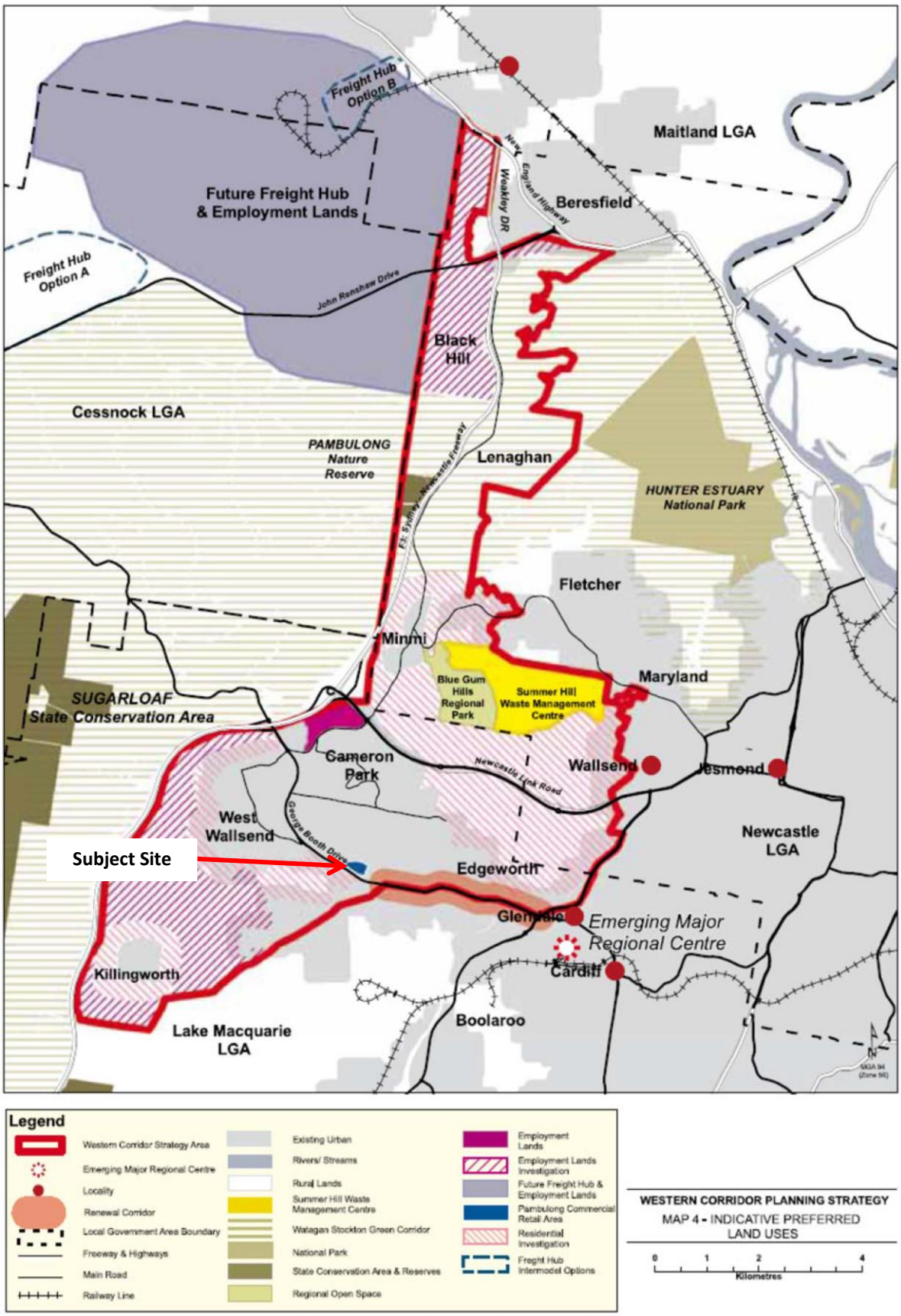
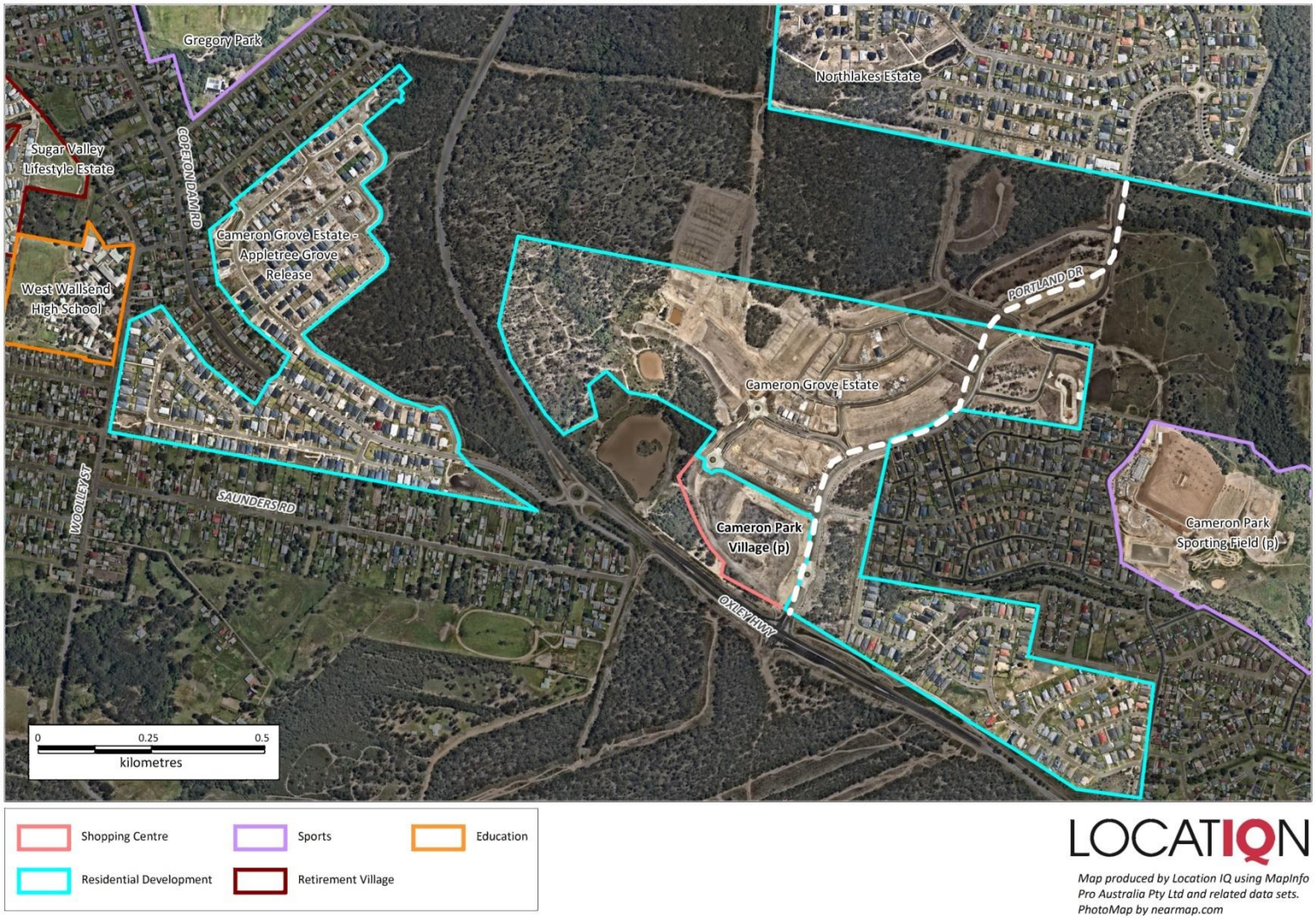


FIGURE 1.2 – WESTERN CORRIDOR STRATEGY AREA



MAP 1.2 – CAMERON PARK VILLAGE LOCAL CONTEXT



1.2 Proposed Development Scheme

i. Figure 1.3 illustrates the development scheme for the proposed shopping centre at Cameron Park. As shown, the centre proper will occupy the northern portion of the site, with a provision of at-grade car parking.

ii. Table 1.1 outlines the major components of the proposed Cameron Park Village, including:

— A Woolworths supermarket of 3,800 sq.m (including liquor and pickup), occupying some 50% of the total centre floorspace.

— Four mini-major tenants (i.e. larger than 400 sq.m) of a combined 2,036 sq.m.

— Specialty floorspace (including kiosks) of 1,692 sq.m.

iii. In total, the centre will include 7,528 sq.m of floorspace. A total of 387 car parking spaces are planned to be provided, equating to 5.1 car spaces per 100 sq.m of centre floorspace. This is in-line with typical supermarket based centre averages and would not affect the viability of alternate retail centres or future development opportunities.

iv. The provision of car spaces at other shopping centres in the surrounding area is similar, namely:

— Stockland Wallsend: 5.0 car spaces per 100 sq.m.

— Edgeworth Town Square: 4.0 car spaces per 100 sq.m.

— Northlakes IGA: 3.6 car spaces per 100 sq.m.

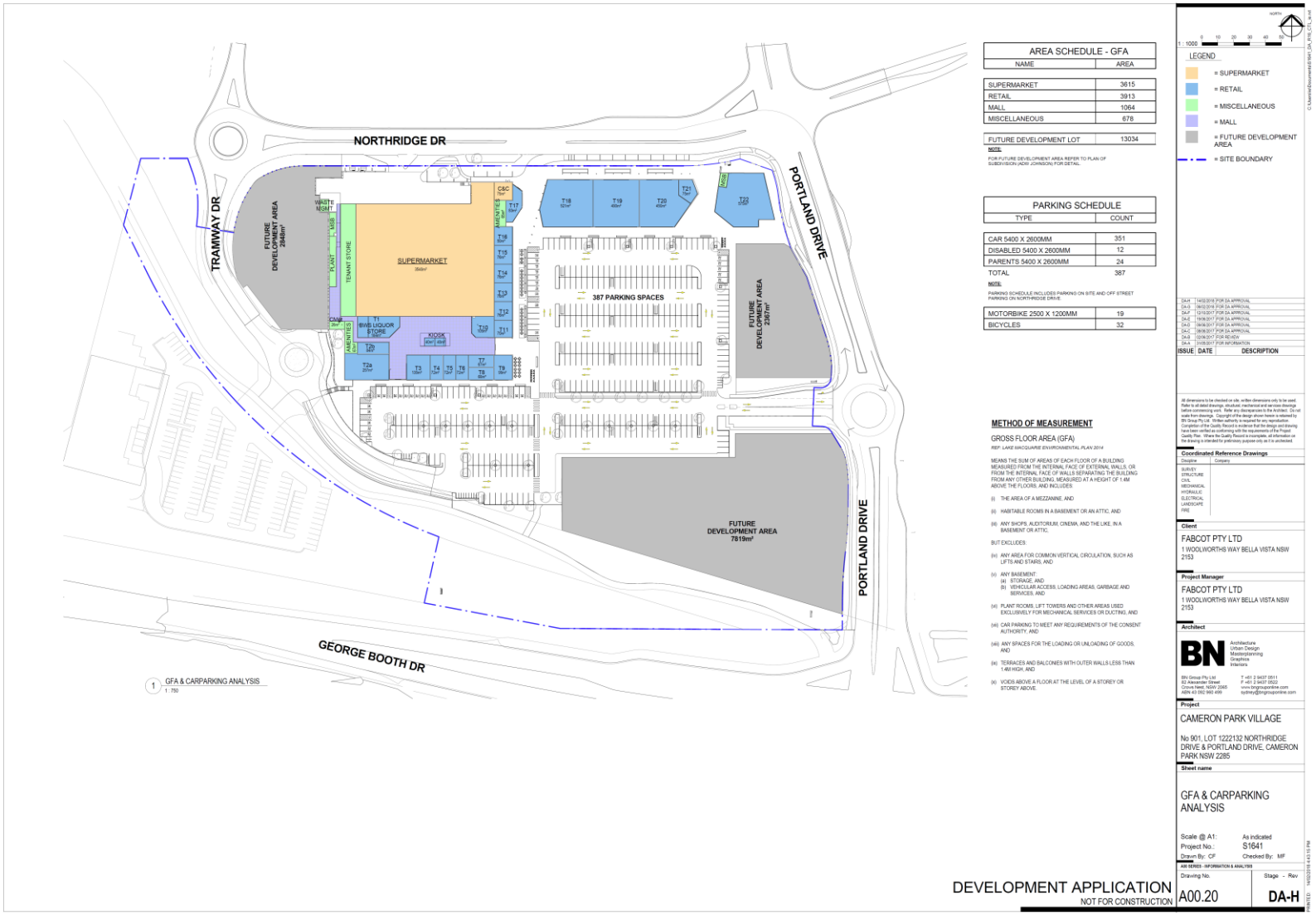
— Stockland Glendale: 2.9 car spaces per 100 sq.m.

TABLE 1.1 – CAMERON PARK VILLAGE - PROPOSED DEVELOPMENT SCHEME

Category	GFA (sq.m)	% of Total
Woolworths	3,800	50.5%
Mini-majors	2,036	27.0%
Specialties	1,692	22.5%
Total Centre	**7,528**	**100.0%**

Source : Woolworths Limited

FIGURE 1.3 – CAMERON PARK VILLAGE PROPOSED DEVELOPMENT SCHEME



2 TRADE AREA ANALYSIS

This section of the report outlines the trade area likely to be served by the proposed Cameron Park Village, including current and projected population levels. A review of the socio-economic profile is also provided.

2.1 Trade Area Definition

i. The trade area likely to be served by the proposed supermarket based shopping centre at Cameron Park has been defined taking into consideration the following key factors:

   — The scale and composition of the proposed centre, which would be based on a major full-line Woolworths supermarket as the major tenant.

   — The provision of retail facilities throughout the region.

   — Regional and local accessibility.

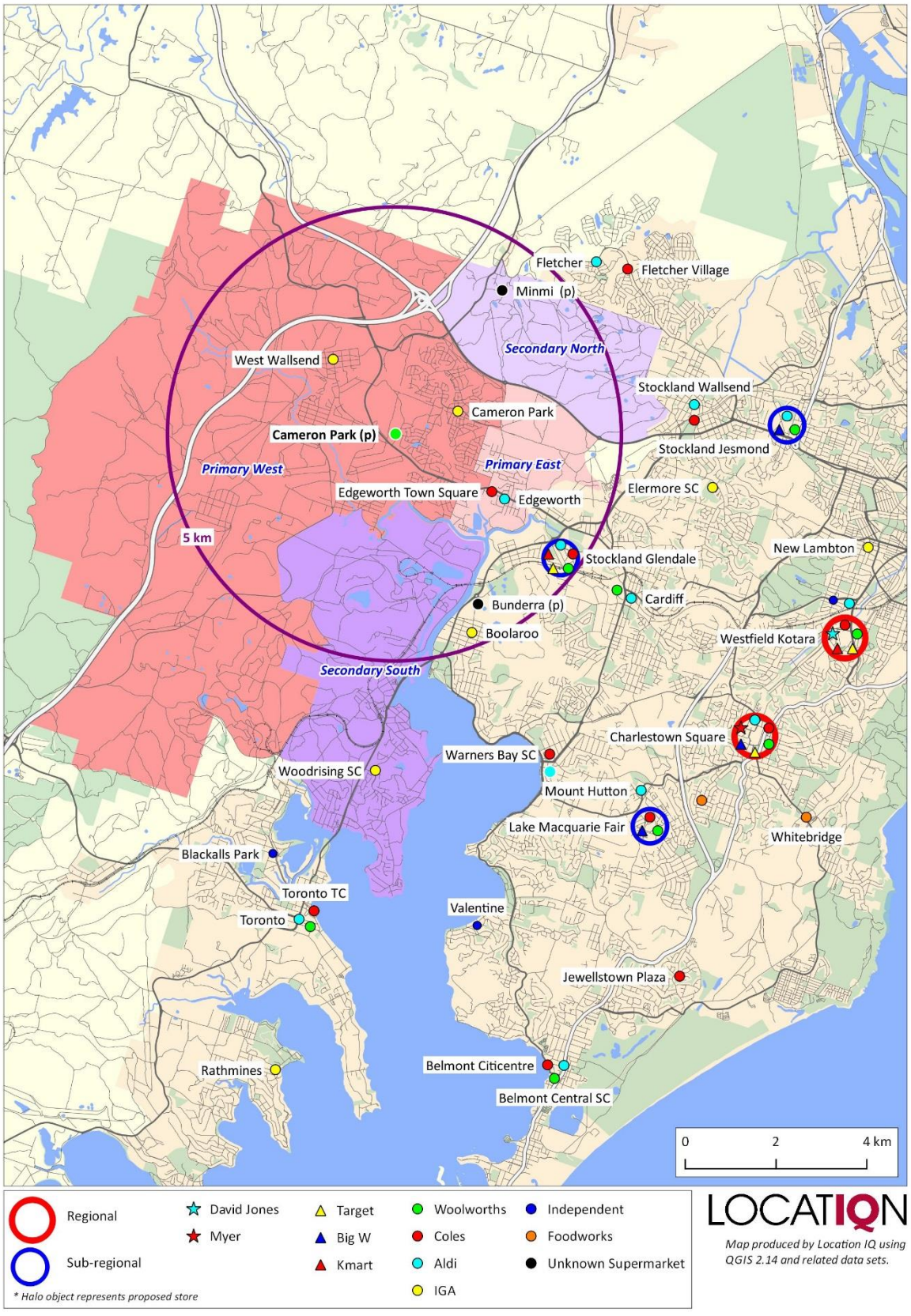
   — The pattern of urban development.

   — Surrounding rural areas.

ii. Map 2.1 illustrates the defined main trade area that is likely to be served by a supermarket based shopping centre at Cameron Park. The main trade area extends 3 – 8 km around the site and includes the suburbs of Cameron Park, Edgeworth, West Wallsend, Holmesville, Barnsley and Killingworth.

iii. The main trade area is the area from which a supermarket-based shopping centre at the site would attract most of its business. The main trade area is generally limited by the provision of higher order facilities at Stockland Glendale, 5.3 km to the south-east.

MAP 2.1 – CAMERON PARK MAIN TRADE AREA & COMPETITION



2.2 Main Trade Area Population

i. Table 2.1 details the current and projected population levels by sector for the Cameron Park Village main trade area. This information is sourced from the following:

— The 2011 and 2016 Census of Population and Housing undertaken by the Australian Bureau of Statistics (ABS);

— New dwelling approval statistics sourced from the ABS for the period from 2011/12 to 2016/17 which indicates that on average, 198 new dwellings have been approved annually over this period for the main trade area, including an average of 163 in the combined primary sectors (refer Chart 2.1);

— Population projections prepared at a small area level by SAFi by Forecast id.; and

— Investigations by this office into new residential developments in and around Cameron Park.

ii. The Cameron Park main trade area population is currently estimated at 31,275, including 18,090 persons in the primary west sector.

iii. The suburb of Cameron Park forms part of the Newcastle-Lake Macquarie *Western Corridor Planning Strategy*, where it is estimated that around 8,000 dwellings will be provided once the area is fully developed.

iv. Given this, significant residential development has been occurring throughout the main trade area since the year 2000, with the major residential estates (shown previously on Map 1.2) including:

— First residents moved into the McCloy Group's Northlakes estate in 2000. The estate, which is situated to the north-east of the Cameron Park site, is expected to include around 1,600 dwellings on completion and is now in the final stages of construction. Development is expected to be finalised in 2018.

— Over 2,000 dwellings are expected on completion of Cameron Grove, an estate which is provided across both sides of George Booth Drive. Construction started to the south of Withers Street in the Appletree Grove release and has now moved to the northern portion of George Booth Drive, immediately north of the proposed retail site.

  The Roche Group have significant land holdings in and around Cameron Park and are likely to continue residential development in the area for a number of years.

v. Taking the above into account, by 2031 the population within the Cameron Park main trade area is projected to increase by over 11,125 persons to 42,400 persons. This represents an average annual growth rate of around 795 persons, or 2.2%.

vi. Typically throughout Australia, one full-line supermarket is provided for every 8,000 – 10,000 persons. On this basis, the current main trade area population could support some three full-line supermarkets with only one (i.e. Coles at Edgeworth) currently provided. Over the period to 2031, some four full-line supermarkets would be supportable based on a population in-excess of 40,000 persons.

vii. In the immediate primary west sector, the population of more than 18,000 persons would support two full-line supermarkets, indicating significant potential for a supermarket at the Cameron Park site. Other supermarkets within the main trade area and beyond the main trade area would also still be supportable given the significant population.

viii. Over the period to 2031, the main trade area is projected to include an additional 11,000 persons with more than 6,000 additional residents in the primary west sector alone. This future population would support an additional full-line supermarket.

TABLE 2.1 – CAMERON PARK MAIN TRADE AREA POPULATION, 2011 – 2031

Trade Area	Actual			Forecast		
Sector	2011	2016	2017	2021	2026	2031
Primary Sectors						
• East	3,680	3,820	3,870	4,070	4,445	4,945
• West	14,510	17,590	18,090	20,090	22,090	24,090
Total Primary	18,190	21,410	21,960	24,160	26,535	29,035
Secondary Sectors						
• North	360	370	420	620	1,870	3,870
• South	9,040	8,870	8,895	8,995	9,245	9,495
Total Secondary	9,400	9,240	9,315	9,615	11,115	13,365
Main Trade Area	**27,590**	**30,650**	**31,275**	**33,775**	**37,650**	**42,400**

Average Annual Change (No.)

	Actual		Forecast	
	2011-2016	2017-2021	2021-2026	2026-2031
Primary Sectors				
• East	28	50	75	100
• West	616	500	400	400
Primary Sector	644	550	475	500
Secondary Sectors				
• North	2	50	250	400
• South	-34	25	50	50
Total Secondary	-32	75	300	450
Main Trade Area	**612**	**625**	**775**	**950**

Average Annual Change (%)

	Actual		Forecast	
	2011-2016	2017-2021	2021-2026	2026-2031
Primary Sectors				
• East	0.7%	1.3%	1.8%	2.2%
• West	3.9%	2.7%	1.9%	1.7%
Total Primary	3.3%	2.4%	1.9%	1.8%
Secondary Sectors				
• North	0.5%	10.2%	24.7%	15.7%
• South	-0.4%	0.3%	0.5%	0.5%
Total Secondary	-0.3%	0.8%	2.9%	3.8%
Main Trade Area	**2.1%**	**1.9%**	**2.2%**	**2.4%**

All figures as at June and based on 2016 SA1 boundary definition.
Sources : ABS; SAFi by .id

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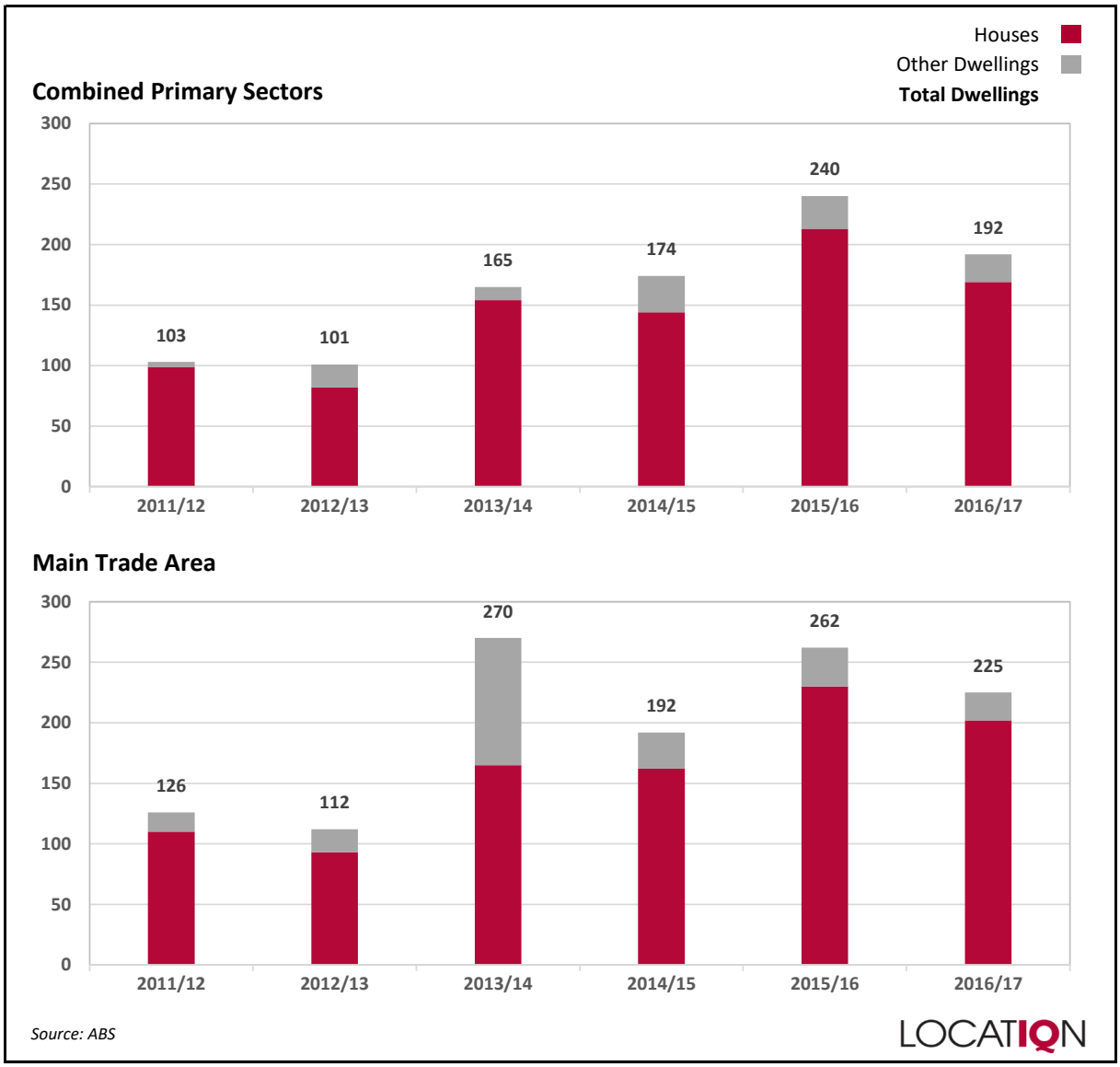
CHART 2.1 – CAMERON PARK MTA NEW DWELLING APPROVALS, 2011/12 - 2016/17



2.3 Socio-economic Profile

i. Table 2.2 summarises the socio-economic profile of the Cameron Park main trade area population by sector based on the 2016 Census of Population and Housing. The non-metropolitan New South Wales and Australian benchmarks are shown for comparison.

ii. The key socio-economic characteristics of the Cameron Park main trade area population compared with the non-metropolitan New South Wales benchmarks include:

- Residents generally earn average household income levels which are higher than the non-metropolitan New South Wales benchmark.
- The average age of residents (37.8 years) is significantly younger than the benchmark (41.3 years).
- The proportion of home ownership is high.
- The population is predominantly Australian born, at over 92%.
- The main trade area includes a significantly higher proportion of traditional families (couples with dependent children) as compared to the average.

iii. Overall, the Cameron Park main trade area includes a high proportion of young, traditional family households, which is typical of a growing area on the edge of a major city. This demographic would benefit highly from the provision of a major full-line supermarket-based shopping centre within close proximity to their homes.

TABLE 2.2 – MAIN TRADE AREA SOCIO-ECONOMIC PROFILE, 2016 CENSUS

Characteristics	Primary Sectors East	Primary Sectors West	Secondary Sectors North	Secondary Sectors South	Main TA	Non Metro NSW Average	Aust Average
Income Levels							
Average Per Capita Income	$30,327	$33,964	$33,870	$31,907	$32,929	$34,181	$38,497
Per Capita Income Variation	-11.3%	-0.6%	-0.9%	-6.7%	-3.7%	n.a.	n.a.
Average Household Income	$77,582	$95,733	$102,457	$79,150	$88,301	$82,505	$98,478
Household Income Variation	-6.0%	16.0%	24.2%	-4.1%	7.0%	n.a.	n.a.
Average Household Size	2.6	2.8	3.0	2.5	2.7	2.4	2.6
Age Distribution (% of Pop'n)							
Aged 0-14	19.9%	22.9%	20.4%	18.0%	21.1%	18.5%	18.8%
Aged 15-19	5.9%	6.6%	9.9%	6.8%	6.6%	6.0%	6.1%
Aged 20-29	13.3%	12.1%	11.8%	11.0%	11.9%	11.1%	13.8%
Aged 30-39	14.2%	15.8%	9.6%	9.7%	13.8%	11.0%	14.0%
Aged 40-49	12.6%	13.6%	19.6%	12.3%	13.2%	12.5%	13.5%
Aged 50-59	11.7%	11.5%	16.5%	14.6%	12.5%	13.8%	12.7%
Aged 60+	22.3%	17.5%	12.1%	27.6%	20.9%	27.0%	21.1%
Average Age	38.0	35.8	35.3	41.9	37.8	41.3	38.5
Housing Status (% of H'holds)							
Owner/Purchaser	76.8%	79.2%	86.1%	70.9%	76.4%	71.0%	68.0%
Renter	23.2%	20.8%	13.9%	29.1%	23.6%	29.0%	32.0%
Birthplace (% of Pop'n)							
Australian Born	92.3%	92.4%	96.4%	92.3%	92.4%	89.2%	72.9%
Overseas Born	7.7%	7.6%	3.6%	7.7%	7.6%	10.8%	27.1%
• Asia	2.1%	2.4%	0.0%	0.9%	1.9%	2.1%	10.7%
• Europe	3.7%	3.1%	2.8%	3.9%	3.4%	5.2%	8.0%
• Other	1.9%	2.1%	0.8%	2.9%	2.3%	3.4%	8.4%
Family Type (% of Pop'n)							
Couple with dep't children	40.5%	51.7%	51.5%	33.7%	45.3%	39.4%	45.2%
Couple with non-dep't child.	10.0%	9.1%	16.3%	10.0%	9.6%	7.4%	7.8%
Couple without children	24.0%	20.1%	13.2%	23.4%	21.4%	26.1%	23.0%
Single with dep't child.	10.0%	8.8%	9.0%	14.9%	10.6%	10.2%	8.9%
Single with non-dep't child.	5.1%	3.7%	6.5%	6.4%	4.7%	4.0%	3.7%
Other family	1.1%	0.8%	0.0%	0.7%	0.8%	0.9%	1.1%
Lone person	9.3%	5.8%	3.4%	10.9%	7.7%	12.1%	10.2%

Sources: ABS Census of Population and Housing 2016

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2.4 Main Trade Area Retail Spending

i. The estimated retail expenditure capacity of the Cameron Park main trade area population is based on information sourced from MDS Market Data Systems. MDS utilises a detailed micro-simulation model of household expenditure behaviour for all residents of Australia.

ii. The MDS model takes into account information from a wide variety of sources, including the regular ABS Household Expenditure Survey, National Accounts Data, Census Data and other information.

iii. In New South Wales, Queensland and Victoria, the MarketInfo estimates of retail spending that are prepared independently by MDS are commonly used by all parties in Economic Impact Assessments.

iv. Chart 2.2 illustrates the retail expenditure levels per person across the main trade area compared with the non-metropolitan New South Wales average.

v. Table 2.3 outlines the retail expenditure levels generated by the Cameron Park main trade area population. The total retail expenditure level of the main trade area population is currently estimated at $406.0 million. This level is projected to increase at an average annual rate of around 3.1% to $619.3 million by 2031. All figures presented in this report are in constant 2017 dollars and include GST.

vi. The projected growth rate of the retail spending market of 3.1% per annum for the main trade area takes into account the following:

- Real growth in retail spending per capita of 0.5% annually for food retail and 1.0% for non-food retail over the period to 2031. This is in-line with the national averages. Real growth in retail spending refers to the increase in retail sales consumption of a household adjusted for changes in prices.

- Main trade area population growth of around 2.2% per annum.

vii. Table 2.4 presents a breakdown of retail spending by key commodity group, indicating the largest spending market is food and liquor at $189.5 million, representing 46.7% of the total retail spending market.

CHART 2.2 – MAIN TRADE AREA RETAIL EXPENDITURE PER CAPITA, 2017

Source : Marketinfo

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TABLE 2.3 – MAIN TRADE AREA RETAIL EXPENDITURE, 2017 - 2031

Y/E June	Primary Sectors East	Primary Sectors West	Secondary Sectors North	Secondary Sectors South	Main TA
2017	46.6	238.1	5.9	115.4	406.0
2018	47.6	246.7	6.8	116.6	417.7
2019	48.6	255.2	7.5	117.8	429.1
2020	49.6	264.0	8.3	119.0	441.0
2021	50.6	273.2	9.3	120.3	453.2
2022	51.7	281.6	10.9	121.7	465.9
2023	53.1	289.2	13.7	123.3	479.3
2024	54.4	297.0	17.3	124.9	493.6
2025	55.8	305.0	21.7	126.6	509.1
2026	57.2	313.3	27.3	128.2	526.0
2027	58.8	321.5	33.0	129.9	543.2
2028	60.5	329.6	38.5	131.6	560.3
2029	62.3	338.0	44.9	133.3	578.5
2030	64.2	346.6	52.3	135.1	598.1
2031	66.0	355.4	61.0	136.8	619.3
Expenditure Growth					
2017-2019	1.9	17.2	1.6	2.4	23.1
2019-2021	2.0	17.9	1.8	2.5	24.1
2021-2026	6.7	40.1	18.0	8.0	72.8
2026-2031	8.8	42.1	33.7	8.6	93.2
2017-2031	19.4	117.3	55.1	21.5	213.3
Average Annual Growth Rate					
2017-2019	2.1%	3.5%	12.7%	1.0%	2.8%
2019-2021	2.0%	3.4%	11.1%	1.0%	2.8%
2021-2026	2.5%	2.8%	24.1%	1.3%	3.0%
2026-2031	2.9%	2.6%	17.4%	1.3%	3.3%
2017-2031	2.5%	2.9%	18.2%	1.2%	3.1%

**Constant 2016/17 dollars & Including GST*

Source : Marketinfo

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TABLE 2.4 – MAIN TRADE AREA RETAIL EXPENDITURE BY KEY COMMODITY GROUP, 2017 - 2031

Y/E June	Food & Liquor	Food Catering	Apparel	H'hold Goods	Leisure	General Retail	Retail Services
2017	189.5	50.9	36.4	68.4	16.2	33.2	11.3
2018	194.4	52.5	37.5	70.5	16.7	34.3	11.7
2019	199.1	54.1	38.7	72.7	17.2	35.3	12.0
2020	204.0	55.7	39.9	74.9	17.7	36.4	12.4
2021	209.1	57.4	41.1	77.2	18.3	37.5	12.8
2022	214.3	59.1	42.3	79.5	18.8	38.6	13.2
2023	219.8	60.9	43.7	82.0	19.4	39.8	13.6
2024	225.7	62.9	45.1	84.8	20.0	41.1	14.0
2025	232.0	65.0	46.7	87.7	20.7	42.4	14.5
2026	239.0	67.3	48.4	90.9	21.5	43.9	15.0
2027	246.0	69.6	50.2	94.2	22.2	45.4	15.5
2028	252.9	72.0	51.9	97.5	23.0	47.0	16.1
2029	260.3	74.4	53.8	101.0	23.8	48.6	16.6
2030	268.3	77.1	55.8	104.7	24.7	50.3	17.2
2031	276.8	80.0	58.0	108.8	25.6	52.2	17.9
Expenditure Growth							
2017-2019	9.6	3.2	2.3	4.3	1.0	2.1	0.7
2019-2021	10.0	3.3	2.4	4.5	1.0	2.2	0.7
2021-2026	29.9	9.9	7.3	13.8	3.2	6.4	2.2
2026-2031	37.9	12.7	9.6	17.9	4.2	8.2	2.9
2017-2031	87.3	29.1	21.6	40.4	9.4	18.9	6.5
Average Annual Growth Rate							
2017-2019	2.5%	3.1%	3.1%	3.1%	3.0%	3.1%	3.1%
2019-2021	2.5%	3.0%	3.1%	3.0%	3.0%	3.0%	3.0%
2021-2026	2.7%	3.2%	3.3%	3.3%	3.3%	3.2%	3.3%
2026-2031	3.0%	3.5%	3.7%	3.7%	3.6%	3.5%	3.5%
2017-2031	2.7%	3.3%	3.4%	3.4%	3.3%	3.3%	3.3%

**Constant 2016/17 dollars & Including GST*

Source : Marketinfo

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3 COMPETITIVE ENVIRONMENT

This section of the report provides a summary of the existing and proposed competitive retail facilities within the area surrounding the Cameron Park site. The previous Map 2.1 illustrates the location of surrounding competitive centres, with these centres summarised in Table 3.1.

TABLE 3.1 – COMPETITIVE CENTRES

Centre	Shopfront GFA (sq.m)	**Anchor Tenants**	Dist. From Site (km)
Regional Shopping Centres			
Charlestown Square	93,500	Myer (12,840), Big W (8,458), Target (5,585), Woolworths (4,837), Coles (4,315)	13.0
Westfield Kotara	74,200	David Jones (15,380), Kmart (6,969), Target (6,350), Woolworths (4,055), Coles (3,107)	13.0
Sub-regional Shopping Centres			
Stockland Glendale	78,000	Target (8,522), Kmart (6,425), Coles (5,109), Woolworths (4,791), Aldi (1,362)	5.3
Supermarket Based Shopping Centres			
Cameron Park IGA	750	IGA (750)	1.4
Edgeworth	*8,900*		*2.6*
• Edgeworth Town Square	7,300	Coles (3,000)	
• Other	1,600	Aldi (1,600)	
Cardiff Marketplace	6,000	Woolworths (3,790), Aldi (1,650)	6.7
West Wallsend	2,000	IGA (300)	7.2
Woodrising SC	2,900	IGA (1,300)	7.2
Stockland Wallsend	12,000	Coles (4,185), Aldi (1,292)	10.6

Source: Australian Shopping Centre Council Database LOCATIQN

3.1 Regional Shopping Centres

i. Regional shopping centres are anchored by one or more department stores.

ii. There are two major regional shopping centres serving the Newcastle urban area, including:

— Charlestown Square is situated around 13 km to the south-east of the Cameron Park site and totals around 93,500 sq.m. The centre includes Myer, Big W and Target non-food majors and Woolworths and Coles supermarkets. According to *Big Guns 2017 (Shopping Centre News)*, the centre currently achieves sales of around $545 million.

— Westfield Kotara, also situated around 13 km to the south-east of the site, is around 20,000 sq.m smaller than Charlestown Square, at 74,200 sq.m. The major components of the centre include a David Jones department store, Kmart and Target discount department stores and Woolworths and Coles supermarkets. According to *Big Guns 2017*, the centre currently achieves sales of around $504 million.

iii. Given the size of both Charlestown Square and Westfield Kotara as the major regional shopping centres serving the Newcastle population, the shopping centres are likely to be major non-food shopping destinations for main trade area residents.

3.2 Sub-regional Shopping Centres

i. Sub-regional shopping centres are anchored by one or more discount department stores.

ii. The sub-regional shopping centre of most relevance is Stockland Glendale, which is located 5.3 km to the south-east of the site. The open-air shopping centre totals around 78,000 sq.m and includes a range of majors, including Target and Kmart discount department stores and Coles, Woolworths and Aldi supermarkets. The centre also includes ten mini-major traders and around 84 specialty shops in addition

to a cinema complex. According to *Big Guns 2017*, the shopping centre currently achieves sales of around $316 million.

iii. Stockland Glendale would currently be a major supermarket shopping destination for Cameron Park main trade area residents, with the centre containing the nearest Woolworths supermarket. Given the successful nature of Stockland Glendale, supermarkets are currently extremely busy in peak periods making it difficult for residents to complete their weekly supermarket shop.

3.3 Supermarket Based Shopping Centres

i. Supermarkets are typically defined in planning documents and Courts as:

> *"Grocery and dry goods stores of at least 500 sq.m, with smaller stores classified as foodstores."*

ii. There are four supermarkets currently provided within the Cameron Park main trade area, namely the Coles anchored Edgeworth Town Square, Aldi at Edgeworth and IGA supermarkets in the Northlakes estate and at Woodrising Shopping Centre.

iii. Edgeworth Town Square is a neighbourhood centre anchored by a Coles supermarket of 3,000 sq.m. The centre totals 7,300 sq.m and is situated 2.6 km to the east of the site. Around 18 specialty shops are also provided with primarily a food catering and convenience focus.

The Coles supermarket at Edgeworth Town Square is currently the only major full-line supermarket (3,000 sq.m or greater) provided to serve a population of more than 20,000 persons. Consequently, the supermarket, on inspection, appears to be trading strongly.

iv. A free-standing Aldi supermarket of around 1,600 sq.m opened at 57 Thomas Street in Edgeworth on 15th February 2017, some 250 metres east of Edgeworth Town Square.

v. The only other supermarkets within the Cameron Park main trade area include a relatively small IGA of approximately 750 sq.m, which is internally located within the

Northlakes Estate and an IGA supermarket of 1,300 sq.m at Woodrising in the secondary south sector. These facilities would only be serving the top up convenience shopping needs of the immediate populations.

vi. A small IGA foodstore is also located just off the Carrington Street retail strip, along Withers Street at West Wallsend.

vii. Supermarkets beyond the main trade area (aside from the major full-line stores situated at Stockland Glendale) are of less relevance and include:

- Cardiff Marketplace is a neighbourhood centre situated 6.7 km to the south-east of the proposed site. The relatively strong trading centre is anchored by a major full-line Woolworths supermarket of 3,790 sq.m, in addition to 15 specialty shops. Aldi is also provided at Cardiff.

- Stockland Wallsend is a relatively large neighbourhood centre totalling 12,000 sq.m (located 10.6 km to the north-east of the site). The centre is anchored by a Coles of 4,185 sq.m and an Aldi supermarket of 1,292 sq.m. These majors are supported by two mini-majors and 43 specialty traders. According to *Mini Guns 2017*, the centre achieves sales of approximately $103 million.

3.4 Proposed Developments

i. Within the secondary north sector, a small local centre is mooted to form part of the overall Minmi residential development area by Winten Property Group. It is possible that the centre would include a small supermarket, however, the centre is only likely to serve the immediate surrounding population and will not impact on the potential to accommodate a major full-line supermarket at the Cameron Park site.

ii. A provision of retail floorspace at Minmi will be supportable based on the future population within this corridor. A retail centre is unlikely to be supportable until there is a significant residential population to support this development. Further, the driving distance from this location to the Cameron Park site would likely result in a limited number of future Minmi residents frequenting a Cameron Park supermarket.

iii. Beyond the main trade area, key competitive retail developments include:

- Stockland Glendale has development approval for centre additions that would comprise an expanded Coles supermarket (an additional 1,226 sq.m), as well as additional retail specialty (5,255 sq.m), food catering (1,860 sq.m) and a grocer of 550 sq.m. At present, construction has not commenced.
- Westfield Kotara is currently undergoing an expansion, which will include additional mini-major floorspace (3,259 sq.m) and retail specialty shops (3,566 sq.m).
- A supermarket was mooted as part of the Bunderra project at Boolaroo, to the south-east of the proposed Cameron Park site (beyond the main trade area). Based on discussions with developers, this is not assumed to proceed during the forecast period.

3.5 Summary

i. The regional and sub-regional shopping centres situated within the broader region will continue to be the major retail destinations for main trade area residents, particularly for higher order retail needs such as non-food shopping.

ii. Given the extensive Cameron Park main trade area population of over 20,000 persons, there is currently a limited provision of supermarket floorspace with this population typically demanding at least two major full-line supermarkets (3,000 sq.m or greater). The Coles supermarket of 3,000 sq.m at Edgeworth Town Square is currently the only major full-line supermarket provided.

iii. Table 3.2 provides a summary of the current provision of supermarket floorspace by trade area sector for the Cameron Park main trade area compared with the non-metropolitan New South Wales; New South Wales and Australian benchmarks. As shown, the provision of supermarket floorspace is significantly lower than the benchmark levels.

iv. Beyond the main trade area, the nearest supermarkets are located more than 5 km away within busy, well utilised centres.

TABLE 3.2 – CAMERON PARK MAIN TRADE AREA SUPERMARKET PROVISION, 2016/17

Trade Area Sector	No. of Supermarkets*	Size (sq.m)	2017 Population	GLA per 1,000 persons
Primary Sectors				
• East	2	4,600	3,870	1,189
• West	0	0	18,090	0
Total Primary	2	4,600	21,960	209
Secondary Sectors				
• North	0	0	420	0
• South	1	1,300	8,895	146
Total Secondary	1	1,300	9,315	140
Main Trade Area	**3**	**5,900**	**31,275**	**189**
Non-metro New South Wales Average				*386*
New South Wales Average				*296*
Australian Average				*336*

** Defined as 500 sq.m or larger*

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4 ASSESSMENT OF POTENTIAL FOR RETAIL FACILITIES

This section of the report considers the sales potential for the proposed Woolworths supermarket based shopping centre at Cameron Park as well as the likely trading and other impacts that can be anticipated following the construction of the proposal.

4.1 Sales Overview

i. In order to assess the potential economic benefits and impacts that may arise from the development of the proposed Woolworths supermarket-based shopping centre at Cameron Park, the sales level which the development is projected to achieve is outlined.

ii. The sales performance of any retail facility, be it an individual store or a collection of stores provided in a shopping centre or precinct, is determined by a combination of the following critical factors:

- The composition and quality of the facility, including the major trader or traders; the specialty mix; centre layout and configuration; ease of accessibility and parking; and the overall feel of the centre.
- The size of the available catchment which the facility serves.
- The location and strength of competitive retail facilities.

iii. The sales potential for the proposed Woolworths supermarket-based shopping centre at Cameron Park is now considered taking into account these factors.

4.2 Supermarket Sales Potential

i. The proposed Woolworths supermarket of 3,800 sq.m (including liquor and pickup) would generate sales primarily from the food and groceries market, as discussed and measured in Section 2 of this report.

ii. Table 4.1 details the potential sales for the proposed Cameron Park Woolworths supermarket. The calculations in this Table go through a series of steps, commencing

with the available expenditure that is of relevance to supermarkets, namely food and grocery spending; assessing the share of expenditure which all supermarkets are likely to achieve; and then concluding with the likely sales which main trade area supermarkets can expect to generate.

iii. The assessment detailed in Table 4.1 is based on the experience of many comparable analyses in locations throughout Australia. Projected sales are detailed for the proposed Woolworths supermarket of 3,800 sq.m as well as other main trade area supermarkets, namely Coles and Aldi at Edgeworth and IGA stores at Cameron Park and Woodrising Shopping Centre. Supermarkets are defined as grocery and dry goods stores of at least 500 sq.m.

iv. The analysis in Table 4.1 is as follows:

- For the main trade area defined earlier in this report, the total food and grocery spending market is projected at $166.5 million for the year to June 2017. The food and grocery spending market for the main trade area population is projected to grow to $179.3 million by 2020 and further to $243.0 million by 2031 (constant 2017 dollars).

- Typically, in Australia, approximately 70% - 75% of food and grocery expenditure is directed to supermarkets, not including small corner stores, convenience stores and milk bars. This ratio varies from location to location depending on the provision of such facilities and the socio-economic profile of the trade area population.

- In the defined main trade area, the proportion of food and grocery spending to supermarkets is currently estimated at 67.5% given the limited number of existing supermarkets within the region. This proportion is projected to increase to 70% in 2019/20 with the addition of the proposed major full-line Woolworths supermarket.

- The next step in the analysis is to estimate the likely proportion of food and grocery expenditure which can be retained by main trade area supermarkets;

specifically, the proportion of expenditure that can be retained by the proposed Woolworths supermarket, Coles and Aldi at Edgeworth, as well as IGA supermarkets at Woodrising Shopping Centre and Cameron Park. This is contrasted by spending directed to supermarkets beyond the main trade area at locations such as Stockland Glendale.

- It is estimated that 52.7% of main trade area food and grocery spending is retained by these supermarkets. Consequently, almost $1 in every $2 of main trade area food and grocery spending is estimated to be escaping the main trade area. After the addition of the proposed Woolworths supermarket at Cameron Park Village, the level of retained spending is projected to increase to 66.2% in 2019/20.

- Additionally, an estimated 8.7% of total supermarket sales are likely to be attracted from beyond the defined main trade area.

v. The steps detailed above generate the annual estimates of food and grocery spending available to supermarkets within the main trade area. On this basis, after the opening of the proposed Cameron Park Village, this figure is projected at $91.0 million in 2019/20. This figure does not include retail inflation, thus the increase shown reflects real growth. By 2031, available food and grocery spending directed to main trade area supermarkets is projected to increase to $119.4 million, expressed in constant 2017 dollar terms.

vi. Finally, in order to estimate the total likely sales volume available to main trade area supermarkets, additional components of sales other than food and grocery is taken into account. The major component of sales other than food and grocery sales that supermarkets typically include are general merchandise and non-food items. Non-food items typically generate around 6% of total store sales for modern supermarket chains. On this basis, the total volume of sales available to main trade area supermarkets is estimated to increase to $96.9 million in 2019/20.

vii. Main trade area supermarkets are currently estimated to be recording sales of $10,500 per sq.m, which is higher than the average sales level recorded by major supermarkets throughout Australia of $9,000 per sq.m.

viii. At the bottom of Table 4.1, the distribution of sales for the Cameron Park Village Woolworths supermarket as compared with other main trade area supermarkets is detailed. The proposed Woolworths supermarket is projected to achieve sales of $36.8 million in 2019/20 with projected sales for other main trade area supermarkets at $60 million ($9 million lower than current sales).

ix. Post the addition of the Woolworths supermarket at Cameron Park, main trade area supermarkets are projected to achieve an average sales volume of around $9,122 per sq.m, increasing to $11,863 per sq.m by 2031.

x. Taking the above into account, there is clearly demand for the proposed full-line Woolworths supermarket as part of the planned Cameron Park Village.

TABLE 4.1 – SUPERMARKET SALES POTENTIAL

	Financial Year				
	2017	2020	2022	2026	2031
Total Food & Grocery (F&G) Spending					
Primary Sectors					
• East	19.7	20.8	21.6	23.6	26.9
• West	95.6	105.2	111.6	122.8	137.4
Total Primary	115.3	126.0	133.1	146.4	164.3
Secondary Sectors					
• North	2.3	3.2	4.2	10.4	22.8
• South	48.9	50.1	50.9	53.1	55.9
Total Secondary	51.2	53.3	55.1	63.5	78.8
Main Trade Area	**166.5**	**179.3**	**188.3**	**209.9**	**243.0**
F&G Spending to Supermarkets					
Primary Sectors					
• East (@ 67.5% incr. to 70% in 19/20)	13.3	14.5	15.1	16.5	18.8
• West (@ 67.5% incr. to 70% in 19/20)	64.5	73.6	78.1	85.9	96.2
Total Primary (@ 67.5% incr. to 70% in 19/20)	77.8	88.2	93.2	102.5	115.0
Secondary Sectors					
• North (@ 67.5% incr. to 70% in 19/20)	1.6	2.3	2.9	7.2	16.0
• South (@ 67.5% incr. to 70% in 19/20)	33.0	35.1	35.7	37.2	39.2
Total Secondary (@ 67.5% incr. to 70% in 19/20)	34.6	37.3	38.6	44.4	55.1
Main Trade Area (@ 67.5% incr. to 70% in 19/20)	**112.4**	**125.5**	**131.8**	**146.9**	**170.1**
F&G Spending Retained by TA Smkts					
Primary Sectors					
• East (@ 59% incr. to 71.3% in 19/20)	7.8	10.4	10.8	11.8	13.4
• West (@ 64% incr. to 79% in 19/20)	41.3	58.2	61.7	67.9	76.0
Total Primary (@ 63.1% incr. to 77.7% in 19/20)	49.2	68.5	72.4	79.7	89.4
Secondary Sectors					
• North (@ 10% incr. to 25% in 19/20)	0.2	0.6	0.7	1.8	4.0
• South (@ 30% incr. to 40% in 19/20)	9.9	14.0	14.3	14.9	15.7
Total Secondary (@ 29.1% incr. to 39.1% in 19/20)	10.1	14.6	15.0	16.7	19.7
Main Trade Area (@ 52.7% incr. to 66.2% in 19/20)	**59.2**	**83.1**	**87.5**	**96.4**	**109.0**
F&G Sales from Beyond TA (@ 8.7%)	5.6	7.9	8.3	9.2	10.4
Total F&G Sales for TA Smkts	**64.9**	**91.0**	**95.8**	**105.5**	**119.4**
General Merchandise Sales (@ 6%)	4.1	5.8	6.1	6.7	7.6
Total TA Smkt Sales	**69.0**	**96.9**	**101.9**	**112.3**	**127.1**
Smkt Floorspace in TA (sq.m)**	6,582	10,382	10,382	10,382	10,382
Average Trading Level ($/sq.m)	10,483	9,329	9,815	10,815	12,238
Distribution of TA Smkt Sales					
Cameron Park Village Smkt	0.0	36.8	38.9	43.1	49.0
Other TA Supermarkets**	69.0	60.0	63.0	69.2	78.1
Total TA Smkt Sales	**69.0**	**96.9**	**101.9**	**112.3**	**127.1**

**Constant 2016/17 dollars & Including GST*

***Existing supermarkets in TA as at January 2018 are Coles Edgeworth Town Square, Aldi Edgeworth, IGA Cameron Park and IGA Woodrising SC.*

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4.3 Shopping Centre Projected Sales

i. Table 4.2 shows projected sales for the proposed Cameron Park Village. Woolworths projected sales were outlined previously, with mini-major and retail specialty sales shown based on an assumed mix.

ii. For the retail specialty floorspace, 85% of total specialty floorspace is assumed to be retail floorspace with the balance non-retail, possibly including a bank, travel agent, office, medical and the like.

iii. Total retail projected sales are $53.1 million in 2019/20, with the supermarket accounting for 69.3% of the total.

TABLE 4.2 – TOTAL CENTRE PROJECTED SALES, 2019/20

Category	GFA (sq.m)	Projected Sales ($000)	($/sq.m)
Woolworths	3,800	36,812	9,687
Mini-majors	2,036	8,915	4,379
Specialties	1,438	7,409	5,152
Total Retail	**7,274**	**53,136**	**7,305**
Non-retail	254		
Total Centre	**7,528**		

Source : Woolworths Limited LOCATIQN

4.4 Sales Impacts

i. This sub-section of the report outlines the likely sales impacts on competitive retail facilities as a result of the development of the retail component of the proposed Woolworths supermarket-based shopping centre at Cameron Park.

ii. It is important to note that impacts outlined in this report are indicative as it is difficult to precisely project the sales impact of the opening of a new store/centre on existing retail facilities. Many factors can influence the impact on individual centres/retailers, including but not limited to:

- Refurbishment/improvements to existing centres.

- Expansions to existing centres.
- Loyalty programs of existing retailers.
- The existing centre mix and how it competes with the proposed development.

iii. For all these reasons and other similar factors, sales impacts outlined in this report should be used as a broad indication.

iv. Table 4.3 outlines projected sales impacts from the proposed Cameron Park Village. The steps involved in assessing the sales and impacts on competitive centres are presented as follows:

- Step 1 - Estimate sales levels for existing centres in the 2017 financial year.
- Step 2 - Project sales for existing and proposed centres in the 2020 financial year, the first full year of trading for the proposed Cameron Park Village. These projections allow for retail market growth, and new retailers (such as expanded offers at Stockland Glendale and Westfield Kotara). All sales projections in 2020 are presented in constant 2017 dollars (i.e. excluding inflation).
- Step 3 - Outline the change in sales at each centre in 2019/20 as a result of the development of the Cameron Park Village. Again, all sales are expressed in constant 2017 dollars.
- Step 4 - Show the impact on sales in 2020, both in dollar terms and percentage of sales.

TABLE 4.3 – CAMERON PARK VILLAGE PROJECTED IMPACTS, 2017 – 2020

	Unit	Estimated 2017	Projected 2020 Pre Dev.	Projected 2020 Post Dev.	Impact 2020 $M	Impact 2020 %
Cameron Park Village	*$M*	*n.a.*	*n.a.*	*53.1*	*n.a.*	*n.a.*
Regional Centres						
Charlestown Square	$M	545.2	580.6	579.1	-1.5	-0.3%
Westfield Kotara[1]	$M	504.2	587.9	586.7	-1.2	-0.2%
Sub-regional Centres						
Stockland Glendale[1]	$M	316.3	377.6	353.1	-24.5	-6.5%
Supermarket Based Shopping Centres						
Cameron Park IGA	$M	7.5	8.1	6.9	-1.2	-15.0%
Edgeworth	$M	73.0	76.5	65.1	-11.5	-15.0%
Cardiff Marketplace	$M	61.9	65.6	62.3	-3.3	-5.0%
West Wallsend	$M	10.0	10.6	9.5	-1.1	-10.0%
Woodrising SC	$M	18.8	19.9	19.4	-0.5	-2.5%
Stockland Wallsend	$M	102.6	111.4	105.9	-5.6	-5.0%

**Constant 2016/17 dollars & Including GST*

[1] Proposed centres and expansions assumed to be trading for a full year by FY2020

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v. The key information outlined in Table 4.3 is summarised as follows:

- The proposed Cameron Park Village is projected to record sales of $53.1 million in 2019/20. Of this total:
  - $19.3 million is projected to come as a result of a redirected spending from competitive facilities within the main trade area;
  - $30.9 million is projected from a reduction in expenditure to facilities beyond the main trade area;
  - $2.9 million is likely to result from impacts on a range of smaller retail facilities within and beyond the main trade area that are not currently represented in Table 4.3.
- The largest impact is projected on Stockland Glendale (beyond the main trade area), in the order of $24.5 million or 6.5%. The majority of this impact is likely to fall on the Woolworths supermarket, which is the closest full-line Woolworths supermarket to the Cameron Park site and is currently achieving a very strong trading level. Post-development of the proposed Cameron Park Village,

Stockland Glendale is projected to record strong sales of over $330 million (assuming an expansion), above benchmarks for similar centres and higher than the existing sales level. Woolworths at Stockland Glendale is 4,791 sq.m in size and the Coles supermarket is to be expanded as part of the current development application. As such, this would be a key supermarket destination in the surrounding region.

- The next largest impacts would likely fall on retail facilities within the Edgeworth Town Centre (within the main trade area), which are projected to be impacted by some $11.5 million in combination, or around 15%. The majority of this impact would fall on Coles and Aldi supermarkets.

- After the impact, main trade area supermarkets are projected to achieve solid trading levels of over $9,100 per sq.m in 2019/20, increasingly to more nearly $10,500 per sq.m by 2025/26. As such, all centres stand to benefit from solid market growth after the impact is absorbed, and recoup existing sales within five years of the Cameron Park Village opening.

- Alternate IGA-based centres within the main trade area, namely at Cameron Park, West Wallsend and Woodrising Shopping Centre are projected to be impacted by $1.2 million (15%), $1.1 million (10%) and $0.5 million (2.5%), respectively.

- Beyond the main trade area, the total impact of Cameron Park Village on the Woolworths-anchored Cardiff Marketplace is projected at $3.3 million (5%) in 2019/20, with Stockland Wallsend estimated to be impacted by $5.6 million (5%).

- All other competitive impacts would be 10% or less and therefore within the normal competitive range. Importantly, any impact from the proposed Cameron Grove Village is only likely to be experienced by competitive centres in the short term, reflecting strong future population growth throughout the main trade area of 2.2% per annum over the forecast period.

vi. Overall, the proposed Cameron Park Village would not impact on the viability or continued operation of any shopping centre within the main trade area or the surrounding region. Current shopping centre expansions would also be supportable as would be a future retail offer at Minmi to serve future population growth in the area.

4.5 Employment and Consumer Impacts

i. The development of the proposed Woolworths supermarket based shopping centre at Cameron Park would result in a range of important economic benefits which will be of direct benefit to the local community. These key positive employment and consumer impacts include:

- The provision of a wider range of food and grocery shopping facilities, including a major full-line Woolworths supermarket of 3,800 sq.m, increasing convenience and price competition for local residents.
- The retail development is projected to employ around 317 persons as summarised in Table 4.4. Taking a conservative view and allowing for an estimated 10% of the total increase to be as a result of reduced employment at existing retail facilities, the net additional jobs are estimated at 285.
- The additional 285 permanent retail employees would earn an average annual wage of around $38,142, based on employee earnings data for the retail trade industry released by the ABS in May 2016. This represents an additional $8.2 million in salary and wages for the local economy, directly as a result of the proposed development.
- Further jobs would be created from the supplier induced multiplier effects as a result of retail jobs for the on-going operation of Cameron Park Village, which may include both full-time and part-time positions. In total, some 271 jobs are projected to be created in the broader community, based on ABS Input/Output Multipliers (refer Table 4.5).

- The development would create a substantial number of additional jobs for the construction and related industries during the construction phase of the development and for the economy generally once the development is complete.

- The estimated total capital costs for the construction of the development are $25 million. By using the appropriate ABS Input/Output Multipliers that were last produced in 1996/97 and a deflated estimated total capital cost of construction of $19.1 million (i.e. in 1996/97 dollars), it is estimated that the construction period of the proposed Cameron Park Village would create some 134 jobs (refer Table 4.6).

- The additional construction jobs (134), would result in a further 214 jobs in the broader community based on ABS Input/Output Multipliers (refer Table 4.6).

- As a result, in total some 904 jobs are likely to be created both directly and indirectly as a result of the opening of the proposed Cameron Park Village.

TABLE 4.4 – ESTIMATED PERMANENT EMPLOYMENT

Type of Use	Estimated Employment Per '000 sq.m	**Cameron Park Village** Change in GFA (sq.m)	Employment (persons)
Supermarket	50	3,800	190
Mini-majors	20	2,036	41
Retail Specialty Shops	60	1,438	86
Total Centre[1]		**7,274**	**317**
Net Increase[2]			**285**

1. Excludes non-retail components.
2. Net increase includes an allowance for reduced employment levels at impacted centres estimated at 10% of the total increase

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TABLE 4.5 – ESTIMATED EMPLOYMENT IMPACT

Original Stimulus	Direct Employment	Supplier Employment *Multiplier Effects*	**Total**
Centre Employment[1]	285	271	556

** Employment totals include both full-time and part-time work*

1. Indicates the estimated number of net additional ongoing jobs as a result of the proposed development

Source : Australian National Accounts: Input-Output Tables 1996-97

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TABLE 4.6 – ESTIMATED CONSTRUCTION EMPLOYMENT IMPACT

Original Stimulus	Estimated Capital Costs ($M)[1]	Direct Employment	Supplier Employment *Multiplier Effects*	**Total**	
Construction of Project	19.1	134	214	348	Job Years[2]

** Employment totals include both full-time and part-time work*

1. Adjusted by inflation and productivity to 1996/97 Dollars

2. Indicates the estimated number of jobs over the life of the construction project plus ongoing multiplier effects, for the equivalent of one year

Source : Australian National Accounts: Input-Output Tables 1996-97

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5 NEEDS ANALYSIS

The final section of this report summarises the key conclusions of the impact analysis for the proposed Woolworths supermarket based shopping centre at Cameron Park.

'Need' or 'Community Need' in a planning sense is a relative concept that relates to the overall wellbeing of a community. A use is needed, for example, if it would, on balance, improve the services and facilities available in a locality. The reasonable demands and expectations of a community are important, therefore, in assessing need.

Many important factors that relate to need, particularly economic need, include:

- Population and supermarket demand.
- Consumer trends.
- Location and alternative sites.
- Impacts on existing retail facilities.
- Impacts on retail hierarchy.
- Net community benefits.

5.1 Population and Supermarket Demand

i. The main trade area population is currently estimated at 31,275 and is projected to increase to 42,400 by 2031, representing an average annual growth rate of 2.2%.

ii. The main trade area population is currently served by only one full-line supermarket, namely Coles at Edgeworth Town Square. Other full-line supermarkets are some 5.3 km away or more, including Stockland Glendale.

iii. In Australia, a full-line supermarket is typically supportable for every 8,000 – 9,000 persons. On this basis, the main trade population could currently easily support three full-line supermarkets, with potential for four full-line supermarkets by 2021.

iv. Indeed, the primary west sector population alone at 18,090, increasing to 24,090 by 2031, would indicate demand for at least two full-line supermarkets. With none currently provided, this indicates strong demand for the proposed Cameron Park Village development.

5.2 Consumer Trends

i. There is a strong need for convenient shopping facilities and a wider choice of facilities within close proximity to the homes of main trade area residents, with consumers visiting supermarkets two to three times a week, on average.

ii. Over the past 5 - 10 years, there has been an increasing trend towards convenience shopping. This trend has been largely driven by broader social trends that have resulted in consumers becoming more time poor. These social trends include:

- Longer working hours.
- An increase in the number of women in the labour force.

iii. Time pressures are ranked at the top of the list of issues that consumers face when undertaking their regular food and grocery shopping.

iv. As a result of the increasing time pressures that consumers face when it comes to food and grocery shopping, there is growing demand for convenient shopping facilities to meet the needs of local residents.

v. The design of proposed Cameron Park Village, including an easily accessible provision of at-grade car parking, would be highly convenient, providing an alternative to less convenient existing supermarket facilities within the area.

5.3 Location

i. The proposed Cameron Park Village site enjoys an easily accessible and high-profile location along George Booth Drive. As such, the proposed development would provide excellent accessibility and a high level of convenience for the surrounding local resident population.

ii. Reflecting the high-profile location of the subject site and the strong demand for additional supermarket floorspace within the main trade area, the subject site should be a strong location for a full-line supermarket.

5.4 Impacts on Existing Retailers and the Retail Hierarchy

i. The proposed development would not impact on the viability or continued operation of any retail centre within the main trade area or the surrounding region.

ii. The largest impacts are projected to fall on Stockland Glendale, which is proposed for expansion and the Edgeworth Town Centre which trades strongly.

iii. The proposed development would not undermine the continued operation of existing retail centres in the main trade area (i.e. impacts are well within the bounds of normal competition). Impacted retail centres will continue to trade at viable levels, benefiting from sales growth over time.

iv. Beyond the main trade area, there are a network of shopping centres including Charlestown Square, Westfield Kotara and Stockland Glendale. These are the largest shopping centres in the region and are significant non-food retail destinations. Main trade area residents would continue to shop at these locations for their higher-order shopping needs.

v. As indicated previously, there is also significant demand for further retail floorspace and in particular, supermarket floorspace within the defined main trade area.

5.5 Net Community Benefits

i. It is the conclusion of this report that a substantial net community benefit would result from the development of the proposed Woolworths supermarket based shopping centre at Cameron Park. Offsetting the trading impacts on some existing retailers, there are very substantial positive impacts including the following:

- Significant improvement in the range of retail facilities that would be available to residents, particularly in terms of convenient full-line supermarket retailing. The

proposed Woolworths supermarket would improve choice of location and also allow for price competition.

- Further, the proposed supermarket at the site would represent the only full-line offer within around 3.5 km, providing residents with a convenient, local major full-line supermarket at which to undertake a full weekly shop.
- The retail offer at the development would provide a convenient and competitive offer for local residents and would satisfy the significant retail demand currently within the main trade.
- The addition of a full-line supermarket would also result in the retention of spending currently being directed to other large supermarket facilities at the major shopping centres beyond the main trade area, which can become quite congested during peak times.
- The creation of additional employment which would result from the project, both during the construction period, and more importantly, on an ongoing basis once the development is complete and operational. In total, some 904 jobs are likely to be created both directly and indirectly as a result of the development of Cameron Park Village. This includes a number of youth employment opportunities with retail developments generally employing a large number of younger staff.
- The reduction in travel time and petrol cost savings.

ii. It is concluded that the combination of the substantial positive economic impacts serves to more than offset the trading impacts that could be anticipated for a small number of existing retail stores, particularly supermarkets, in the region. Further, the impacts would not threaten the viability of any centres.

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To: Thomas Rethati, Assistant Development Manager, Woolworths

From: Greg Malempre, Director, Location IQ

Date: 15th February 2018

Subject: **Cameron Park, Lake Macquarie**

This memorandum provides an independent assessment of the potential for the proposed Cameron Park Marketplace, a Woolworths supermarket anchored shopping centre that will serve an existing and growing population base.

In response to Councils information request, a cost benefit analysis of the planned car parking provision at the site is undertaken.

As outlined in Table 7 of the *Lake Macquarie Development Control Plan 2014*, that was adopted by Council on the 10th July 2017:

> *"where the total area for a shop or group of shops is greater than 5,000 sq.m GFA, the car parking provision is one space per 40 sq.m GFA"*.

Assuming the DCP car parking provision and based on the planned floorspace for Cameron Park Village of 7,528 sq.m, this would indicate 188 car spaces should be provided. In terms of the definition for car parking provision as undertaken in typical retail assessments, this would indicate 2.5 car spaces per 100 sq.m of floorspace which is significantly lower than the typical benchmark of around 5 car spaces per 100 sq.m of floorspace for similar shopping centres. Currently, Woolworths Limited propose 387 car spaces for Cameron Park Village at a rate of 5.1 car spaces per 100 sq.m of floorspace.

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In relation to the need for the planned 387 car spaces as part of the Cameron Park Village, key points to note include:

- The higher provision in comparison to the rate outlined in the DCP would not be a competitive advantage for Cameron Park Village as other shopping centres in the immediate area have similar car parking rates (car spaces per GFA sq.m), namely:
    - Stockland Wallsend: 5.0 car spaces per 100 sq.m.
    - Edgeworth Town Square: 4.0 car spaces per 100 sq.m.
    - Stockland Glendale: 2.9 car spaces per 100 sq.m.
    - Northlakes IGA: 3.6 car spaces per 100 sq.m.

  On this basis, should Cameron Park Village have a rate of 2.5 car spaces per 100 sq.m of floorspace, the shopping centre would be significantly disadvantaged in comparison to other shopping centres.

- Typically, a lower provision of car parking spaces for a shop or a group of shops as part of a shopping centre is common in more densely populated areas. In inner city areas the density is generally higher, average household sizes are smaller and the average basket size of shoppers is smaller with these people undertaking smaller shops more regularly. A lower rate of car parking is not typically evident in outer suburban areas with lower dwelling yields and larger household sizes.

- A low rate of car parking spaces generally reflects an immediate large walker population and a reduced need for car based travel to a shopping centre/shops. Pedestrians would typically undertake a walk of 0.8 – 1 km from their home or place of work to retail facilities. This is generally accepted to be a comfortable walking distance. Within an approximate 0.8 – 1 km radius around the Cameron Park Village site, there is currently a resident population of 1,000 – 2,188 persons. This reflects a low level of density compared to other nearby shopping centres (refer Table 1). It is noted that even when the density increases with future development, the density will still be relatively low.

- With the provision of a full-line Woolworths supermarket at the Cameron Park Village site, it is considered unlikely that the surrounding resident population would walk to the shopping centre to undertake a weekly family shop as it would be difficult to carry a number of bags back to their homes. A full-line supermarket would typically indicate a bigger basket size/shop with these types of shopping trips undertaken by car for convenience. Smaller shops/shopping centres require less car parking as customers are more likely to undertake a quick, top up shopping trip only.

- In outer suburban areas such as Cameron Park, families are more common with one or more young children. Parents taking children to the shops and undertaking a large weekly shop require convenient and ample car parking.

- If the car parking rate applied to the Cameron Park site is in accordance with the DCP at around 2.5 car spaces per 100 sq.m of floorspace, this would likely mean that a significant number of shoppers would be inconvenienced during peak shopping periods by being unable to easily find a car park. Shoppers would either have to circle the car park until car spaces turnover; park on street which is undesirable in terms of amenity, safety and convenience; or choose to travel further afield to supermarkets with a greater provision of more accessible car parking. All of these actions would result in a greater cost in terms of petrol and car maintenance and also have more traffic generation on roads in the local area. Further, there is potential health risks with cars manoeuvring more often through a car park, particularly in an area that will house a number of younger families (i.e. parents and children).

- The planned provision of car parking at around 5.1 car spaces per 100 sq.m of floorspace for Cameron Park Village would ensure greater customer amenity, significant customer flows and a more equivalent offer with other similar centres that have higher car parking ratios.

Taking all of the above into consideration, the current car parking rate proposed by Woolworths Limited of 5.1 car spaces per 100 sq.m of floorspace for Cameron Park Village is required and would ensure the best outcome for the planned development whilst also reducing possible impacts on both residents/consumers and infrastructure. If the DCP provision of 2.5 car spaces per 100 sq.m of floorspace is applied to the Cameron Park Village site, this would result in a significant disadvantage to the site given that other shopping centres in the surrounding area have significantly higher car parking ratios that are more in accordance with the planned 4.9 car spaces per 100 sq.m. Other negative results would also likely occur including greater car based travel, on street car parking which is undesirable, potential traffic incidents, possible traffic congestion in to and out of the car park and also on the site and increased costs for local residents.

I hope this information meets your requirements. Should you have any further queries, please feel free to contact me directly.

Yours Sincerely

Greg Malempre
Director
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TABLE 1 – CAR PARKING RATIOS AND POPULATION DENSITY (2016 POPULATION)

	1 km radius Population	Car parking Provision (per 100 sq.m)
Cameron Park Village (p)	*2,188*	*5.1*
Stockland Wallsend	7,043	5.0
Northlakes IGA	6,905	3.6
Stockland Glendale	5,176	2.9
Edgeworth Town Square	3,767	4.0

Source: LocationIQ, ABS

239402-DA-001-F

5090
D.P.1235166

5088
D.P.1235166

5089
D.P.1235166

PT.6000
D.P.1238670

902
D.P.1222132

McKENDRY DRIVE

NORTHRIDGE DRIVE

PORTLAND DRIVE

GEORGE BOOTH DRIVE

PT.2
(2231m²)

1
2798m²

McKENDRY DRIVE (2097m²)

WOOLWORTHS

PT 2
(3.24Ha)
TOTAL AREA
3.89Ha

3
2369m²

5
2486m²
PUBLIC
RESERVE

5
2486.7m²

4
7670m²

PT.2
(4253m²)

CYCLEWAY

STORMWATER
BASIN
LOCATION

(H) (G) (F) (I) (C) (D)

Parcel Table				
No.	Bearing	Length	Arc	Radius
C1	20°56'55"	64.47	19.65	44.305
C2	193°00'40"	102.844	31.345	43.5
C3	168°00'30"	29.202	8.9	58.5
C4	358°07'50"	46.436	14.155	28
C5	41°56'15"	26.868	8.19	8
C6	159°28'00"	52.891	16.12	77.5
C7	172°23'35"	29.12	8.875	36.5
C8	209°11'40"	24.259	7.395	9.18
C9	30°07'40"	41.336	12.6	16.3
C10	196°37'20"	37.791	11.52	38.2
C11	136°55'15"	15.627	4.765	6.3
C12	165°28'25"	33.551	10.225	42.5
C13	179°55'20"	4.326	1.32	5
C14	359°58'00"	4.301	1.31	5
C15	196°12'25"	66.013	20.12	26.5
C16	229°00'30"	82.206	25.055	50.825
C17	281°37'25"	70.497	21.485	40
C18	110°02'15"	88.064	26.84	111
C19	14°49'05"	30.563	9.315	46.5
C20	194°49'05"	68.022	20.735	103.5
C21	15°56'35"	44.417	13.54	56.5
C22	183°25'30"	11.982	3.65	18.5
C23	74°19'55"	25.807	7.865	5
C24	327°28'40"	16.078	4.9	5
C25	5°31'10"	21.112	6.435	18.5
C26	21°22'25"	38.104	11.615	56.5
C27	30°28'00"	69.363	21.14	189
C28	290°28'00"	77.437	23.605	211
C29	88°45'05"	14.326	4.365	15.25
C30	106°16'10"	9.602	2.925	9
C31	128°12'50"	13.016	3.965	9
C32	315°45'55"	47.968	14.62	82.5
C33	309°39'50"	124.07	37.815	1058
C34	302°52'45"	39.587	12.065	60
C35	131°57'15"	40.777	12.43	24
C36	323°54'30"	43.217	13.175	131
C37	319°22'15"	107.894	32.885	568.5
C38	311°44'05"	124.962	38.09	182.5
C39	138°21'55"	25.994	7.925	18
C40	156°09'15"	64.645	19.705	109

Parcel Table				
No.	Bearing	Length	Arc	Radius
C82	172°13'40"	241.997	73.76	251.47
C85	155°29'10"	240.14	73.195	251.47
C87	142°20'15"	138.531	42.225	251.47
C88	311°44'05"	121.539	37.045	177.5
C89	319°22'15"	106.945	32.595	563.5
C90	323°54'30"	41.568	12.67	126
C94	315°45'55"	45.061	13.735	77.5
C95	131°57'15"	49.272	15.02	29
C97	302°52'45"	36.288	11.06	55
C100	309°39'50"	123.486	37.64	1053
L1	41°34'35"	70.511		
L2	117°00'45"	72.411		
L3	187°47'35"	24.501		
L4	33°39'20"	18.389		
L5	33°39'20"	6.226		
L6	352°22'00"	59.611		
L7	12°36'40"	1.504		
L8	71°15'45"	9.422		
L9	153°30'25"	28.863		
L10	179°21'30"	235.795		
L11	153°30'25"	14.998		
L12	161°20'00"	42.667		
L13	126°27'20"	59.174		
L26	207°15'45"	11.536		
L36	96°07'05"	66.32		
L37	76°26'50"	17.687		
L38	295°15'40"	4.734		
L39	27°00'45"	172.841		
L40	297°00'45"	13.006		
L41	27°00'45"	26.115		
L42	297°00'45"	6.732		
L46	27°00'45"	27.247		
L48	117°00'45"	41.54		
L49	27°00'45"	18.496		
L50	295°15'40"	66.903		
L51	352°22'00"	43.269		
L52	7°28'40"	8.234		
L53	126°27'20"	3.263		
L54	74°41'55"	13.778		
L55	117°00'45"	587.496		

Parcel Table				
No.	Bearing	Length	Arc	Radius
L56	136°26'20"	52.715		
L57	189°04'45"	9.935		
L58	189°04'45"	7.775		
L59	297°00'45"	82.057		
L65	27°00'45"	207.053		
L66	297°00'45"	146.943		
L69	180°37'40"	84.406		
L70	41°34'35"	35.587		
L71	209°15'50"	19.038		
L72	177°46'10"	44.177		
L73	189°04'45"	2.441		
L74	189°04'45"	97.446		
L75	117°16'05"	71.827		
L76	117°18'40"	283.306		
L77	121°37'00"	213.731		
L78	219°29'10"	104.612		
L79	209°15'50"	0.182		
L80	299°24'00"	9.303		
L81	125°45'20"	64.303		
L82	209°23'40"	59.33		
L83	119°24'00"	15.689		
L84	14°50'30"	41.161		
L85	117°16'05"	80.705		
L86	175°33'20"	3.496		
L87	175°33'20"	25.041		
L88	207°15'45"	34.776		
L89	326°47'20"	56.312		
L91	297°07'05"	26.99		
L92	207°15'45"	19.059		
L93	133°38'45"	452.097		
L94	206°57'45"	112.99		
L95	297°00'45"	267.85		
L96	207°00'45"	36.624		
L97	297°00'05"	150.003		
L98	207°15'45"	12.72		
L99	115°35'05"	7.929		
L100	14°50'30"	65.966		
L101	297°07'05"	26.99		
L102	146°47'20"	56.312		
L103	125°45'20"	44.223		
L104	161°20'00"	99.515		

PROPOSED ROAD

PROPOSED PUBLIC RESERVE

WOOLWORTHS SITE

DEVELOPMENT LOTS

(C) RIGHT OF ACCESS VARIABLE WIDTH (D.P.1222132)
(SUBJECT TO VARIATION TO NEW ROAD DESIGN)

(D) EASEMENT FOR SERVICES VARIABLE WIDTH (D.P.1222132)
(SUBJECT TO VARIATION TO NEW ROAD DESIGN)

(F) EASEMENT FOR ELECTRICITY AND OTHER PURPOSES 15 WIDE

(G) PROPOSED EASEMENT FOR ACCESS VARIABLE WIDTH
(FINAL POSITION SUBJECT TO ACCESS REQUIREMENTS)

(H) PROPOSED EASEMENT TO DRAIN WATER
(FINAL POSITION SUBJECT TO DESIGN)

(I) PROPOSED EASEMENT FOR STORMWATER BASIN

NOTES:-

1. BOUNDARIES HAVE BEEN DETERMINED BY PLAN DIMENSIONS ONLY, AND HAVE NOT BEEN SURVEYED. ALL BEARINGS, DIMENSIONS, AREAS AND EASEMENTS ARE SUBJECT TO FINAL SURVEY.
2. IT IS INTENDED TO DEDICATE THE EXTENSION OF PROPOSED ROAD McKENDRY DRIVE TO COUNCIL.

ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
F	21-02-18	AMEND BOUNDARIES AND ADD DIMENSIONS	RC	TC	DATUM: N/A CONTOUR INTERVAL: N/A	0 15.0 30.0m SCALE: 1:600 (FULL)	

drawing title:
PLAN OF PROPOSED SUBDIVISION OF LOT 901 D.P.1222132

location: GEORGE BOOTH DRIVE CAMERON PARK

council: LMCC

dwg ref: 239402-DA-001-F

client: FABCOT PTY LTD

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SITE WASTE MINIMISATION AND MANAGEMENT PLAN

WOOLWORTHS, CAMERON PARK

Prepared for
WOOLWORTHS LIMITED

By
MRA ENVIRONMENTAL

FEBRUARY 2018

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LIMITATIONS

MRA Environmental has prepared this Site Waste Minimisation and Management Plan for the sole use of Woolworths Limited, for the proposed commercial development at 309 George Booth Drive, Cameron Park N.S.W.

We have performed our services for this project in accordance with our current professional standards. No other warranty, expressed or implied is made as to the professional advice included in this submission.

Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions. The report also contains comments and information provided by others. MRA Environmental cannot take responsibility for advice provided by any third party.

This document has been prepared for the sole purpose of a Site Waste Minimisation and Management Plan, on the abovementioned property. It may not contain sufficient information for the purposes of other parties, for other uses or at other locations. It does not purport to present final or detailed engineering designs for construction.

DOCUMENT CONTROL SHEET

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Document No: MRA18-003

Date February 2018

Project Manager Ryan Henry

***Title*:**	SITE WASTE MINIMISATION AND MANAGEMENT PLAN WOOLWORTHS, CAMERON PARK
***Author*:**	Ryan Henry
***Client*:**	Woolworths Limited
***Client Contact*:**	Thomas Rethati
***Client Ph*:**	0424 743 007
***Summary*:**	A conceptual Site Waste Minimisation and Management plan for the operational phase of the development in regards to waste storage and collection.

REVISION/CHECKING HISTORY

Revision Number	Date	Checked By		Issued By	
B	February 2018	MR		MR	

DISTRIBUTION

Destination	Revision							
	Draft	a	b	c	d	e	f	g
Woolworths Limited	1	1	1					
MRA Environmental	1	1	1					

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Attachment A: MRV Swept Paths

1.0 GLOSSARY OF TERMS

Class - the classification of a building as determined by the Building Code of Australia.

Collection point - the usual (or agreed) point on the footpath/roadway, or on-site, where garbage and recyclables are loaded onto vehicles.

Collection area - the location where garbage or recyclable material is transferred from a building's storage containers to a collection vehicle for removal from the site.

Compostable material - vegetative material capable of being converted to humus by a biological decay process.

Dwelling - a room or number of rooms occupied or used, or, so constructed or adapted as to be capable of being occupied or used, as a separate domicile.

Garbage - refuse or waste material other than trade waste, effluent, compostable material, green waste or recyclable material.

Garbage and recycling room - a room where garbage and recycling receptacles are stored, awaiting reuse or removal from the premises.

Green waste - vegetative matter including trees, branches, shrubs, cuttings, lawn clippings and untreated timber and wood products.

Hazardous waste - any waste that, because of its physically, biologically or chemically damaging properties, is capable of causing a danger to the life or health of any living thing if it is released into the environment.

Recyclable - capable of being reprocessed into useable material or re-used.

Site Waste Minimisation and Management Plan - a checklist showing the volume and type of waste to be generated, stored and treated on site, and how the residual is to be disposed of.

Special waste - a waste that posed or is likely to pose an immediate or long-term risk to human health or the environment. This includes hazardous waste, clinical waste and contaminated waste. Special arrangements need to be made for the management of these wastes.

Storey - a habitable or occupied space within a building between one floor level and the next floor level above, or if there is no floor level above, the roof.

Trade waste - refuse or waste material arising from any trade or industry but excludes liquid waste, demolition waste, building waste, special waste, contaminated waste, green waste or recyclable waste.

Volume Reduction Equipment - devices, which reduce the volume of waste or recyclable material including compressing devices such as compactors and balers, and shredding, pulverising or crushing devices.

Waste includes:

- any substance (whether solid, liquid or gaseous) that is discharged, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment, or
- any discarded, rejected, unwanted, surplus or abandoned substance, or
- any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, reprocessing, recovery or purification by a separate operation from that which produced the substance.

Waste storage and recycling area - a designated area or a combination of designated areas upon the site of a building for the housing of approved containers to store all waste material (including recyclable material) likely to be generated by the buildings' occupants.

Waste storage and recycling room - rooms within buildings, for holding waste and recyclable material. Compaction equipment may be provided and rooms could be refrigerated.

2.0 INTRODUCTION

Woolworths Limited propose to develop a Commercial Shopping Centre at 309 George Booth Drive, Cameron Park on land described as Lot 901 on DP1222132 (refer **Figure 1**). The site is bound by Northridge Drive to the north, Portland Drive to the east, George Booth Drive to the south and future development area to the west of the site. A commercial development including a supermarket, two kiosks, 23 specialty shops, car parking and supporting facilities is proposed. Future development areas also exist to the east, south and west of the subject site and will be addressed in subsequent applications.

A Development Application for the proposal was lodged with Lake Macquarie City Council (LMCC) in 2017 to which Council responded in October 2017 with a Request for Further Information (RFI). Item 11 of the RFI requires that further detail be provided regarding waste management as follows:

Waste: *In regards to Section 8.1 (Demolition and Construction Waste Management) and Section 8.2 (Waste Management) of DCP 2014, Council's Waste Co-ordinator, David Brake, and Waste Officer, Lindi Bowen, have reviewed the proposed development and advised the following information is required:*

a. *The expected quantities of each waste type to be generated during the operation of the shopping centre;*
b. *The number and size of bins, compacting equipment and space for bales expected to be required to store each waste type, considering the service frequency for each waste type;*
c. *The waste enclosure to show that it is of suitable size to store the number of proposed bins, bales and/or compactors with bin layout provided on a plan to show staff can safely access the bins to place waste in;*
d. *Access for waste collection vehicles to show that they can safely negotiate the internal road network to access the service area and waste enclosure; and*
e. *Whether food wastes will be minimised by donation to charity of suitable quality foods; and the remaining food waste to be separated for diversion to composting or other alternative waste treatment.*

MRA Environmental (MRA) has been commissioned by Woolworths Limited to prepare this Site Waste Minimisation and Management Plan (SWMMP) for the operational phase of the development. The SWMMP will be submitted to Council as a component of the RFI response. The SWMMP addresses the above points regarding waste management requirements for the development, and ensures that the waste storage and collection activities for the operational phase of the development are in accordance with Council's *Waste Management Guideline* (LMCC, June 2013).

2.1 SCOPE OF REPORT

This report represents a Site Waste Minimisation and Management Plan for the operational phase of the development, which includes:

- Details on the anticipated quantity of waste (**Section 3.0**);
- Details of the proposed waste storage arrangements (**Section 4.0**); and
- Details of the proposed waste collection arrangements (**Section 5.0**).

This report presents conceptual information on the above dot points, rather than involving detailed designs and calculations. At the current phase of the proposal, the development of detailed engineering designs in regards to waste storage and collection is not practical.

MARK RIGBY & ASSOCIATES excellence in environmental management solutions · balance · growth	DESIGNED: RH DRAWN: RH CHECKED: MR APPROVED: MR DATE: JANUARY 2018	SCALE: NTS LEVEL DATUM: - SHEET SIZE: A4 CAD FILE: ISSUE: FINAL	CLIENT: WOOLWORTHS LIMITED PROJECT: WASTE MANAGEMENT PLAN 309 GEORGE BOOTH DRIVE, CAMERON PARK TITLE: SITE LOCATION MAP	JOB NUMBER: MRA18-003 DRAWING: FIGURE 1 REV: A

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3.0 WASTE QUANTITIES

3.1 TYPE OF WASTE

Table 1 outlines the predicted types of waste that are expected to be generated from the Cameron Park development.

Table 1: Predicted waste types to be generated from the development.

Tenancy Type	Predicted Waste Types
Food and beverage tenancies	Waste cooking oil, cardboard, recycling and mixed food and beverage waste.
Fresh food outlets	General and recycling waste.
Specialty retail outlets	General and recycling waste.
Supermarket	General and recycling waste, cardboard waste.

3.2 WASTE QUANTITIES

The waste expected to be generated from the various components of the Cameron Park development has been calculated using typical waste generation rates provided by Council. **Tables 2** and **3** below (and over Page 7) display the anticipated general and recycling waste quantities for the various components of the Cameron Park development.

Table 2: Anticipated general waste quantities for the Cameron Park development.

Tenancy	Approximate Floor Space (m^2)	Estimated Waste Generation Rate (L/day)	Estimated Waste Generation (m^3/week)	Estimated Waste Generation (m^3/day)
Supermarket	3,450	8,496	59.47	8.50
T1	184	92	0.64	0.09
T2a	256	128	0.90	0.13
T2b	84	67.2	0.47	0.07
T3	135	108	0.76	0.11
T4	72	36	0.25	0.04
T5	72	36	0.25	0.04
T6	72	36	0.25	0.04
T7	67	33.5	0.23	0.03
T8	68	34	0.24	0.03
T9	99	659.34	4.62	0.66
T10	105	52.5	0.37	0.05
T11	70	466.2	3.26	0.47
T12	76	506.16	3.54	0.51
T13	76	60.8	0.43	0.06
T14	76	60.8	0.43	0.06
T15	76	60.8	0.43	0.06
T16	50	40	0.28	0.04
T17	83	41.5	0.29	0.04

T18	521	260.5	1.82	0.26
T19	490	245	1.72	0.25
T20	450	225	1.58	0.23
T21	75	37.5	0.26	0.04
T22	575	287.5	2.01	0.29
C&C	75	7.5	0.05	0.01
Kiosks	80	40	0.28	0.04
TOTAL	**7,527**	**12,117.8**	**84.82**	**12.12**

Table 3: Anticipated recycling waste quantities for the Cameron Park development.

Tenancy	Approximate Floor Space (m^2)	Estimated Waste Generation Rate (L/day)	Estimated Waste Generation (m^3/week)	Estimated Waste Generation (m^3/day)
Supermarket	3,450	8,496	59.47	8.50
T1	184	92	0.64	0.09
T2a	256	128	0.90	0.13
T2b	84	42	0.29	0.04
T3	135	67.5	0.47	0.07
T4	72	18	0.13	0.02
T5	72	18	0.13	0.02
T6	72	18	0.13	0.02
T7	67	16.75	0.12	0.02
T8	68	17	0.12	0.02
T9	99	198	1.39	0.20
T10	105	52.5	0.37	0.05
T11	70	140	0.98	0.14
T12	76	152	1.06	0.15
T13	76	38	0.27	0.04
T14	76	38	0.27	0.04
T15	76	38	0.27	0.04
T16	50	25	0.18	0.03
T17	83	20.75	0.15	0.02
T18	521	260.5	1.82	0.26
T19	490	245	1.72	0.25
T20	450	225	1.58	0.23
T21	75	18.75	0.13	0.02
T22	575	287.5	2.01	0.29
C&C	75	7.5	0.05	0.01
Kiosks	80	20	0.14	0.02
TOTAL	**7,527**	**10,679.75**	**74.76**	**10.68**

In summary, the proposed development is expected to generate a combined total of approximately **12.12m³** per day of general waste and **10.68m³** per day of recyclable waste.

It should be noted that waste cooking oil facilities will also be provided for food & beverage tenancies. However, the quantity of waste cooking oil generated can vary greatly, depending on the type of food & beverage tenancies, seasonality etc. For that reason, no estimates for waste cooking oil have been provided.

4.0 WASTE STORAGE AND TREATMENT

4.1 PROPOSED REFUSE STORAGE AREAS

The supermarket is expected to generate the largest quantity of refuse for the development. The operator of the supermarket has standard waste provisions for their stores that are specific to their needs and will provide bins necessary for their operations at the development. The supermarket will utilise a cardboard baler for all cardboard waste, a bulk bin for general waste, and a bulk bin for co-mingled recycling material (i.e. bottles, plastics, cans). A collection facility will also be provided for the storage of any food waste that is unable to be sold in-store but is of suitable quality to be donated to charity. The supermarket will have a dedicated bin storage and servicing area that is separate to the remainder of the development.

The remaining components of the development have been divided into two (2) conceptual 'catchments' for waste storage. Each catchment will be allocated with a number of bulk bins (general and recycling) that are to be stored in dedicated waste storage areas within each catchment. It will be the responsibility of tenants to dispose of waste in the bins allocated to their tenancy. Site management will then be responsible for carting the mobile bins to the bin servicing area where they will be collected by the contracted service providers. **Figure 2** shows the catchments and the proposed bin storage areas.

The bin storage areas will be designed and constructed to meet the requirements listed below. The bin storage areas will be:

1. Conveniently located to enable easy access for on-site movement and collection;
2. Have sufficient space for the quantity of waste generated and careful source separation of materials, such as recyclables;
3. Have sufficient space to comfortably contain any on-site treatment facilities, such as compaction equipment;
4. Have adequate weather protection and, where appropriate, be enclosed or undercover;
5. Be secure and lockable;
6. Be well-ventilated and drained to the sewer;
7. Be aesthetically pleasing, adding to the scene, not detracting from it. Materials, design and landscaping to complement the building and streetscape;
8. Be clearly signposted to ensure appropriate use;
9. Clean and healthy, free from dust, litter, odour and noise;
10. Designed with appropriate ceiling height to type of service;
11. Provided with sufficient door width for installation, maintenance and wide containers;
12. Accessible for occupants and collection service operators;

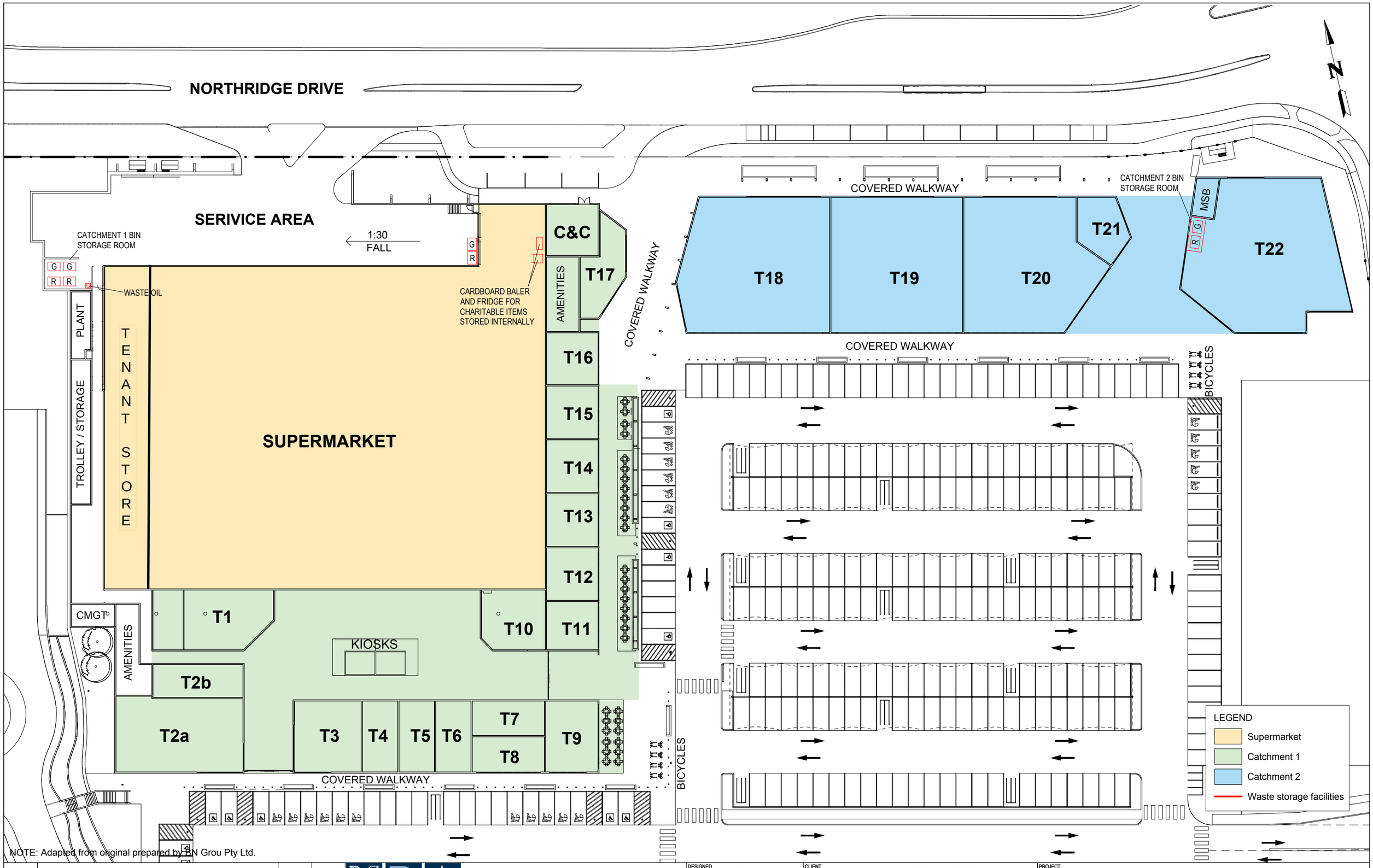
13. Storage and drainage racks are of durable, impervious, non-corrosive material and separated from walls to allow easy access;
14. Provided with adequate mechanical and natural ventilation;
15. Provided with adequate water supply, including hot water for commercial uses;
16. Well drained to a floor waste connected to the sewer;
17. Impervious floor, wall and ceiling material – steel trowel finished concrete floor (minimum 75mm thick) and cement rendered walls;
18. Entry of vermin is prevented;
19. Adequate separation from walls where containers are used and fitted with a bump rail 50mm clear of walls;
20. Durable and smooth ceilings;
21. Durable, self-close and close fitting doors which are openable from inside and outside;
22. Provided with adequate lighting, controllable from inside and outside;
23. Provided with additional space for the storage of bulky waste, such as clean-up materials awaiting removal, or recycling;
24. Designed to enable each separately tenanted or separately occupied area within the building or complex to be provided with a designated and clearly identified space for the housing of sufficient containers to accommodate the quantity of waste and recyclable material generated;
25. On difficult or steep sites, or sites with two street frontages, it may be appropriate to have a number of waste storage and recycling areas/rooms to minimise distances, prevent site pollution and facilitate easy collection;
26. For large-scale proposals there may be a number of garbage and recycling rooms, operating in conjunction with a main collection area located adjacent to the designated collection point. At appropriate times, waste is transported from the garbage and recycling rooms to the main collection area for collection;
27. Council or private vehicles must enter the site and a separate collection area should form part of the development and legal access agreements obtained;
28. Where it is considered necessary, compaction and/or other volume reduction equipment may be provided in the garbage and recycling room(s).

4.2 PROPOSED WASTE CONTAINERS

To ensure that the design of each waste storage area is sufficient, details of the type and quantity of waste, and the bins to be stored within each area are outlined in **Table 4**. Note that the bin provisions for the supermarket will be specified by the tenant according to their standard waste management requirements.

Table 4: Details of bins stored within each catchment storage area of the development.

Waste storage area	Waste Type	Waste Volume (m^3/week)	Bins Proposed in Area	Destination	Frequency
Supermarket	General	Variable	1 x $3m^3$ bulk bin	Landfill	As required
	Co-mingled recycling	Variable	1 x $3m^3$ bulk bin	Recycling facility	
	Cardboard	Variable	Cardboard baler	Recycling facility	
	Suitable quality foods	na	Refrigerated storage	Charity	
Catchment 1	General	17.96	2 x $3m^3$ bulk bins	Landfill	Three per week
	Recycling	8.03	2 x $3m^3$ bulk bins	Recycling facility	Two per week
	Cooking oil	na	1 x waste oil drum	Waste oil refinery	As required
Catchment 2	General	7.39	1 x $2m^3$ bulk bin	Landfill	Four per week
	Recycling	7.26	1 x $2m^3$ bulk bin	Recycling facility	Four per week



NOTE: Adapted from original prepared by BN Grou Pty Ltd.

REV.	DESCRIPTION / NOTES	DATE	APPROVED

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DESIGNED	RH	CLIENT	WOOLWORTHS LIMITED
DRAWN	RH	LEVEL DATUM	AHD
CHECKED	MR	JOB NUMBER	MRA18-003
APPROVED	MR	SHEET SIZE	A3
DATE	JANUARY 2018	REVISION	B

PROJECT
SITE WASTE MINIMISATION AND MANAGEMENT PLAN
309 GEORGE BOOTH DRIVE, CAMERON PARK

TITLE
SITE LAYOUT &
WASTE STORAGE AREAS

SCALE	ISSUE	DRAWING NO.
NTS	FINAL	FIGURE 2

5.0 DETAILS OF COLLECTION

5.1 FREQUENCY

Waste collection frequencies for the operational phase of the development have been included in **Table 4**. Once the development is operational, the collection frequency should be reviewed to ensure that it is sufficient but not excessive. It should be noted that no collection frequency for the supermarket waste streams or waste cooking oil has been provided. Servicing of these waste streams should be conducted as required.

5.2 LOCATION AND ACCESS

On-site servicing of bins in the rear loading area by a private contractor is proposed (refer to **Figure 2**). As such, the bin servicing area will be designed to meet the following requirements. The bin servicing area will be:

1. Conveniently located to ensure ease of access for the service providers;
2. Located away from living/working space in buildings;
3. Weather protected;
4. Provided with appropriate signposting, such as for recycling bins;
5. Designed with sufficient space to cater for the anticipated service vehicles;
6. Designed with adequate driveway widths and height at entrance ways – minimum driveway width of 3.5 metres, maximum grade of 1:8, minimum vertical clearance 4.3 metres;
7. Structural capability of driveway to carry fully loaded waste collection vehicles; and
8. Turning circles or three point turn arrangements to be sufficient so that vehicles can enter and exit the site in a forward direction (minimum turning circle 21.7 metres).

Project traffic engineers Ason Group have prepared MRV swept paths showing service vehicle access to the bin servicing area at the rear of the supermarket and have been included in **Attachment A**. It will be the responsibility of site management to ensure that the bins are appropriately positioned for servicing on collection days. Following servicing, site management will also be responsible for returning bins to the appropriate bin storage areas.

6.0 SUMMARY

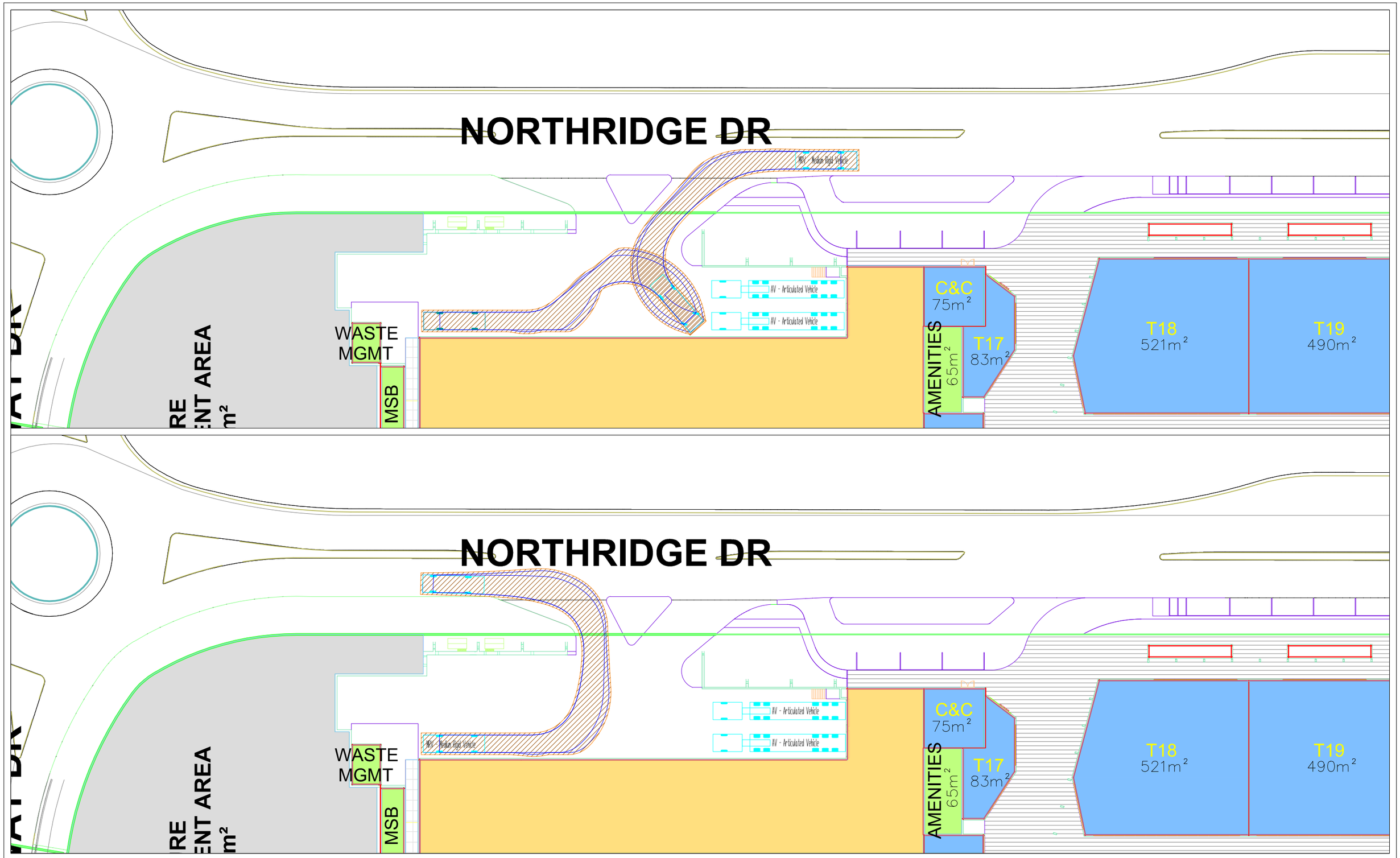
The main objective of this report is to provide details for optimal waste management arrangements for the Cameron Park development in compliance with Council requirements. Further detailed designs will be provided by others.

Details of this Site Waste Minimisation and Management Plan are summarised below:

- The development will involve the construction of a supermarket, 23 commercial tenancies, car parking and associated facilities at Cameron Park, N.S.W;
- Waste generated from across the site is expected to consist of general waste, co-mingled recycling materials, cardboard, waste cooking oil and products suitable food for charitable donation;
- The entire development is expected to generate a combined total of approximately **12.12m^3/day** of general waste and **10.68m^3/day** of recyclable waste according to Council's standard waste generation rates;
- Waste generated by the supermarket will be managed by the tenant independently of the rest of the development;
- The supermarket will utilise a bulk bin for general waste, a bulk bin for co-mingled recycling materials and a cardboard baler for all cardboard waste;
- Any suitable food that cannot be sold by the supermarket will be collected by charity and diverted away from landfill;
- The remainder of the site (excluding the supermarket) has been conceptually divided into two separate catchments for waste management purposes with each catchment including a bin storage room for general waste and recycling separation;
- Tenants will be responsible for carting waste to the provided bins within each catchment and sorting waste into the appropriate bins;
- Each of the waste storage points will be designed and constructed in accordance with Council's guideline requirements;
- Waste cooking oil drums will be provided in a bunded area for the storage of any waste cooking oil;
- Bin wash facilities will be provided within each bin storage room and in the central waste storage area. It will be the responsibility of on-site management and staff to wash bins and to maintain the amenity of the waste storage areas;
- Site management will cart the bulk bins to the rear loading area for servicing by a contracted waste service provider; and
- Project traffic engineers have demonstrated that there is sufficient clearance and space available at the nominated service locations for trucks to manoeuvre and service the bins.

ATTACHMENT A

MRV SWEPT PATHS
(PREPARED BY ASON GROUP)



Revision notes:

Rev:	Date:	Notes:

Drawn By: AJ

Client: Fabcot Pty Ltd

Project: AG0313 George Booth Drive, Cameron Park

Drawing Title: Loading Dock MRV

Date: 22 June 2017

Scale @ A3: 1:500

Revision: -

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19 February 2018

General Manager

Lake Macquarie City Council
Box 1906
Hunter Regional Mail Centre
NSW 2310

Att: **Ms Georgie Williams**

RE: DA 1178/2017 Proposed Development at Lot 901, DP 1222132 George Booth Drive, Cameron Park

Dear Ms Williams

Studio GL have been engaged by the applicant, Fabcot, to prepare a letter that responds to Council's request for additional information (RFI) dated 23 October 2017, specifically regarding comments that relate to the location of the loading dock and active street frontages.

Background

The site is situated within a new residential estate, Cameron Grove, which is located in Cameron Park, approximately 10km north west of Charlestown. Part of the subdivision approval, granted in 2005, included identification of a new commercial centre, zoned Local Centre (B2) on an area of land immediately to the north of George Booth Drive, a major connector road that links the Pacific Highway (M1) to the west with the strategic centre of Glendale to the east. Access to the site is possible off Portland Drive, Northridge Drive and Tramway Drive (via Northridge Drive). The site is located on a north south ridge with land falling to the east and the west.

Since 2005, development of the area has progressed including subdivision of the area zoned Local Centre into two triangular shaped sites either side of Tramway Drive; and approval for a hotel on the smaller of the triangular shaped sites to the south west of Tramway Drive. Development approval for a Woolworths shopping centre (DA 2207/2007/C) was given in June 2010. The approved development is larger than that currently proposed and included a discount department store (Big W). It also located two loading docks off Northridge Drive. Following approval of this development, substantial earthworks have been completed which flatten the eastern area of the site with steeper slopes to the west and towards Tramway Drive.

Studio GL's Involvement

Studio GL was approached in November 2016 by Fabcot to review and provide feedback on a scheme for this site. We provided initial feedback, met with the architect and the proponent and prepared detailed site and context analysis plans for a workshop with Lake Macquarie Council, the proponent and the consultants which was held on Monday 13 March 2017. Following this workshop Studio GL prepared an Urban Design Review of the proposal in June 2017. In January 2018 Studio GL was appointed to prepare advice on the proposed loading

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Director | Architecture
Nominated Architect - NSW Reg: 6861

Diana Griffiths BArch MURP(Hons) MPIA CPP
Director | Urban Design

dock and active street frontages. To assist in the preparation of this advice we were provided with documents including:

- The letter to the proponent by Lake Macquarie Council dated 23 October 2017
- Proposed Floor Plan – GL by BN, Drawing Number A06.01 dated 14/02/2018

Location of the Loading Dock

It is worth noting that many decisions had been made by the developer of the Cameron Grove Residential Estate, Fabcot Pty Ltd and Lake Macquarie Council about the location of the commercial site, the shape of the site and the access and movement network well before Studio GL's involvement at the end of 2016. These earlier decisions include:

- *Location* – The decision to locate the commercial site on the corner of George Booth Drive, and Portland Drive. George Booth Drive is a major road which does not allow access into the site and there is no opportunity for a loading dock off this road. Portland Drive is the key entry road into the area and therefore an undesirable location for a loading dock.
- *Lot shape and size* – The decision to 'cut' the B2 zoned land into two triangular sites, while it supports the provision of a pedestrian cycleway along a section of the West Wallsend tramway alignment (a local heritage item), makes loading access and a loading dock undesirable along this interface and creates less efficient sites.
- *Zoning and interfaces* – The decision to have different zones either side of Northridge Drive and the decision to approve medium density housing facing two approved loading docks.
- *Topography and landform* – The decision to locate the commercial site on a ridge which discourages active transport to the east and west (up and down the slope).
- *Commencement of work* – Regrading the site following the DA approved in 2010.

Given the history of development on the site, the Urban Design Review of the opportunities and constraints lodged as part of the Development Application documentation could not, and did not, assume that the site was a "blank slate" where anything was possible. The Urban Design Review identified opportunities that were possible given the limitations created by the earlier decisions listed above. This is not unusual as few developments occur without constraints created by earlier decisions.

It should also be noted that in the design of successful small commercial centre developments, the location of a loading dock, while important, is only one of many decisions that impacts on the ability to encourage social activity and active transport. The location of the development and the ability of people in the surrounding area to access the site by walking and cycling relies on the design of the streets, footpaths and links through areas of open space, the topography and the ability to cross roads safely and easily.

The proposed loading dock is on a section of the western end of Northridge Drive which is away from the key pedestrian desire lines and is not in an area of high visual sensitivity or on a key local road. Pedestrians accessing the site from the west are likely to take the less steep and more direct route along the West Wallsend tramway alignment (cycleway), with pedestrians from the north and south likely to travel along Portland Drive and those from the east up Northridge Drive to the signalised intersection with Portland Drive. The bus stop is also located on Portland Drive making this a higher pedestrian priority area. It is also noted, in the long term, that the signalised intersection across George Booth Drive and the less steep topography to the south would encourage active transport from this area along Portland Drive.

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The quality of the development, the treatment of the loading dock and blank facades, the location and mix of uses and the activation of surrounding streets will also play an important role in the success of the local shopping centre. The proposed loading dock is also proposed to be carefully and aesthetically treated with a sandstone wall and detailed landscape design (Drawing Number A100.01 dated 19/02/2018 by BN).

The proponent and the architect reviewed many different options for the location and design of the loading dock and the wider project team have helped to identify the advantages and disadvantages of each option. The current proposal locates the loading dock well away from the intersection with Portland Drive and Northridge Drive, minimises the size of the loading area and provides visual screening to Northridge Drive. This, combined with active frontages along Northridge Drive and Portland Drive, will result in a development with a streetscape that responds to the local context and provides an appropriate level of outward facing amenity.

Active Frontages

The proposal shows that active frontages are possible at T17, T18, T19, T20, T21 and T22 and with the potential to provide active frontages to the future development at the corner of Northridge Drive and Tramway Drive. This means that more than fifty percent of the length of Northridge Drive has the potential to be designed to provide activation to the street. This is considered consistent with the Council's DCP requirements.

As identified above, the greatest concentration of pedestrian activity is likely to occur near the intersection of Northridge Drive and Portland Drive. To respond and encourage this activity, three points of entry are provided, one at the bus stop on Portland Drive and two along Northridge Drive. We also understand that the proposed development intends to encourage more activity around T22 with a public area with seating and the opportunity for public art. Assuming the current zoning anomaly can be addressed, the future development areas along Portland Drive (proposed Lots 3 and 4) also provide the opportunity to locate active frontages along this street. In addition, compared to the approved development, the current proposal increases the amount of active frontage along Northridge Drive.

Conclusion

Studio GL are supportive of Lake Macquarie Council's Strategic Direction: Lifestyle 2030 and the Walk21 Charter and the desire to encourage active transport across the city. Studio GL also agree that local commercial centres play an important role in local communities, however, in our experience we have found that the greatest opportunities occur at the early planning stages and when creating site specific, strategic policies for a new commercial centre.

On this occasion we consider that many of the earlier decisions regarding this site have established a direction and limited the available options. It is our opinion that the key to maximising the opportunities for this site lie in the ability to attract and maintain a diversity of uses along Northridge Drive and Portland Drive that will activate the streets and encourage pedestrian activity. Overall it is our position that the proposed development, considering the earlier design decisions that have been made, can deliver an appropriate urban design outcome.

Sincerely yours,

Diana Griffiths
Director – Urban Design
Studio GL Pty Ltd

Felicity Lewis BArch MArch MBA
Director | Architecture
Nominated Architect - NSW Reg: 6861

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Director | Urban Design

D08739003

USB ATTACHED 21/2/18

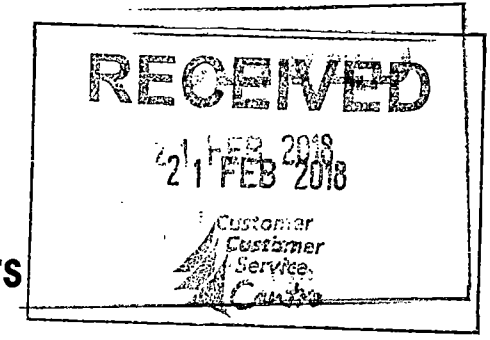
Attn: Georgie Williams
DA 1178/2017

As requested, please find the following enclosed:

- 2 x hard copies of response submission including all appendices and A3 plans.
- 1 x copy of A1 plans including Architectural, landscaping and civil plans.
- 1 x USB of all documents.

adw johnson

with compliments



Regards,
Mat Radridge

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D08739003

Our Ref: MR:NW:239402

21 February 2018

General Manager
Lake Macquarie City Council
Box 1906
HUNTER REGION MAIL CENTRE NSW 2310

ATTENTION: Ms Georgie Williams

Dear Georgie,

RE: DA 1178/2017 - PROPOSED WOOLWORTHS DEVELOPMENT.
LOT 901 DP 1222132, GEORGE BOOTH DRIVE, CAMERON PARK.

I refer to the abovementioned project, Council's request for additional information (RFI) dated 23 October 2017 and subsequent meetings with Council staff and CEO. This submission presents a formal response to the matters raised in Council's RFI.

Following consideration of Council's RFI, the proponent has made a number of design amendments and undertaken additional investigations where necessary to address the matters raised by Council.

Woolworths seek to deliver convenience shopping to this fast growing area. We have no doubt that the community will appreciate this also.

The proponent and its consultant team are available to meet with Council staff to discuss any of the items that form part of this submission. The proponent seeks to work with Council staff to achieve a recommendation for approval to the JRPP following completion of Council's assessment.

STRUCTURE OF RESPONSE

Attached as **Appendix A** to this cover letter is a response to all issues raised by Council, however key issues including loading dock location and carparking are addressed in this letter.

Section 94 developer contributions are being addressed separately to this submission and the proponent is awaiting a response from LMCC in relation to the letter from Addisons Lawyers submitted to LMCC on 18 January 2018.

Provided below is a brief summary of the proposal as lodged in July 2017, details of the proposed design amendments and confirmation of the proponents position regarding loading dock location and carparking.

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A comprehensive site history, including details of the approved and activated Development Consent (DA 2207/2007/C) for a much larger Woolworths shopping centre was provided within Section 2.0 of the SoEE and within our submission to Council dated 22 November 2017.

Summary of DA Lodged July 2017

A brief description of the original proposal lodged is as follows:

- Estimated Cost of Works: $26,114,000.
- 190 positions of local employment (full time, part time and casual) will be created.
- Development broadly includes:
  - Woolworths supermarket (3,920m^2).
  - 22 specialty retail shops.
  - Three (3) future development sites (subject to separate DA).
  - Approximate total GFA of 7,830m^2.
  - One (1) loading dock on Northridge Drive (located in generally the same position as the currently approved two (2) loading docks).
  - Linkages to the future public cycleway.
  - Subdivision to separate the future development lots and the cycleway land from the Woolworths and speciality retail site.
  - Landscaping.
  - 476 car parking spaces. Access to the carpark provided from Portland Drive to the east and Tramway Drive to the west.
- The development is permissible in the zone. The site is predominantly zoned B2 Local Centre. There is a zoning anomaly along the site's eastern boundary which contains a narrow strip of R3 Medium Density Residential land. This anomaly is being rectified in a rezoning application currently with Council. This anomaly does not affect the development as proposed.
- The DA was publicly advertised for approximately 1 month (July / August 2017). During this time, only two (2) x public submissions were received. Matters raised were largely seeking clarification in relation to:
  - The effect of the current proposal (if approved) relevant to the approved development (i.e. will Woolworths be able to pick and choose from both consents)?
  - Water management.
  - Loading dock on Northridge Drive, noting:
    - Northridge Drive may not be wide enough.
    - Acoustic Impact for residential development opposite.
  - Not enough on site car parking proposed.
  - Concern regarding creation of a potential 'rat run' to the hotel site through the carpark.

Each of these matters are addressed within **Appendix A** of this submission except for the item raised regarding the effect that the current proposal will have relevant to the approved development. In response to this item, if approved, the proponent intends to construct the current Woolworths proposal in accordance with DA 1178/2017.

Proposed Revised Design February 2018

Provided in **Appendix D** is a package of revised development plans prepared by BN Group. The revised site plan is supplied in **Figure 1** below.

Following is a summary of the key changes proposed:

- Minor reduction in Gross Floor Area (GFA) of the proposed Woolworths supermarket from 3,920m^2 to 3,615m^2. The proposed building size remains the same as originally proposed but the floor layout has been amended to provide additional storage area.
- Tenancy 2 as originally proposed (341m^2) has been split into Tenancy 2a (257m^2) and 2b (84m^2). Whilst the tenancy has been split, the gross floor area remains unchanged. Accordingly, there are now 23 specialty commercial shops proposed.
- The GFA of all proposed commercial tenancies (ie. T1 – T22) remains unchanged at 3,913m^2.
- The total proposed GFA (i.e. supermarket plus T1-T22) is 7,528m^2.
- Reduction in carparking of 89 spaces (new total 387 spaces). The number of disabled parking spaces (12) and parents with pram parking spaces (24) remains unchanged from the original proposal.
- A reduction in motorcycle parking from 24 to 19 spaces.
- Car parking for each of the future development lots (i.e. proposed Lots 1, 3 and 4) will be provided at the individual application stage for each of these lots. All parking proposed is to cater for the Woolworths supermarket and the specialist tenancies only (T1-T22).
- Regularised shape of the future development lot at the south eastern corner of the site (proposed Lot 4). The lot is proposed to be increased in size from 6,024m^2 (as lodged) to 7,670m^2 to facilitate this.
- Increased landscaping provision throughout the carpark consistent with Council's DCP planting ratio.
- Reduction in pylon signage height from 12m to 10m, consistent with the height of the proposed shopping centre.
- As discussed with Council's Greg Field, the proponent seeks to dedicate Lot 5 to Council, which will contain the public cycleway (adaptive reuse of the former West Wallsend Heritage Tramline).
- A pedestrian refuge has been provided at the eastern entry to the site (to replace a pedestrian crossing).
- Based on the findings of the Economic Impact Assessment, projected employment was understated in the SoEE. The projected employment is as follows:
  - Operation of the proposed retail development – 317 positions of employment (originally estimated at 190).
  - Construction employment 134 positions of employment (originally estimated at 160).
- All operational details as originally proposed remain the same.

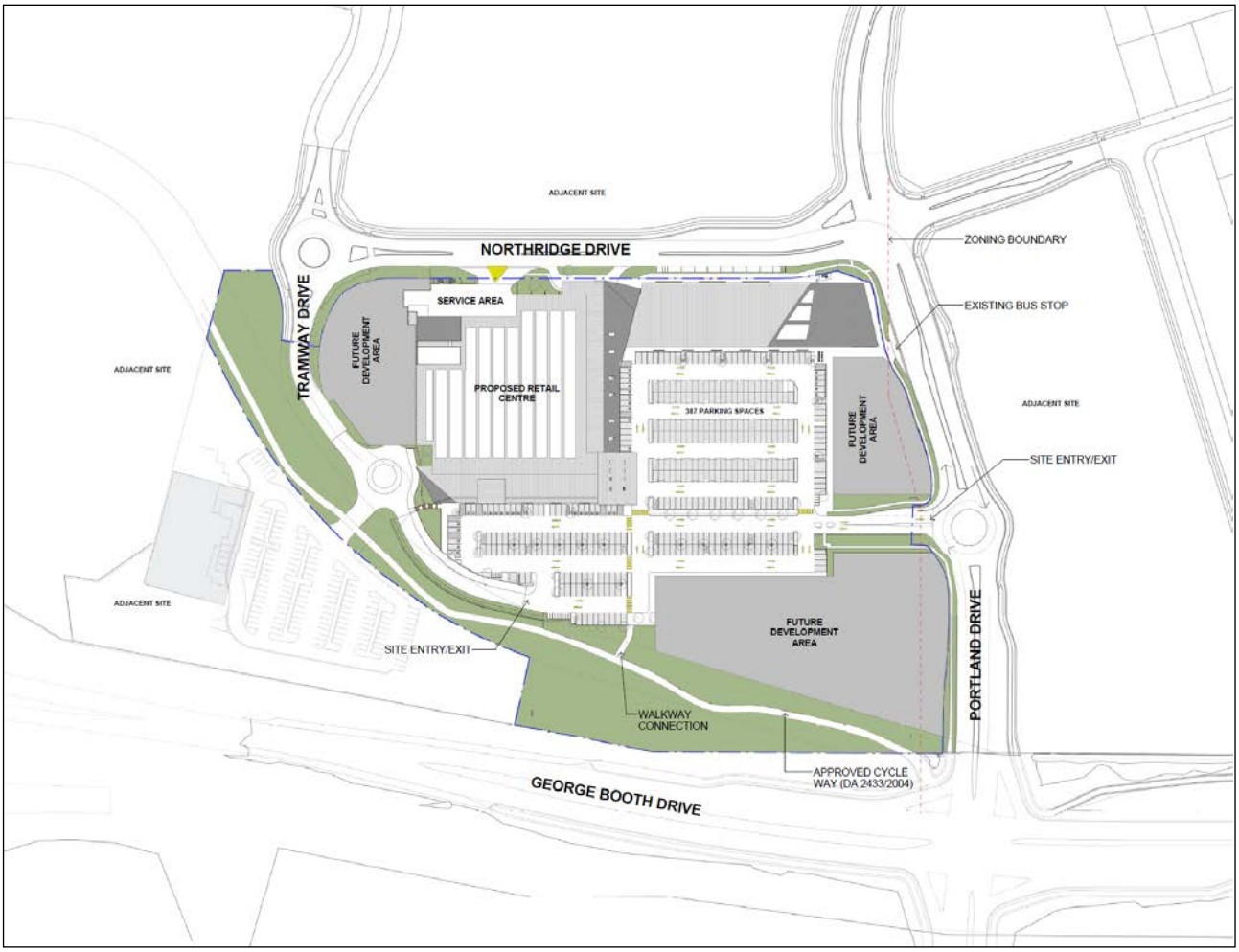

Figure 1 – Revised Site Plan.

Benefits of Current Proposal (as amended) in Comparison with Existing Approval 2207/2007/C

Whilst the proposed development will be assessed on its individual merits, it is important to recognise the improvement that the proposed development will have when compared with the existing approval.

The proposed development represents an improved outcome for the locality and broader LGA relative to the existing approval for the following reasons:

- Reduced number of loading docks off Northridge Drive from two (2) to one (1) and associated reduced loading dock activity.

- Improved treatment of the loading dock area. The loading dock area will be aesthetically treated with sandstone walls and landscaping (refer to the loading dock treatment shown in **Appendix D**).

- Removal of the Big W discount department store provides increased opportunity for active street frontages to Northridge Drive. The current proposal incorporates a number of retail tenancies along the frontage which essentially replaces a wall of a Big W.

- Increased opportunity for active street frontage to Portland Drive. The proposed future development sites (Lots 3 and 4) that front Portland Drive allow for development opportunity rather than at grade parking up to this boundary as per the current approval.

- Reduced visibility of carparking, with proposed surface parking largely surrounded by proposed and future built form.

- A shift in market approach to be more consistent with the B2 Local Centre Zone and its objectives in particular the removal of the Big W, which is a potential competitor to the Glendale Town Centre. The proposed development sits more comfortably within the overall retail hierarchy of the LGA. We note that Cameron Park is not nominated by Council as a Town Centre.

Loading Dock Location

The proposed loading dock location becomes an obvious choice (and in fact there is no viable alternative) after consideration of site constraints and operational needs. This is detailed in the submitted Statement of Environmental Effects (Section 3.3.1) and is discussed further below. The loading dock location is not prominently located and has a limited visual catchment.

In considering the most appropriate position for the loading dock the following is noted:

- Access cannot be directly gained from George Booth Drive to the south. The location of the signalised intersection with Portland Drive at the south eastern corner of the site, vegetation to be retained at the southern edge of the site and the location of the future public cycleway (adaptive reuse of West Wallsend Heritage Tramway alignment) prevent access.

- A single access point exists from Portland Drive for cars. It is best practice (for safety reasons) to separate delivery vehicles from customer vehicles, customer car parking areas and pedestrian linkages through the site and so delivery truck access at this point is inappropriate and unsafe. Additionally a second access point or any access for delivery vehicles off Portland Drive is not appropriate as it is not desirable to have a loading dock or loading dock driveway located off Portland Drive given that it is the prime entry into the Cameron Grove estate and is highly visible.

- The topography of the western portion of the site is affected by a steep slope, which does not physically support access to / from Tramway Drive and is inherently unsafe for delivery truck movements.

Provided in Section 3.3.1 of the SoEE is a section titled 'Site Challenges'. This section provides an analysis of the site constraints required to be considered in establishing the most appropriate location for the loading dock.

Taking into account the site constraints, the proponent considered eight (8) alternate loading dock options which included input from the proponent's urban designer (Studio GL), traffic consultant (Ason Group), architect (BN Group) and civil engineer (ADW Johnson). This detailed analysis is provided within Section 3.3.1 of the SoEE (pages 26-39). The analysis identified that the location of the proposed loading dock is the most suitable outcome.

Council's RFI identifies Option 10.3 as being the most suitable location for the loading dock (this option shifts the loading dock to the west of the supermarket and utilises a 1 way flow of large delivery vehicle traffic from Northridge Drive through to a roundabout on Tramway Drive), as shown below.

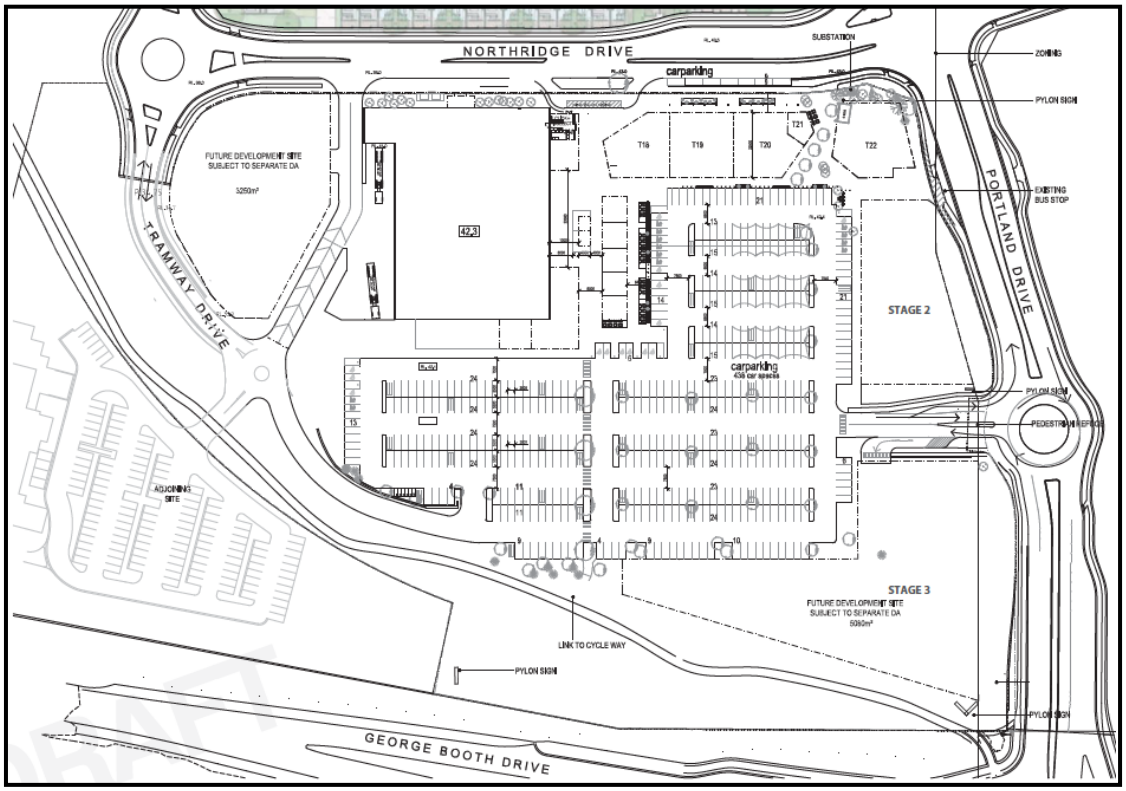

Figure 2 – Option 10.3.

As a result of the analysis undertaken by the abovementioned specialists, the proponent is strongly of the position that option 10.3 is a poor outcome for the following reasons:

- The topography in this location does not physically support the access link and it is inherently unsafe. There is approximately 4 - 5m of fall from Northridge Drive towards Tramway Drive.
- Creation of a 'rat run' to the adjoining hotel. It is noted that creation of a dangerous 'rat run' to the hotel is a concern that was raised in one of the two public submissions received.
- Potential conflict with traffic associated with the future development site located to the west.
- The access link would isolate the future development site to the west.

In addition to the above, provided in **Appendix M** of this submission is additional commentary from the proponent's Urban Designer (Studio GL) that addresses the proposed location of the loading dock. The Studio GL advice confirms that many decisions have been previously made by the developer of the Cameron Grove estate and LMCC which limit design opportunity (i.e. the site cannot be considered a 'blank slate' where anything is possible). This is not unusual as few developments occur without constraints created by earlier decisions. The decisions relevant to the subject site include:

- Location – The decision to locate the commercial site on the corner of George Booth Drive and Portland Drive. As noted above, George Booth Drive is a major road which does not allow access into the site and there is no opportunity for a loading dock off this road.

Portland Drive is the key entry road into the estate and therefore an undesirable location for a loading dock.

- Lot size and shape – The decision to 'cut' the B2 Local Centre zoned land into two triangular sites, while it supports the provision of a pedestrian cycleway along a section of the West Wallsend tramway alignment (a local heritage item), makes loading access and a loading dock undesirable along this interface and creates less efficient sites.
- Zoning and interfaces – The decision to have different zones either side of Northridge Drive and the decision to approve medium density housing facing two approved loading docks.
- Topography and landform – The decision to locate the commercial site on a ridge which discourages active transport to the east and west (up and down the slope).

The Studio GL advice notes that in the design of a successful small commercial centre development, the location of the loading dock, while important, is only one of many decisions that impacts on the ability to encourage social activity and active transport. The location of the development and the ability of people in the surrounding area to access the site by walking and cycling relies on the design of the streets, footpaths and links through areas of open space, the topography and the ability to cross roads safely and easily.

The proposed loading dock is on a section of the western end of Northridge Drive which is away from the key pedestrian desire lines and is not in an area of high visual sensitivity or on a key local road. Pedestrians accessing the site from the west are likely to take the less steep and more direct route along the West Wallsend tramway alignment (cycleway), with pedestrians from the north and south likely to travel along Portland Drive and those from the east along Northridge Drive to the signalised intersection with Portland Drive. The bus stop is also located on Portland Drive making this a higher pedestrian priority area. It is also noted that, in the long term, that the signalised intersection across George Booth Drive and the less steep topography to the south would encourage active transport from this area along Portland Drive.

The quality of the development, the treatment of the loading dock (refer to **Figure 3** below) and blank facades, the location and mix of uses and the activation of surrounding streets will also play an important role in the success of the commercial centre. The proposed loading dock is also proposed to be carefully and aesthetically treated with sandstone walls and detailed landscape design. The proposal locates the loading dock well away from the intersection with Portland and Northridge Drive, minimises the size of the loading area and provides visual screening to Northridge Drive. This, combined with active street frontages along Northridge Drive and Portland Drive, will result in a development with a streetscape that responds to the local context and provides an appropriate level of outward facing amenity.

Figure 3 – Loading Dock Treatment

In relation to acoustic considerations for the proposed location of the loading dock, the proponent has obtained advice from its acoustic consultant, Marshall Day, which confirms that full compliance with the Industrial Noise Policy (INP) can be achieved provided that operational restrictions apply to the loading dock, specifically:

- Use will be restricted to 7am to 10pm, 7 days per week; and
- Deliveries to the loading dock will not be scheduled to occur before 7am Monday to Saturday and 8am Sunday.

The proponent confirms it will adopt these usage restrictions. This acoustic advice is provided within **Appendix B** of this submission.

Carparking

Council has expressed concern in relation to carparking noting that the number of spaces proposed is beyond that required by the DCP.

The revised plans (refer to **Appendix D**) provide 387 carparking spaces, a reduction of 89 spaces from the 476 as originally proposed. This represents a carparking rate of 1 space per 19.5m² GFA. This is a reduced rate to that as originally lodged (1 space per 16m² GFA) and a similar rate as that approved under the existing consent (1 space per 20.5m²).

Relevant to the carparking proposed, the proponent advises the following:

- The carparking rate that Woolworths require to operate a successful and viable neighbourhood shopping centre is 1:20m² GFA, not 1:40m² as per Council's DCP. Woolworths are highly experienced at building and operating successful centres and this experience informs the desired rate. Woolworths have analysed a number of comparable centres including those with other supermarkets such as Coles and Aldi and the 1:20m² rate is a standard that is consistent, both within existing centres in the LGA and also in other areas by comparison.

  Located at **Appendix C** is a carparking and public transport analysis that provides a snapshot of the existing approval, original proposal (as lodged in July 2016), revised design, consideration of the DCP and provision of parking rate examples within the LGA as well as comparable Woolworths developments outside of the LGA. The examples provided for Woolworths development's outside of the LGA were selected as they have similar GFA's to the Cameron Park proposal and they sit in a similar retail hierarchy as Cameron Park.

- The preferred design revision provides parking at a rate of 1:19.5m² GFA. Whilst Council's general principal of reducing parking (and in part using this as a mechanism to reduce car usage) is understood there are a number of reasons why this does not work for a local Woolworths shopping centre in this location:

  - Cameron Park is not a Town Centre that has multiple public transport options. It is a local neighbourhood centre located close to the residential area in which it will serve. Cameron Park is located toward the north western extremity of the LGA and it is a fact that car dependency will remain high for this locality for the foreseeable future.

  - This local neighbourhood centre is for convenience shopping. The majority of people driving past or on their way home into the estate will stop and complete their weekly shop with multiple grocery items that are best transported by car.

  - A reduced number of car parks in this location (to the point that there is inadequate parking to cater for demand) will not result in people catching the bus or walking. The bus timetable would not support necessary frequency and people (particularly families) cannot do a full weekly shop and easily or realistically transport the groceries by bus, bike or on foot. Instead people will drive to the next available centre, which will have the effect of increased vehicle trip distance and therefore negative environmental impacts.

Cameron Park is very different to the likes of Charlestown Square where people may visit for a whole day (i.e. to have breakfast and lunch, go to the movies, visit time zone, etc.) and to do a range of non-grocery shopping that the bus becomes a real option, particularly noting its more central location relative to bus services. However we note that even Charlestown Square with this significant advantage over Cameron Park as to why people would and can use public transport (refer to Table 1 below) still has a supplied parking rate of 1 per 26m² GFA (refer to Table 4 of the enclosed carparking analysis).

As a comparative example, we have undertaken a review of the bus timetable for Charlestown Square and a number of other local shopping centres and compared it with operational bus stops in Cameron Park located approximately 1.5km north west of the subject site (located on North Lakes Drive, Cameron Park). Hunter Valley Buses are the relevant operator. The following is noted:

Table 1: Comparison of Bus Service Availability

Location	Routes	Weekday Services	Saturday Services	Sunday / Public Holiday Services
Northlakes Drive, Cameron Park	2	32	24	17
Charlestown Square	10	175	153	91
Westfield Kotara	7	111	87	49
Stockland Glendale	4	80	58	46
Mt Hutton (Lake Macquarie Fair)	4	65	56	35
Edgeworth Town Square	3	43	27	22
Cardiff Shopping Centre	3	61	41	33

  - Woolworths has no desire to construct car parking beyond what it needs. It is expensive to build and unless utilised these funds can be better invested elsewhere.

  - Should transport options change over time for this locality there is no reason why in the longer term that parking could not be replaced with additional floor space resulting in a reduced parking ratio.

- Notwithstanding that customers will have a higher car dependency, the proposal has been designed to link with the surrounding pedestrian network established along Portland Drive and Northridge Drive (including signalised crossings) as well as links to the future cycleway (adaptive reuse of the West Wallsend Heritage Tramway alignment) that will extend through the southern portion of the site.

- Whilst the carparking exceeds Council's standard, this is not at the expense of a good design outcome. In particular the carparking has been centralised to allow a built form edge to street frontages to the north, east and west. Reduced parking does not support relocating the loading dock off Northridge Drive.

- A Cost Benefit Analysis of the proposed carparking has been completed by Location IQ (refer to **Appendix J2**). The full findings of the Cost Benefit Analysis are provided in detail within Section 8 of **Appendix A** of this submission.

  The Cost Benefit Analysis notes that the proposed parking rate is required and will ensure the best outcome for the proposed development whilst also minimising impacts on residents, consumers and infrastructure. If the DCP rate of 2.5 spaces per 100m^2 (or 1 per 40m^2) of floor space is applied to the Cameron Park Village site, this would result in a significant disadvantage to the site given that other shopping centres in the surrounding areas have significantly higher parking ratio's that are more in accordance with the proposed 5.1 spaces per 100m^2 (or 1 space per 19.5m^2). Other negative results would also likely occur including greater car based travel, potential traffic incidents, on street car parking, possible traffic congestion into and out of the car park and also on the site and increased costs for local residents.

The proponent was advised verbally by Council staff (i.e. separate to the RFI) that this response should take into account Council's draft Parking Strategy. The following is noted:

- Exhibition of the draft strategy commenced after lodgement of the DA.
- The subject site is not within a town centre and a Transport Management Plan has not been adopted for Cameron Park.
- Relevant to parking standards for commercial development, it is noted that the draft strategy recommends that over time Council should switch DCP parking standards from a minimum rate to a maximum rate. The strategy suggests that this will result in a 'market driven approach as they permit developers to determine how much parking is required for a development based on market conditions'. For the reasons outlined above as well as the carparking analysis undertaken, the proponent is strongly of the position that the carparking proposed by the development is a market driven approach.
- We understand that the strategy will not apply to the proposed development.

RESPONSE TO LMCC RFI

Provided in **Appendix A** is a table response to each of the matters raised in Council's RFI. The response should be considered in the context of the above preamble.

Appendices B – M of this submission provide a range of specialist consultant inputs relevant to Council's RFI.

If you wish to discuss this matter please do not hesitate to contact me on 49785100 or mathewr@adwjohnson.com.au.

Yours faithfully,

Mat Radnidge
Senior Planner
ADW Johnson Pty Ltd
Hunter Office
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Encl:

Appendices

Appendix A	Response to LMCC RFI
Appendix B	Addendum to Acoustic Assessment (Marshall Day)
Appendix C	Carparking & Public Transport Analysis
Appendix D	Revised Development Plans (BN Group)
Appendix E	Revised Civil Engineering Documentation & Stormwater Management Report (ADW Johnson)
Appendix F	Addendum to Visual Impact Statement (BN Group)
Appendix G	Revised Landscaping Plans (Habit8)
Appendix H	Revised Statement of Heritage Impact (EJE Heritage)
Appendix I	Addendum to Traffic Impact Statement (ASON Group)
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