Porter
Consulting Engineers

FORRESTFIELD / HIGH WYCOMBE STAGE 1 DEVELOPMENT CONTRIBUTION PLAN

REVIEW OF COST ESTIMATES

REPORT PREPARED FOR

CITY OF KALAMUNDA

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Job number	19-03-043
Our reference	R34.19
Checked	BIH

HISTORY AND STATUS OF THE DOCUMENT

Revision	Date issued	Author	Issued to	Revision type
Rev A	30/08/2019	M. Cook	City of Kalamunda	1st submission before public advertising
Rev B	07/02/2020	M. Cook	City of Kalamunda	2nd submission
Rev C	19/06/2020	M. Cook	City of Kalamunda	3rd submission
Rev D	23/06/2020	M. Cook	City of Kalamunda	4th submission
Rev E	26/06/2020	M. Cook	City of Kalamunda	5th submission
Rev F	29/06/2020	M. Cook	City of Kalamunda	6th submission

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ATTACHMENTS

1.0 INTRODUCTION

Porter Consulting Engineers (PCE) was initially commissioned by the City of Kalamunda on 15 March 2019 to review cost estimates for civil infrastructure included in the Forrestfield / High Wycombe Stage 1 Light Industrial Area Development Contribution Plan Report.

The Forrestfield / High Wycombe development area is located within the City of Kalamunda (the City) and is bound by Milner Road to the north, Sultana Road West to the east, Roe Highway to the south and Berkshire Road and Dundas Road to the west as shown in **Figure 1**.

Figure 1: Forrestfield / High Wycombe Local Structure Plan area

The Forrestfield / High Wycombe Local Structure Plan (the LSP) has been prepared to facilitate industrial subdivision and development within the area. Due to the nature of fragmented land ownership, a Development Contribution Plan (DCP) has been prepared to coordinate the provision of common infrastructure required to cater for development. A copy of the Forrestfield/ High Wycombe Local Structure Plan is included in **Attachment 1**.

1.1 Background

The Scheme Amendment to include the Development Contribution Scheme (DCS) within the City's Local Planning Scheme No. 3 (LPS3) was gazetted in May 2013. This allowed the City to place on development and subdivision approvals, the obligation to pay a development contribution.

Following the gazettal of the DCS, the Council was required to adopt a DCP Report and cost apportionment schedule. The DCP Report and the associated cost apportionment schedule sets out in detail the calculation of cost contributions for development in accordance with the methodology shown in the DCP. The DCP Report is a dynamic document to maintain the currency of the cost of infrastructure, land and other DCP items.

Each DCP review includes an assessment of the cost estimates (based on current industry rates) for various items of civil infrastructure within the DCP.

The first cost contribution was adopted by the City in December 2012. The DCP Report is required by Clause 6.5.11.2 of LPS3 to be reviewed at least annually. The DCP Report is currently under review, with previous reviews having occurred in December 2013, June 2015, December 2016 and December 2018.

1.2 Summary of Preceding Revisions of this Review Document

Revision A of this document

The scope of the review as part of Revision A of this document was:

1) Review the following documents provided by the City:
   - Forrestfield/High Wycombe Industrial Area Stage 1 Development Contribution Plan Report July 2017 - June 2018 (Revised October 2018);
   - Special Council Meeting minutes for 3 December 2018;
   - DCS Mastersheet 2017-2018 for Cost Estimate Review (hereafter referred to as the Mastersheet); and
   - Relevant design drawings provided.
2) Review aerial mapping and information readily available online in the area of the subject roads.
3) Review relevant design drawings to the subject roads, the subject roads being:
   - Berkshire Road –Ashby Close to Milner Road;
   - Milner Road- Berkshire Road to Sultana Road West;
   - Nardine Close extension (Road 2A);
   - Sultana Road West-Milner Road to Roe Highway;
   - Milner Road and Nardine Close intersection;
   - Berkshire Road and Ashby Close intersection; and
   - Dundas Road, Berkshire Road and Milner Road intersection.
4) Review and comment on the rates and quantities listed in the DCS Mastersheet civil works cost estimate for the subject roads for their appropriateness to the relevant scope; and
5) Document and make comments regarding the designs (if necessary), rates and quantities of the subject roads.

At the time of preparing Revision A of this document, the engineering drawings for Bonser Road were currently being redesigned and therefore no assessments were made for Bonser Road in Revision A.

Revision B of this document

The scope of the review as part of Revision B of this document was:

1) The City at Officer level has reviewed Revision A of this document and provided comments (as Work Package 1)[1] to PCE for consideration towards adoption.

   Clarification of utilities for Milner and design work progressed to a 25% status have led the City to the belief warranting a reduction in the Contingency amount noted in the Mastersheet:

   - Reducing the Contingency amount to Milner Road from 20% to 10%.
   - Reducing the Contingency amount for Sultana Road West from 20% to 5%.

2) The Milner Road and Nardine Close intersection works had concluded in November 2019. Revision B of this document was able to publish the actual projects costs as of 22 January 2020 as reported by the City.

3) The Berkshire Road and Ashby Close intersection works were completed in October 2019. Revision B of this document was able to publish the actual projects costs as of 22 January 2020 as reported by the City.

4) Compare tender price submission received by the City for the construction of Bonser Road against the Mastersheet. Bonser Road will provide a connection between Nardine Close and Berkshire Road.

1.3 Purpose of this Version of the Report

The purpose of this report is to document the review of the DCP cost estimates prior to the DCP report being presented to the Council for adoption.

The scope of the review as part of Revision C of this document was:

1) The City has refined the design parameters (as Works Package 2)[2] to better inform designs and DCP cost assessment for the upgrade of Sultana Road West and Milner Road:

   - Sultana Road West to be widened to 9m wide.
   - Milner Road to be widened to 10m wide.
   - A pavement investigation to confirm the profile of the existing pavement to Sultana Road West and Milner Road.
   - Permeability testing of the soil to prove up the viability of the use of verge side swales for the disposal of stormwater in Sultan Road West.
   - The design vehicle for Sultana Road West being amended from a Restricted Access Vehicle category 4 (RAV4) 27.5m long to an "As of Right" 19m semi-trailer.
   - Locate and survey of services to inform the designs.
   - Prepare 85% design status drawings for Sultana Road West, Milner Road and Berkshire Road.

1 Budge. G, *FW: Porters Design & Consultancy Services - Forrestfield North,* 30 January 2020, email to Cook. M, <mcook@portereng.com.au>
2 Budge. G, *FW: Porters Design & Consultancy Services - Forrestfield North,* 30 January 2020, email to Cook. M, <mcook@portereng.com.au>

2) Incorporate the findings and cost estimate from the Western Power Feasibility Study for the relocation of the power pole at the Milner Road / Sultana Road West intersection.
3) Incorporate updated actual project costs as reported by the City to the following roads:
   - Milner Road/Nardine Close intersection;
   - Dundas Road, Berkshire Road and Milner Road intersection; and
   - Berkshire Road and Ashby Close intersection.

The comparisons provided in the cost review summaries throughout this report include reference to a "Mastersheet Amount". The estimated costs provided in this report is compared to the Mastersheet amounts utilised to complete the DCP review on 3 December 2018.

1.4 General Assumptions

a) Pavement investigation has been undertaken for Milner Road and Sultana Road West, with the findings informing the 85% designs.
b) No assessment has been made of the capacity of the existing utility services infrastructure to support the expected development within the LSP (i.e. electrical infrastructure may need zone capacity upgrades to support the anticipated development). A servicing investigation to the area could be undertaken to review the existing infrastructure and the capacity to service the future development within the LSP. Servicing upgrades are generally paid for by individual developments when required by Service Authorities to support respective development sites.
c) All costs noted are exclusive of GST.

2.0 BERKSHIRE ROAD

Berkshire Road is an existing road that borders the western portion of the LSP area and is approximately 900m long. Berkshire Road is required to be upgraded to service the future development envisaged by the LSP.

Originally, the DCP proposed funds to upgrade the northern footpath to a shared path. However, it is understood the City will be seeking grant funding[3] from the Department of Transport for a cycling shared path along the southern verge of Berkshire Road.

Therefore, the City will need to consider further whether the DCP will continue to fund improvements to the existing footpath in the northern verge. In the event that the City elects to remove improvements to the northern footpath, the costs to the DCPE for Berkshire Road would only be for undergrounding consumer aerial lines (see below).

Northern Verge Footpath

For the City's future consideration, PCE has prepared 85% design status engineering drawings for the improvement of the footpath in the northern verge (see **Attachment 2**), which seeks to provide a 2m wide continuous path between Milner Road and Roe Highway.

3 Budge. G, *RE: 19-11-135: Berkshire Road: 25% design for proposed footpath*, 5 February 2020, email to Cook.M, <mcook@portereng.com.au>

It is noted that this design represents an ultimate outcome for the future footpath on the northern verge of Berkshire Road.

Notwithstanding the above, for the purposes of providing an estimated cost, the City has requested that PCE consider and note the following short term objectives regarding the footpath in the northern verge:

- Construct a 2m wide footpath along the northern verge of Berkshire Road. Where there is currently an existing 2m wide footpath in sound condition the path will be retained, however, where the path is in disrepair or the path is less than 2m wide the path will be widened or removed and reconstructed to be 2m wide.
- Apply painted gore markings to crossovers to delineate the path crossing the crossovers.

The City has reviewed the existing condition of the footpath on the northern verge of Berkshire Road and has made the following assessment:

Section 1. From the Milner Road / Berkshire Road intersection, extending south approximately 150m the existing path is in good condition with a mix of new and old footpath.

Section 2. Older 2m wide footpath, in fair to good condition. A 30m long section of path is damaged and needs replacement with a 2m wide path.

Section 3. Relatively new section of footpath typically 1.8m wide. There is a 13m long section of path that is 1.5m wide which will be widened or removed and replaced with a 2m wide path.

Section 4. No path exists along this section of the northern verge from Lot 99 (271) to the Ashby Close / Berkshire Road intersection. Construct a 2m wide path.

Section 5. An existing 2m wide footpath is present at the Ashby Close / Berkshire Road intersection extending along Ashby Close, with a path along the southern verge of Berkshire to Roe Highway.

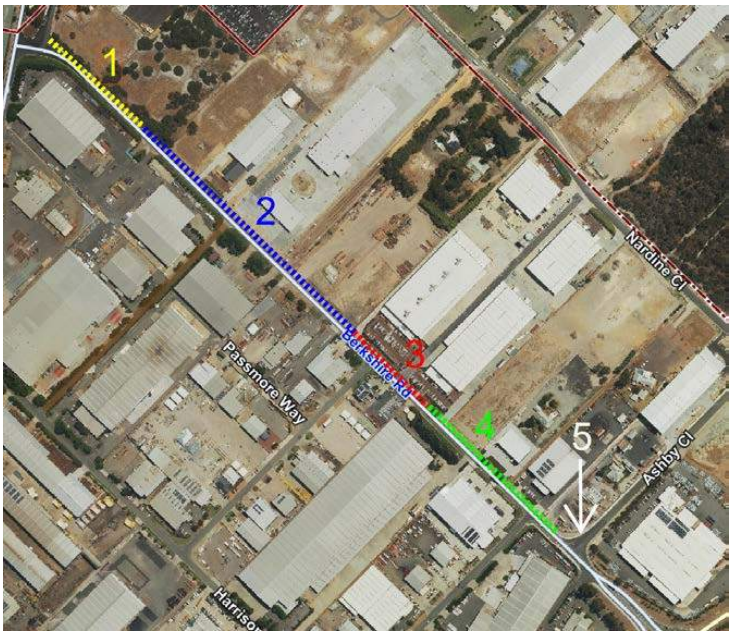

Figure 2: Condition Assessment for a 2m path along the northern verge of Berkshire Road

Overhead Consumer Line

To provide Berkshire Road with unobstructed overhead height clearance that applies for RAV routes, an overhead clearance of 4.6m is to be provided and satisfy minimum clearance requirements from the relevant authorities for services that pass over the road.

A clearance assessment has been undertaken to all overhead services that cross Berkshire Road, which consists of Western Power consumer lines. The assessment notes the following:

Western Power has indicated it would not consider the option of raising the lines and therefore the direction from Western Power was to convert these overhead lines to underground lines. An assessment has been made (see **Attachment 3**) with the following consumer aerial lines needing to be undergrounded:

- Pole S132830 – Consumer Aerials fronting the #303/307 Berkshire Road property boundary.
- Pole S122686 – Consumer Aerials fronting #291 Berkshire Road and the Bonser Road intersection.
- Pole S122688 – Consumer Aerials fronting #287 Berkshire Road.
- Pole S122689 – Consumer Aerials fronting #281Berkshire Road.
- Pole S122696 – Consumer Aerials fronting #247 Berkshire Road.

The assessment report notes the probable cost estimate to underground the 5 overhead consumer lines to be in the order of $75,000 (no GST payable). A further allowance of $12,500 plus GST should there be a need to any internal electrical re-cabling works within the respective properties as part of the change over from an overhead supply to an underground supply.

PCE's comments in review of the Mastersheet is noted **Table A**, with **Table 1** presenting a summary of the amounts and the variances between the Mastersheet and PCE's review. The full Mastersheet listing quantities and rates for the Berkshire Road construction cost estimate are noted in **Attachment 14**.

Table 1: Berkshire Road Cost Review Summary

Description	Mastersheet Amount	PCE Review Amount	Variance
Preliminaries	3,877	7,743	*(3,867)*
Survey Control and Testing	3,230	6,453	*(3,222)*
Clearing and Demolition	0	1,590	*(1,590)*
Earthworks	1,890	2,004	*(114)*
Roadworks	32,220	25,459	*(6,761)*
Miscellaneous	24,500	$12,500	*(12,000)*
Conversion of overhead consumer lines to underground lines	0	$87,500	*(87,500)*
Construction Sub Total excl. GST (including preliminaries & survey)	**$71,717**	**$143,248**	***($71,532)***
Allowances and Charges	$19,148	$31,085	*($11,937)*
CONSTRUCTION TOTAL excl. GST	**$90,865**	**$174,333**	***($83,468)***

The project cost estimate variance for Berkshire Road between the Mastersheet amount of $90,865 and PCE's review amount of $174,333, is $83,468 which is 92% of the Mastersheet amount mainly due to conversion of the overhead consumer lines to underground. The Mastersheet did not initially allow for the conversion of the overhead consumer lines to underground, but rather the lifting of overhead consumer lines. As outlined above this option would not be supported by Western Power.

2.1 Other Considerations

In relation to the scope of works discussed above the City may wish to consider:

- Make an application to Western Power to design and quote for the conversion of the overhead lines to underground that cross Berkshire Road.
- Investigate and prepare designs for any internal electrical works to the respective properties that may be required as part of the change over from an overhead supply to an underground supply.
- Preparing 100% design documentation for the installation of the 2m wide footpath along the northern verge.
- Preparing designs for the shared path along the southern verge of Berkshire Road, and secure construction funding from the Department of Transport.

Table A: Mastersheet Commentary Summary to Berkshire Road

Mastersheet							Porter Consulting Engineers Reviews			
Item	**Description**	**Qty**	**Unit**	**Rate**	**Amount**	**Notes**	**Qty**	**Rate**	**Amount**	**Comments**
3.4	Demolish and dispose redundant footpaths					Existing footpath to be retained and widened. No allowance noted in Mastersheet for removal of portions of the existing path.	80	$20.00	$1,590.00	Removed 30m of damaged path from Section 2, and removed 13m of 1.5m wide path from Section 3.
4.1	Remove 100mm Topsoil to spoil for footpath widening	630	m^2	$3.00	$1,890.00	Calculated based on 0.7m stripping for footpath widening for 900m assumed length. 0.7x900=630	364	$3.00	$1,093.00	Mainly topsoil stripping will be needed for Section 4 where there is no existing path.
4.2	Cut to spoil for footpath widening		m^3			No allowance noted in Mastersheet	36	$25.00	$911.00	From path boxout.
5.1	Widen existing concrete footpaths (from 1.8m wide to 2.5m wide)	630	m^2	$47.65	$30,019.50	Assumed existing footpath to be retained and widened to 2.5m. New footpath widening of 0.7 m for 900m assumed length. 0.7x900=630				
5.2	Install new 100mm thick concrete footpath, 2m wide		m^2	$5.20			424	$47.65	$20,218.00	Remove and replace 30m of damaged path from Section 2 and 13m of 1.5m wide path from Section 3.
5.3	Supply and Install Pram Ramps	4	ea	$550.00		Allowed for 2 road crossings. 2x2=4	6	$550.00	$3,300.00	Pram ramps only needed where crossovers have edge kerbing.
5.4	Install diagonal pavement markings to crossovers		Width of crossover				194	$10.00	$1,941.00	The City specified diagonal pavement markings to delineate path through crossovers.
6.2	Adjust Telstra Pit	1	Item	$3,000.00	$3,000.00	Quantity based on aerial imagery.	-	$3,000.00	$-	Assessed as not required.
6.3	Adjust stay poles	1	Item	$5,000.00	$5,000.00	Quantity based on aerial imagery.	-	$5,000.00	$-	Assessed as not required.
6.4	Adjust hydrant	1	Item	$3,000.00	$3,000.00	Quantity based on data from Water Corporation.	-	$3,000.00	$-	Assessed as not required.
6.5	Provision for miscellaneous/unidentified service relocations	1	Item	$10,000.00	$10,000.00	A conservative allowance for minor works to existing services	1	$3,000.00	$3,000.00	Reduce the allowance from $10k to $3k for provision for unidentified services relocation.
6.6	Crossover adjustments and reinstatements - allow $1,500 per crossover	4	Item	$1,500.00	$6,000.00	Although the original Mastersheet notes this $6,000 amount, it is not included in the summation amount of $24,500	4	$1,500.00	$6,000.00	Although crossover adjustments are likely to be minimal, consideration has been had for crossovers needing adjustment where a pram ramp is installed.
7.1	Convert overhead electrical lines (5 consumer lines) that conflict with RAV clearance requirements to underground lines						5	$15,000.00	$75,000.00	Refer to 3E's review of the overhead lines to Berkshire Road. (Drawing No. 3E19102-R01)
7.2	Ancillary works in relation to conversion to overhead to underground within the private property						5	$2,500.00	$12,500.00	Private cabling from the new pillar to the customer switchboard may be required.
9.5	Contingency			10%	$7,172.00			5%	$7,162.42	The percentage for contingency has been reduced from 10% to 5% as the scope has been well defined.

3.0 MILNER ROAD

Milner Road is an existing road that borders the northern boundary of the LSP area. Milner Road is required to be upgraded to service the future industrial development envisaged by the LSP.

The following items are noted in the DCP report for the Milner Road scope:

- Widen the carriageway from 7.4m to achieve a 10m wide pavement from kerb to kerb.
- Remove existing pedestrian paths and reinstate the verge area.
- Construction of a 2.5m shared path to provide a connection between Berkshire Road and Sultana Road West.
- Install street lighting between Berkshire Road and Sultana Road West to comply with Lighting standards.
- Road upgrades to accommodate category RAV7 36.5m long vehicles between Berkshire Road and Nardine Close including the Berkshire Road / Nardine Close intersection.
- Road upgrades to accommodate category "As of Right" (19m semi-trailer) vehicles between Nardine Close and Sultana Road West including the Milner Road / Sultana Road West intersection.

PCE has prepared 85% design status engineering drawings for the upgrade of Milner Road which is included in **Attachment 4.**

PCE's comments in review of the Mastersheet are noted in **Table B**, with **Table 2** presenting a summary of the amounts and the variances between the Mastersheet and PCE's review. The full Mastersheet for Berkshire Road is noted in **Attachment 14.**

Table 2: Milner Road Cost Review Summary

Description	Mastersheet Amount	PCE Review Amount	Variance
Preliminaries	29,040	42,400	*(13,361)*
Survey Control and Testing	24,200	35,334	*(11,134)*
Clearing and Demolition	57,911	135,809	*(77,898)*
Earthworks	51,944	41,592	*(10,352)*
Roadworks	237,038	398,523	*(161,485)*
Drainage	41,000	27,500	*(13,500)*
Miscellaneous	96,100	103,250	*(7,150)*
Construction Sub Total excl. GST (including prelims, survey)	**$537,233**	**$784,407**	***($247,175)***
Allowances and Charges	197,164	$130,996	*($66,168)*
CONSTRUCTION TOTAL excl. GST	**$734,397**	**$915,403**	***($181,007)***

The construction cost estimate variance for Milner Road between the Mastersheet amount of $734,397 and PCE's review amount of $915,403, is $181,007, 25% greater than the Mastersheet amount. This is mainly due to the items listed in **Table B**.

3.1 Particulars and Assumptions

a) The Milner Road / Sultana Road West (heading south) intersection has been upgraded to accommodate 'As of Right (19m semi-trailer)' vehicles with lane correct turning movements.

b) The cost of the pavement works to construct Milner Road / Sultana Road West (heading south) intersection upgrades is included within the Milner Road works costs. However, due to historic reasons the cost to relocate the power pole at the intersection is allocated within the Sultana Road West costs.

c) A pavement investigation[4] has been undertaken that has informed the required pavement works:

   i. Existing pavement areas shall have the asphalt wearing course removed and the existing base course ripped and reworked to a minimum 150mm thick. A 30mm AC14 dense grade asphalt wearing course (black) and 7mm primer sealed shall be laid.

   ii. For areas of pavement widening, the pavement shall consist of a compacted subgrade, 200mm thick limestone subbase, 150mm thick base course, 7mm primer seal and 30mm AC14 dense grade asphalt wearing course (black).

   iii. For the Eureka Street / Milner Road intersection and Milner Road / Sultana Road West intersection, the pavement shall be fully reconstructed to a 200mm thick limestone subbase, 150mm thick base course, 7mm primer seal and 40mm AC14 dense grade asphalt wearing course (black).

d) A preliminary lighting design has been prepared that specifies luminaires and outreaches installed on existing poles in the southern verge.

e) There is an existing ATCO Gas high pressure gas main along the northern verge of Milner Road which has been located and surveyed to inform the designs. ATCO gas has stringent design and construction requirements typically within 15m of high pressure assets with the following allowance made:

   i. Generally, for any works within 15m of high pressure assets, ATCO will require a full time approved onsite spotter to supervise the works at the developers/constructors expense. PCE has made a nominal $50,000 provisional allowance for spotter supervision and associated costs.

   ii. ATCO will require analysis of the coating to the high pressure gas main (a DCVG survey), to ensure the integrity of the coating to the pipe is still suitable ahead of the proposed works. PCE has made a nominal $5,000 provisional allowance for this.

f) There is an underground Western Power 132kV transmission cable under the north boundary lane. The cable has been located and surveyed to inform the designs.

g) Crossovers will be reinstated to match the material of the existing crossovers.

h) Having undertaken 85% designs for Milner Road, the Contingency percentage has been further reduced to 5% due to the greater confidence in the designs and project risks.

4 Brown Geotechnical, *Geotechnical Investigation (Factual Report) – Milner, Sultana Rd West - Pavement Cores and CBR Testing*, 20 December 2019 <ref: 19051>

Table B: Mastersheet Commentary Summary to Milner Road

Mastersheet								Porter Consulting Engineers Review			
Item	**Description**	**Qty**	**Unit**	**Rate**	**Amount**	**Notes**		**Qty**	**Rate**	**Amount**	**Comments**
3.1	Clear large trees including grubbing	9	ea	$246.00	$2,214.00	Quantity based on aerial imagery.					
3.2	Clear small trees inc grubbing	6	ea	$179.00	$1,074.00	Quantity based on aerial imagery.		19	$500.00	$9,500.00	PCE has adopted for a higher rate due to existing services near trees to be removed & grubbed. All trees for removal considered small trees.
3.3	Clear shrubs	5,040	m^2	$1.82	$9,172.80	Allowed for clearing from edge of footpath to road reserve boundary. Clearing required is approximately 4.5m on both sides for 560m assumed length. (4.5x2)x560=5040		111	$3.00	$333.00	Based on 85% status drawings
3.5	Demolish and dispose redundant kerbing	1,120	m	$2.73	$3,057.60	Adopted road length 560m, estimated kerb length is double this and excludes intersection upgrades at Dundas, Nardine and Sultana. 560x2=1,120		1,220	$9.00	$10,981.80	Based on 85% status drawings
3.6	Remove and Dispose redundant drainage pits	0	ea	$460.00	$0.00			8	$460.00	$3,680.00	Based on 85% status drawings
3.7	Remove and dispose redundant pavements	112	m^2	$35.65	$3,992.80	100mm allowed on both sides of the widening for the cut line. (0.1x2)x560=112		-	$20.00	$-	See item 3.8
3.8	Remove and Dispose existing asphalt offsite. Excavate exiting base and subbase for possible reuse as part of pavement reconstruction, basecourse as documented.							4,072	$20.00	$81,440.00	For pavements designated "Full depth pavement reconstruction with asphalt intersection mix" & "to be resurfaced"
4.1	Remove 100mm Topsoil to spoil	5,040	m^2	$3.00	$15,120.00	Allowed for topsoil stripping from edge of footpath to road reserve boundary. Area is approximately 4.5m on both sides for 560m assumed length. (4.5x2)x560=5040		2,280	$3.00	$6,840.00	Based on 85% drawings
4.2	Form, Shape, Compact Subgrade	1,680	m^2	$4.00	$6,720.00	Existing 8m wide pavement. Widening to 10m with equal 1m widening on both side. An additional 500mm of widening has been allowed for on both sides to allow for kerbing. Total of 3m widening has been allowed for roadbase construction for estimated length of 560m. 3x560=1680		2,915	$4.00	$11,660.16	Based on 85% drawings
4.5	Cut to spoil	1,100	m^3	$24.64	$27,104.00	Removal of unsuitable materials based on Portion B rate. Excavate to prepare subgrade to say 600-700mm depth			$24.64	$-	The pavement investigation did not encounter any clay or unsuitable material. That is not to say unsuitable material won't be encountered.
4.6	Cut to spoil for box out formation of widening.		m^3			Nil noted.		815.40	$24.64	$20,091.46	Spoils to be removed & disposed offsite for the widening box out.
5.1	Rip and rework the existing base course to minimum 150mm		m^2					2,312	$4.00	$9,248.00	For pavements designated "To be Resurfaced"
5.2	Supply and Install 220mm limestone sub-base	370	m^3	$50.00	$18,480.00	Sub-base has been calculated for the 3m widening for estimated length of 560m for a depth of 220mm. (3x560)x0.22=370		-	$50.00	$0	PCE has adopted a higher rate for 100mm road base of $85/$m^3$ compared to the Mastersheet of $65/$m^3$.
5.3	Supply and Install 200mm limestone sub-base		m^2					2,915	$12.00	$34,980.48	For pavements designated "Full depth pavement reconstruction with asphalt intersection mix" & "pavement widening"
5.4	Supply and Install 100mm road base	168	m^3	$65.00	$10,920.00	Basecourse has been calculated for the 3m widening for estimated length of 560m for a depth of 100mm. (3x560)x0.1=168		-		$-	

5.5	Supply and Install 150mm road base		m^3					2,915	$12.00	$34,980.48	For pavements designated "Full depth pavement reconstruction with asphalt intersection mix" & "pavement widening"
5.7	Supply and Install 7mm Primer Seal	1,680	m^2	$2.60	$4,368.00	Primer seal has been calculated for the 3m widening for estimated length of 560m. 3x560=1680		5,227.04	$2.60	$13,590.30	Porter's design will result in the existing pavement and new pavement areas needing sealing.
5.8	Supply and Install 30mm AC10 (black)	5,600	m^2	$12.19	$68,264.00	Allows for full resheet of 10m wide pavement for estimated 560m length. 10x560=5600		3,715	$12.19	$45,285.12	
5.9	Supply and Install 40mm AC10 (intersection mix)							1,704	$18.00	$30,673.80	
5.13	Supply and Install SMK (refer note 8)	1,120	m	$20.48	$22,937.60	Semi Mountable Kerb assumed for entire job. Estimated road length of 560m. 2x560=1120		1,133	$20.48	$23,203.84	
5.14	Key kerbs		m					265	$17.00	$4,511.80	
5.15	Remove existing crossover		m^2					795	$20.00	$15,906.00	
5.16	Reinstate existing Crossovers	640	m^2	$90.00	$57,600.00	Allowing 40m2 reinstated for 16 crossovers. 16x40=640			$90.00	$-	See below for crossovers being reinstated in varying materials
5.17	Reinstated Concrete Crossovers for commercial/industrial properties to be: 150mm thick N32MPa concrete with SL62 mesh centrally located with a 100mm limestone basecourse.		m^2					430	$110.00	$47,267.00	Based on 85% designs
5.18	Reinstate Asphalt crossovers for commercial/industrial properties to be: 150mm thick rock roadbase, 7mm primer seal with 30mm asphalt wearing course.		m^2					126	$18.79	$2,373.18	Based on 85% designs
5.19	Reinstate concrete crossovers to residential properties to be: 100mm thick N32MPa with 150mm limestone base.		m^2					93	$100.00	$9,320.00	Based on 85% designs
5.20	Reinstate Asphalt crossovers to residential properties to be: 100mm thick rock roadbase, primer seal with 30mm asphalt wearing course.		m^2					35	$18.79	$661.41	Based on 85% designs
5.21	Reinstate Existing block paving crossovers is to have the existing bricks retained for reuse towards reinstating the crossover on a 150mm limestone base.		m^2					30	$54.00	$1,614.60	Based on 85% designs
5.22	Reinstate industrial and commercial laterite gravel crossover 150mm thick		m^2					93	$16.00	$1,494.40	Based on 85% designs
5.23	Supply and Install new concrete footpaths (2.5m wide)	1,400	m^2	$38.12	$53,368.00	Assumed only reinstating footpath on one side of the road with a width of 2.5m for estimated length of 560m. 2.5x560=1400		1,565	$38.12	$59,648.27	Based on 85% designs
5.24	Supply and Install new concrete footpaths (1.8m wide)							1,185	$38.12	$45,163.05	Based on 85% designs
5.25	Supply and Install Pram Ramps	2	ea	$550.00	$1,100.00			7	$550.00	$3,850.00	
6.6	Supply and Install new SEP or Gully pit.	0	ea	$3,000.00	$0.00			7	$500.00	$3,500.00	Based on 85% designs
6.6	Supply and Install 375 dia. RCP	15	m	$400.00	$6,000.00			8	$3,000.00	$24,000.00	Based on 85% designs
7.2	Supply and Install street lighting	560	m	$110.00	$61,600.00	Based on adopted road length of 560m and Portion A & B pricing.					
7.3	Supply and install street lighting including cabling		ea pole					5	$3,000.00	$15,000.00	
7.4	Remove light poles		ea pole					2	$2,500.00	$5,000.00	

7.11	Adjust access chamber (sewer manhole) in road	1	ea	$7,000.00	$7,000.00	Estimate based on data from Water Corporation. 1 Manhole observed.		1	$3,000.00	$3,000.00	The Mastersheet amount of $7k seems high.
7.13	Provision for miscellaneous /unidentified service relocations	1	Item	$20,000.00	$20,000.00			1	$10,000.00	$10,000.00	Provisional allowance should it arise other services need adjusting
7.14	High Pressure gas spotter (Provisional)		Item			No specific allowance noted in the Mastersheet.		1	$50,000.00	$50,000.00	Atco Gas will require a spotter on-site when there is works occurring in the vicinity of the HP gas which is in the northern verge.
7.15	DCVG coating survey on HP gas main (Provisional)		Item			No specific allowance noted in the Mastersheet.		1	$5,000.00	$5,000.00	When working near HP Gas, ATCO Gas has in the past required testing of the surface coating on HP gas mains. A provisional allowance has been made.
7.16	Western Power quote for interfacing works (Provisional)							1	$5,000.00	$5,000.00	The design development has progressed to an 85% status, supporting the contingency can be further reduced from 10% (Rev B of DCP) to 5%.

4.0 NARDINE CLOSE EXTENSION (ROAD 2A)

The Nardine Close extension (Road 2A) is the extension to provide access to lots currently serviced by a series of battle-axe legs. The extension is required to service the future development envisaged by the LSP.

The following items are noted in the DCP report for the Nardine Close extension (Road 2A) scope:

- Construction of a new 10m wide pavement to service current battle-axe configuration lots.
- Construction of a drainage swale along the road verge sections in accordance with the Drainage Strategy.
- Roads will only be constructed to service current battle-axe configured lots if land assembly and consolidation processes do not provide the affected lands with access from gazetted and constructed public roads.
- Creation of a new 20m road reservation.
- Associated service installation and relocation.

The City of Kalamunda provided engineering drawings prepared by Porter Consulting Engineers for the Nardine Close extension (Road 2A), with the extension drawings documented over two stages (i.e. Stages 1 and 2). The drawings are included in **Attachment 5** and **Attachment 6**.

PCE was the Superintendent and undertook contract administration duties during the Stage 1 works constructed by RJV. Stage 1 was a 280m extension of Nardine Close from Ashby Close to a constructed cul-de-sac by the lot 308 /lot 51 property boundary. The original intention for the cul-de-sac was to be temporary until the Stage 2 works occurred.

The Stage 1 works achieved practical completion on 5 July 2019. PCE has utilised the Adjusted Contract Amount of $496,278 for Stage 1 costs plus GST which includes approved variations that arose during the works which is noted in **Attachment 7**.

The Stage 2 works as shown on the engineering drawings seeks to extend Nardine Close approximately 130m northwards to establish a permanent cul-de-sac by the boundary of lot 50 and lot 51.

PCE has reviewed both the Stage 2 engineering drawings and Mastersheet in relation to quantity and rates.

During the preparation of the cost estimate for Stage 2, a number of comments were noted as presented in **Table C**.

As the actual construction amount for Stage 1 has been utilised to reflect the true construction cost, it is not possible to make a direct like for like comparison to the Mastersheet cost headings. However, PCE has endeavoured to group costs from the Stage 1 contract to be appropriate to the Mastersheet headings and prepared a cost estimate for the construction of Stage 2, as presented in **Table 3.**

For both Stages 1 and 2 of the Nardine Close extension (Road 2A), the variance between the Mastersheet value of $1,108,188 excluding GST and PCE's value of $1,103,349 excluding GST is $4,839, which is 0.5% of the Mastersheet value and is within the typical expected range of cost estimates of this nature.

Table 3: Nardine Close Extension (Road 2A) Cost Review Summary

Description	PCE Stage1 Adjusted Contract Amount	PCE Stage 2 Estimate Amount	PCE Stage 1 & 2 Summation Total	Mastersheet Amount	Variance
Preliminaries	97,326	$30,022	$127,348	39,399	*$87,949*
Survey Control and Testing	Included in Preliminaries	$30,022	$30,022	32,832	*($2,810)*
Clearing and Demolition	25,462	$128,080	$153,542	125,000	*$28,542*
Earthworks & Retaining	29,048	$47,729	$76,777	86,016	*($9,239)*
Roadworks	193,864	$120,870	$314,734	269,032	*$45,702*
Drainage	3,246	$3,720	$6,966	3,000	*$3,966*
Miscellaneous	48,213	$29,150	$77,363	75,400	*$1,963*
Services	99,119	$45,720	$144,839	98,200	*$46,639*
Construction Sub total	**$496,278**	**$435,312**	**$931,591**	**$728,879**	*$202,712*
Allowances and Charges Western Power costs Water Corporation costs Design and Superintendence	66,413	$105,346	$171,759	194,611	*($22,852)*
Total excl. GST	**$562,691**	**$540,658**	**$1,103,349**	**$923,490**	*$179,859*
Staging Contingency	included	included	included	184,698	
Total with Staging excl. GST	**$562,691**	**$540,658**	**$1,103,349**	**$1,108,188**	*($4,839)*

The City is also considering an option to not undertake the Stage 2 works, such that the existing cul-de-sac at the lot 308 / lot 51 boundary is to be converted to permanently cul-de-sac. Due to a recent Development Application for a place of worship to lot 50 Sultana Road, Stage 2 extension works of Nardine Close may no longer be required. It is possible to provide a cul-de-sac by the lot 308 / lot 51 boundary and service these lots for future industrial development.

An engineering assessment and development cost has been prepared that reviews the options available should the Stage 2 works not occur and a permanent cul-de-sac is provided by the lot 308 / lot 51 boundary. The assessment considered retaining the existing cul-de-sac and an alternative arrangement such that the cul-de-sac is relocated approximately 35m northwards so that it straddles the lot 308 / lot 51 property boundary. The consideration of an alternative arrangement is due to concerns being raised that the exiting cul-de-sac arrangement may not provide adequate access to lot 51.

A summary of the indicative development costs for the cul-de-sac is presented in with the full assessment in **Attachment 8**.

Table 4: Summary of costs for a cul-de-sac by the lot 308 / lot 51 boundary

Item	Costs to Accommodate the Existing Cul-de-sac	Costs to Relocate the Cul-de-sac to the lot 308/lot 51 boundary
Construction costs	132,200	223,200
Extra over costs for works from the interim to permanent reservation boundary	28,000	Nil
Development Fees and Charges	29,100	23,400
Sub total	**$189,300**	**$246,600**
GST	$18,930	$24,660
Total including GST	**$208,230**	**$271,260**
Costs for Emergency Accessway works	67,100	61,100
Development Fees and Charges for the Emergency Accessway works	8,000	7,500
Sub total	**$75,100**	**$68,600**
GST	$7,510	$6,860
Total including GST	**$82,610**	**$75,460**
Sub total for cul-de-sac and emergency way works	**$264,400**	**$315,200**
GST	$26,440	$31,520
Total including GST for cul-de-sac and emergency accessway works	**$290,840**	**$346,720**

Table C: Mastersheet Nardine Close Extension (Road 2A) Commentary

Mastersheet								Porter Consulting Engineers Review (Stage 2)			
Item	**Description**	**Qty**	**Unit**	**Rate**	**Amount**	**Notes**		**Stage 2 Qty**	**Rate**	**Amount**	**Comments**
3.6	Remove and dispose redundant pavements		m^2	$35.65	0	It appears the Mastersheet did not note allowance for removal of the temporary turnaround constructed in Stage 1.		654	$20.00	$13,080.00	Removal of existing temporary turnaround constructed in Stage 1. The Mastersheet notes a rate of $35.65/$m^2$ which is towards the higher end of the range. PCE has noted a rate of $20/$m^2$ for this item.
4.5	Cut to spoil (cart offsite)	0 (for Stages 1 & 2)	m^3	$24.64	0	It appears the Mastersheet did not allow for cut to spoil.		530	$25.00	$13,250.00	PCE assesses there is likely to be excess spoil material, based on cut/fill/balance DTM calculation available to PCE being the design consultant.
4.6	Cut to fill	1,000 (for Stages 1 & 2)	m^3	$5.00	$5,000.00			265 (for Stage 2)	$5.00	$1,325.00	PCE assesses there is likely to be excess spoil material, based on cut/fill/balance DTM calculation available to PCE being the design consultant.

5.0 SULTANA ROAD WEST

Sultana Road West is an existing road that borders the western boundary of the LSP area. Sultana Road West from Milner Road to Lot 222 (#128) Sultana Road West is to be upgraded to service the future development envisaged by the LSP.

PCE has prepared 85% design status engineering drawings for the upgrade of Sultana Road West which is included in **Attachment 9.**

The following items are noted for the Sultana Road West scope:

- Carriageway widening between Milner Road and Lot 222 (#128) Sultana Road West to provide a 9-metre-wide carriageway between kerbs. The existing carriageway width is 6m.
- Construction of drainage swales along the road verge sections for stormwater disposal.
- Construction of a footpath along the west side to provide a connection between Milner Road and Lot 222 (#128) Sultana Road West. The original Mastersheet had provision for a 2.5m wide path, however, the City has advised[5] that the path does not form part of the City's overarching Bicycle Plan and therefore does not require a path wider than 1.8m. Therefore, allowance has now been made for a 1.8m wide path.
- Install street lighting to comply with lighting standards.

PCE's comments in review of the Mastersheet as noted in **Table D,** with **Attachment 9**.

Table 5 presenting a summary of the amounts and variances between the Mastersheet and PCE's review. The full Mastersheet for Sultana Road West is noted in **Attachment 14.**

Table 5: Sultana Road West Cost Review Summary

Description	Mastersheet Amount	PCE Review Amount	Variance
Preliminaries	59,631	$74,414	*$14,784*
Survey Control and Testing	49,692	$62,012	*$12,320*
Clearing and Demolition	18,941	$80,862	*$61,921*
Earthworks	47,856	$107,465	*$59,609*
Roadworks	388,849	$519,139	*$130,291*
Drainage	12,000	$176,853	*$164,853*
Miscellaneous	526,198	$355,921	*($170,277)*
Construction Sub total	**$1,103,167**	**$1,376,668**	***$273,501***
Allowances and Charges	404,862	$236,787	*($168,075)*
Sub Total entire width, approx 800m length	**$1,508,028**	**$1,613,454**	***$105,426***
Total to Scheme (50%) excl. GST	**$754,014**	**$806,727**	***$52,713***

The construction cost estimate variance for Sultana Road West between the Mastersheet amount of $1,508,028 excluding GST and PCE's review amount of $1,613,454 excluding GST, is $105,426, which is approximately 7% of the Mastersheet amount mainly due to the items listed in **Table D**. The DCP report indicates that 50% of the construction costs will be borne by the DCP.

5 Budge. G, *FW: 19-03-043:: Forrestfield North DCA with Porter's comments*, email to Cook. M, 31 January 2020, <,mcook@portereng.com.au>

5.1 Particulars and Other Considerations

a) The Milner Road / Sultana Road West (heading south) intersection has been upgraded to accommodate 'As of Right (19m semi-trailer)' vehicles with lane correct turning movements.

b) Western Power has undertaken a feasibility study[6] and estimate of costs for the removal of existing power pole #132866 to facilitate the proposed intersection widening works at Milner Road / Sultana Road West. The study notes the cost for the works being $270,920.99 (GST not applicable). This amount does not allow for any costs associated with land acquisitions.

c) The design drawings (MP190326) that accompanied the Western Power feasibility study for the removal of pole #132866 notes a need for a new electrical substation and LV kiosk in lot 90 north of the intersection. The required land areas are:

   i. Kiosk: 1.9m deep by 2.4m wide.

   ii. Substation: 3m deep by 4.5m wide.

   The City should allow sufficient time to liaise with the landowner of lot 90 for the acquisition of the required land for the kiosk and substation. Lot owner approvals would also need to be sought where new stay poles front respective properties.

d) A pavement investigation[7] has been undertaken that has informed the required pavement works:

   - As the existing pavement ranges from a 150mm to 225mm thick base course, it shall be fully reconstructed to consist of a compacted subgrade, 125mm thick limestone subbase, 125mm thick base course, 7mm primer seal and 30mm AC14 dense grade asphalt wearing course (black).
   - For areas of pavement widening, the pavement shall consider of a compacted subgrade, 125mm thick limestone subbase, 125mm thick base course, 7mm primer seal and 30mm AC14 dense grade asphalt wearing course (black).
   - A 40mm AC15 MRWA intersection mix asphalt shall be applied to the cul-de-sac head.

e) Permeability testing[8] of the insitu sands in the verge was undertaken to assess the suitability of stormwater disposal via roadside swales. The testing indicated good drainage characteristic soils with 47.5m/day permeability.

f) A preliminary lighting design has been prepared to comply with Standards that specifies luminaires and outreaches installed on existing poles.

g) An allowance has been made for the adjustment of communication pit lids and Water Corporation valve and hydrant lids.

h) No allowance has been made for street trees or landscaping[9] given insufficient space is available due to the swales drainage requirements.

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6 Western Power, *Feasibility Study Milner Road (MF011894/GFVSVU),* 22 May 2020
7 Brown Geotechnical, *Geotechnical Investigation (Factual Report) – Milner, Sultana Rd West - Pavement Cores and CBR Testing*, 20 December 2019 <ref: 19051>
8 Brown Geotechnical, *Geotechnical Investigation – (Permeability Testing) – Sultana Road West, Forrestfield.,* 14 April 2020, <ref: 20034>
9 Lodge. C, *Re: 19-11-135: Sultana Road West: Street trees*, 15 June 2020, email to Cook. M, <mcook@portereng.com.au>

i) Land acquisitions of approximately 350m^2 in area from 4 Brand Road, High Wycombe will be required to facilitate the cul-de-sac. It is noted that this will not be a land acquisition cost of the DCP.

j) No land acquisitions are expected to be required to facilitate the intersection upgrades to Milner Road / Sultana Road West (heading south). However, the City will need to obtain approval from the owner of lot 1563 (H85) Milner Road, High Wycombe to allow for a batter approximately 1m in height and extending 3m into the property as part of works to the Milner Road / Sultana Road West intersection. If the owner does not grant approval for the batter, consideration could be had for a panel and post retaining wall, or land acquisition.

   For the costings, it has been assumed that the lot owner of 1563 will grant approval for the battering works to extend into the property.

k) The DCP report indicates that 50% of the roadwork upgrade costs will be borne by the DCP, with the remaining 50% assumed to be borne by future developers undertaking development on the eastern side of Sultana Road West. There is a risk that the City may encounter a funds shortfall to undertake the roadworks as the timeframe for securing funds from future developers is uncertain. Development to the east side of Sultana Road West will develop over time and is not likely to coincide with the City's timeframe to undertake the roadworks. Therefore, the City may need to consider prefunding the infrastructure for the other 50% of the roadworks costs with a portion of the costs being repaid by a future DCP in Forrestfield North.

Table D: Mastersheet commentary summary to Sultana Road West works

Mastersheet								Porter Consulting Engineers Review			
Item	**Description**	**Qty**	**Unit**	**Rate**	**Amount**	**Notes**		**Qty**	**Rate**	**Amount**	**Comments**
3.1	Clear large trees inc grubbing	10	ea	$246.00	$2,460.00	approximate only based on aerial imagery		10	$500.00	$5,000.00	PCE has adopted for a higher rate due to likely presence of existing services near trees to be removed & grubbed.
3.2	Clear small trees inc grubbing	27	ea	$179.00	$4,833.00	approximate only based on aerial imagery		8	$250.00	$2,000.00	PCE has adopted for a higher rate due to likely presence of existing services near trees to be removed & grubbed.
3.3	Clear shrubs/grass	4,000	m^2	$1.82	$7,280.00	Length of road taken as 800m with 4m road widening (2x 0.5m extra for topsoil stripping). 800x5=4000		0	$1.82	$-	There are very few scrubs along this length. Topsoil removal accounted for in item 4.1
3.4	Trim / lop branches to shrubs.		Item					1	$2,000.00	$2,000.00	From a site visit, there is likely to be a need for some overhanging branches to be trimmed/lopped to facilitate the works.
3.5	Demolish and dispose redundant footpaths	0	m^2	$20.00	$0	No allowance in the Mastersheet.		0	$20.00	$-	The Milner Road costings accounts for any paths that need removal by the Sultana Road intersection.
3.6	Demolish and dispose redundant kerbing	1,600	m	$2.73	$4,368.00	Quantity based on assumed length. Removal on both sides of road. 800x2=1600		1,565	$9.00	$14,085.00	Remove existing flush kerbing along full length.
3.8	Remove and Dispose existing asphalt offsite.		m^2					5,100	$9.50	$48,450.00	For works to existing pavement areas
3.9	Remove and Dispose redundant pavements	0	m^2	$97.37	$0.00			480	$24.64	$11,827.00	Redundant pavement between cul-de-sac to Brand St.
4.1	Remove 100mm topsoil to spoil	4,000	m^2	$3.00	$12,000.00	Length of road taken as 800m with 4m road widening (2x 0.5m extra for topsoil stripping). 800x5=4000		993.9	$3.00	$2,982.00	Based on 85% designs
4.2	Form, Shape, Compact Subgrade	4,000	m^2	$4.00	$16,000.00	Length of road taken as 800m with 4m road widening (2x 0.5m extra for topsoil stripping). 800x5=4000		8096	$4.00	$32,384	Length of road taken as 800m with2m wide pavement extension to both sides, plus a further 0.5m extension beyond the edge of pavement, as shown on the drawings. And the existing pavement being reconstructed.
4.3	Import Fill, Shape, Compact	0	m^3	$30.00	$0.00			60	$30.00	$1,800.00	Minor fill batter into lot 1563 by Milner Road/Sultana Road West intersection.
4.4	Cut to spoil	400	m^3	$24.64	$9,856.00	Allowed for 100mm of cut for topsoil area. (5x800)x 0.1=400.		1,107	$24.64	$27,287.00	Includes disposal of topsoil and boxout material.
5.1	Rip and rework the existing base course to minimum 150mm		m^2					4,620	$4.00	$18,480.00	For works to existing pavement areas
5.2	Supply and install 220mm limestone sub-base	880	m^3	$50.00	$44,000.00	Road area with 220mm depth. (5x800)x0.22= 880				$-	
5.3	Supply and install 125mm limestone sub-base		m^2					8096	$10.50	$85,008	Based on 85% designs.
5.4	Supply and install 100mm road base	400	m^3	$65.00	$26,000.00	Road area with 100mm depth. (5x800)x0.1=400		0		$-	
5.5	Supply and install 125mm road base		m^2					8096	$11.25	$91,080	Based on 85% designs
5.6	Supply and Install 7mm Primer Seal	4,000	m^2	$2.60	$10,400.00	Road area. 5x800=4000.		7376	$2.60	$19,178	Based on 85% designs
5.7	Supply and Install 30mm AC14	3,200	m^2	$12.19	$39,008.00	Length of road (800m) x road widening (4m). 800x4=3200		7376	$12.19	$89,913	Based on 85% designs
5.8	Supply and Install 40mm AC14							879	$18.00	$15,822.00	Based on 85% designs
5.9	Supply and Install FK	1,529	m	$55.20	$84,400.80	781m south side, 748m north side		1,490	$60.00	$89,400.00	Based on 85% designs
5.11	Supply and Install SMK (refer note 8)	0	m	$35.00	$0.00			157	$35.00	$5,495.00	Based on 85% designs
5.12	Reinstate existing Crossovers	1,160	m^2	$90.00	$104,400.00	29 crossovers at 40m2 each. 29x40=1160m2			$90.00	$-	See below for crossovers being reinstated in varying materials
5.14	Reinstated Concrete Crossovers for commercial/industrial properties to be: 150mm thick N32MPa concrete with SL62 mesh centrally located with a 100mm limestone basecourse.		m^2					261	$110.00	$28,710.00	Based on 85% designs

5.15	Reinstate Asphalt crossovers for commercial/industrial properties to be: 150mm thick rock roadbase, 7mm primer seal with 30mm asphalt wearing course.		m^2					43	$18.79	$807.97	Based on 85% designs
5.16	Reinstate concrete crossovers to residential properties to be: 100mm thick N32MPa with 150mm limestone base.		m^2					28	$100.00	$2,800.00	Based on 85% designs
5.17	Reinstate Asphalt crossovers to residential properties to be: 100mm thick rock roadbase, primer seal with 30mm asphalt wearing course.		m^2					158	$18.79	$2,968.82	Based on 85% designs
5.18	Reinstate Existing block paving crossovers is to have the existing bricks retained for reuse towards reinstating the crossover on a 150mm limestone base.		m^2					20	$54.00	$1,080.00	Based on 85% designs
5.19	Reinstate gravel crossover 150mm thick		m^2					177	$16.00	$2,832.00	Based on 85% designs
5.20	Supply and Install new concrete footpaths	2,000	m^2	$38.12	$76,240.00	800x2.5 = 2000m2		1,621	$38.12	$61,796.00	As part of Revision B to the DCA report (R34.19), the City has instructed that the path in Sultana Road West is to be reduced from 2.5m to 1.8m. Quantity based on 85% designs.
5.21	Supply and Install Pram Ramps	8	ea	$550.00	$4,400.00	6 @ Milner, 2x @ Brae		2	$550.00	$1,100.00	
6.1	Supply and install new 300dia culverts	0	ea	$2,000.00	$0	No allowance in the Mastersheet.		361.4	$85.00	$30,719.00	drainage pipe under crossovers
6.2	Remove and Replace existing culverts OR extend existing culvert	1	ea	$5,000.00	$5,000.00	Brae Road			$5,000.00	$-	See item below
6.3	Remove existing drainage pipework		m					29	$30.00	$870.00	Remove the pipework at the intersection with Brae Road. This is at a local high point so no need to have the drainage pipe in place.
6.4	Convert Existing SEP's to Gully's	0	ea	$2,500.00	$0.00			1	$2,500.00	$2,500.00	
6.5	Covert Existing SEP's to Manholes	1	ea	$2,000.00	$2,000.00	Quantity based on aerial imagery.		0	$2,000.00	$-	
6.6	Supply and Install new SEP's	1	ea	$3,000.00	$3,000.00	Quantity based on aerial imagery.		0	$3,000.00	$-	
6.7	Supply and install bubble in/out soakwell pits							41	$3,000.00	$123,000.00	Pits in swales by crossovers
6.8	Supply and Install 375 dia. RCP	5	m	$400.00	$2,000.00	Quantity based on aerial imagery.		0	$400.00	$-	
6.10	Form roadside swales		m					1098	$18.00	$19,764.00	Based on 85% designs
7.1	Supply and Install misc linemarking and Signage	1	Item	$5,000.00	$5,000.00	7.1		1	$1,000.00	$1,000.00	Chevrons by Brand Rd
7.3	Supply and install street lightng including cabling		ea pole					9	$3,000.00	$27,000.00	Based on 85% designs
7.4	Supply and Install trees	54	ea	$450.00	$24,300.00	Allowed for trees at 15m spacing for the entire road length. 800/15=53.33 rounded up.		0	$450.00	$-	City confirms that having street trees located in the proposed swales would be suboptimal, and therefore exclude street trees from the design and costs.
7.5	Maintenance of trees and verges for a 2 year period	2	year	$16,948.86	$33,897.72			0	$16,948.86	$-	City confirms that having street trees located in the proposed swales would be suboptimal, and therefore exclude street trees from the design and costs.
7.11	Adjustment of Telstra or NBN lids to suit finished levels (Provisional)							1	$10,000.00	$10,000.00	Although it is expected that most of the existing communication pit lids currently match proposed levels, an allowance has been made for some lids needing adjusting.
7.12	Adjustment of Water Corp lids (valves, hydrants) to suit finished levels (Provisional)							11	$2,000.00	$22,000.00	As the verge level of Sultana Road will be adjusted slightly, lids and spindles will need to be raised.
9.5	Contingency	20%			$220,633.26			5%		$56,606.00	Contingency reduced from 20% to 5% as part of preparing Revision B of the DCA report (R34.19), as instructed by the City, and is reflective the investigations and designs undertaken to date.

6.0 MILNER ROAD AND NARDINE CLOSE INTERSECTION

The widening works at the intersection of Milner Road and Nardine Close have been designed to accommodate a 36.5m B-triple truck turning movement, with the relevant drawings included in **Attachment 10**.

The Milner Road and Nardine Close intersection works were completed in November 2019, and is currently within the 12 months defect liability period. **Table 6** notes the project costs[10] as of 11 June 2020 for the intersection works including investigations, construction, professional fees and charges. The City has noted there are outstanding minor works for the adjustment of services for an estimated $5000.

Due to the complexity of cost allocations across the whole project, a lump sum amount is noted within **Table 6**.

Table 6: Milner Road and Nardine Close Intersection Cost Review Summary

Description	Mastersheet Amount	Actual Project Amount to 11 June 2020	Outstanding costs	Project Costs to completion	Variance
Total project costs excl. GST	**$450,019**	$295,076	$5,000	$300,076	*$149,943*

The project cost variance between the Mastersheet value of $450,019 and the project costs to completion of $300,076 is $149,943 which is 66% less than the Mastersheet value.

Future reviews of the DCP costs should include any costs that may arise during the defects liability period which concludes on 15 July 2020.

7.0 BERKSHIRE ROAD AND ASHBY CLOSE INTERSECTION

The widening works for the Berkshire Road and Ashby Close intersection have been designed to accommodate a 36.5m B-Triple truck turning movement with the relevant drawings included in **Attachment 11.**

The intersection construction works were completed in October 2019 and are currently within the 12 months defects liability period.

Table 7 notes the actual project costs as of 11 June 2020 including investigations, construction and professional fees and charges. The City has noted there are outstanding minor works for the adjustment of sewer manholes for an amount of $8,729.

Due to the complexity of cost allocation across the whole project, a lump sum amount is noted in **Table 7**.

10 Lodge.C, *RE: 19-03-043: Forrestfield DCP: Any further adjustments to costs to the Berkshire /Ashby intersection*, 11 June 2020, email to Cook. M, <mcook@portereng.com.au>

Table 7: Berkshire Road and Ashby Close Intersection Cost Review Summary

Description	Mastersheet Amount	Actual Project Amount to 11 June 2020	Outstanding costs	Project Costs to completion	Variance
Total project costs exc GST	**$210,614**	$268,042	$8,729	$276,771	*($66,157)*

The project cost variance between the Mastersheet estimated value of $210,614 and the project costs to completion of $276,771, is $66,157, 31% greater than the Mastersheet value.

Future reviews of the DCP costs should include any further costs that may arise during the defects liability period which concludes on November 2020.

8.0 DUNDAS ROAD, BERKSHIRE ROAD AND MILNER ROAD INTERSECTION

The works at the intersection of Dundas Road, Berkshire Road, and Milner Road have been designed for a 19m long semi-trailer turning movement, with relevant drawings included in **Attachment 12**.

The intersection construction works were completed in December 2019, and is currently within the 12 months defects liability period. **Table 8** notes the project costs as of 11 June 2020 for including investigations, construction, professional fees and charges. The City has noted a $5000 allowance towards any works that may be required during the defect liability period.

Due to the complexity of cost allocations across the whole project, a lump sum amount is noted in **Table 8**.

Table 8: Dundas Road, Berkshire Road and Milner Road Cost Review Summary

Description	Mastersheet Amount	Actual Project Amount to 11 June 2020	Outstanding costs	Project Costs to completion	Variance
Total project costs exc GST	**$1,159,269**	$955,233	$5,000	$960,233	*$199,036*

The project cost variance between the Mastersheet amount of $1,159,268 and the project costs to completion of $960,233, is $199,036, being 83% less than the Mastersheet amount.

Future reviews of the DCP costs should include any further costs that may arise during the defects liability period which concludes on December 2020.

9.0 BONSER ROAD

Bonser Road will be a newly constructed road providing a connection between Nardine Close and Berkshire Road. The following items are noted in the DCP report for the Bonser Road scope:

- A 10m wide carriageway kerb to kerb,
- Drainage swales within the road verges,

- A 1.8m wide footpath in the northern verge,
- Intersections to accommodate a category RAV7 vehicle,
- Supply and installation of street trees.

The City of Kalamunda has provided engineering drawings prepared by RSA Consulting Engineers for Bonser Road, which are included in **Attachment 13.** The drawings have been approved by the City and utilised for tendering purposes as reported by the City[11].

Bonser Road construction will be divided into two stages:

1) The construction of Bonser Road with the exception of road works (truncations) impacting Lots 16 and 17 Berkshire Road. This first stage would result in a road that is not to a standard suitable for a category RAV7 vehicle. The acquisition of truncations for Lots 16 and 17 Berkshire Road is required in order to facilitate the full construction of an intersection for RAV 7 vehicles.
2) Following the acquisition of truncations from Lots 16 and 17 Berkshire Road, upgrades to bring the intersections up to a standard suitable for category RAV7 vehicles will be undertaken.

The first stage of construction works commenced in January 2020 and achieved Practical Completion in June 2020. The second stage will follow the acquisition of truncations from Lots 16 and 17 Berkshire Road.

The City has provided costs to Bonser Road based on received tender prices presented in the Mastersheet included in **Attachment 14**. Attempts have been made to group cost headings to be appropriate to the Mastersheet headings as presented in **Table 9**.

The amounts do not make allowance for land acquisition costs related to lot 16 and lot 17 Berkshire Road.

Table 9: Bonser Road Cost Review Summary

Description	Mastersheet Amount	Amounts based on tender prices (provided by the City)	Variance
Preliminaries	20,706	44,974	*5,167*
Survey Control & Testing	17,255		
Clearing and Demolition	12,180		
Earthworks	52,456	312,248	*(67,772)*
Roadworks	192,020		
Stormwater Drainage	0	30,792	*(30,792)*
Miscellaneous	88,452	$42,823	*45,629*
Stage 2: For construction of truncations once land is acquired from Lots 16 and 17 Berkshire Road	0	70,038	*(70,038)*
Sub Total excl. GST	**$383,069**	**$500,874**	*(117,805)*
Allowances and Charges	$102,280	$86,783	*15,497*
Total excl. GST	**$485,350**	**$587,657**	*(102,307)*

11 Lodge. C, RE: *19-03-043:: Forrestfield North DCA with Porter's comments*, email to Cook.M, 30 January 2020, <mcook@portereng.com.au>

The cost estimate variance between the Mastersheet value of $485,350 and the amount based on tender prices of $587,657, is $102,307 being 21% greater than the Mastersheet value.

Subsequent DCA reviews of Bonser Road should include the final construction costs along with any changes to fees or charges, and consideration for land acquisition costs.

10.0 CONCLUSION

The body of this document outlines in greater detail the assumptions, considerations and differences noted in a review of estimated costs of infrastructure included in the DCP. However, in brief, the following conclusions are noted below and should be reviewed further for addressing in future review of the DCP and design development of the respective road.

10.1 Berkshire Road

In relation to the scope of works discussed above the City may wish to consider:

- Make an application to Western Power to design and quote for the conversion of the overhead lines to underground that cross Berkshire Road for a RAV route.
- Investigate and prepare designs for any internal electrical works (if required) from the new Western Power pillar to the consumer switchboard.
- Preparing 100% design documentation for the installation of the 2m wide footpath along the northern verge.
- Prepare designs for the shared path along the southern verge of Berkshire Road, and secure funding from the Department of Transport.

10.2 Bonser Road

Future reviews of the DCP costs should include the final construction costs and any costs that may arise during the defects liability period.

10.3 Milner Road

Prepare 100% design status drawings and seek approvals from Authorities. Due to the high pressure gas main and underground transmission cables, approvals should be expedited early with ATCO Gas and Western Power due to typically long approval times.

10.4 Nardine Close

The City is to make a determination on whether Stage 2 works are to occur, or if the establishment of a permanent cul-de-sac by the lot 308/lot 51 boundary is to take pace. And incorporate the outcome in future reviews of the DCP.

10.5 Sultana Road West

a) Prepare 100% status design drawings and seek approvals from Authorities.

b) Allow sufficient time for Western Power to prepare the detailed design for the removal of the existing power pole #132866. Western Power also require 12 weeks advance notice to schedule the works once the construction quote has been paid by the proponent. The pole will need to be removed in advance of the intersection works.

c) Undertake early liaison with the land owners of lot 90 Milner Road, High Wycombe for the acquisition of the required land for the kiosk (1.9m deep by 2.4m wide) and substation (3m deep by 4.5m wide) to facilitate the removal of the existing power pole #132866.

d) Undertake early liaison with lot owners for approval for the installation of stay poles that front the respective properties to facilitate the removal of the existing power pole #132866.

e) Undertake early liaison with the owner of 4 Brand Road for the acquisition of approximately 350m^2 to facilitate the cul-de-sac.

f) Undertake early liaison with the owner of lot 1563 (H85) Milner Road to allow for a batter approximately 1m in height and extending 3m into the property as part of works to the Milner Road / Sultana Road West intersection. If the owner does not grant approval for the batter, consideration could be had for a panel and post retaining wall, or land acquisitions.

g) As part of ongoing design development for Sultana Road West, early discussions should be had with Telstra and NBN to provide quotes:

   i. Adjustment of pit lids along the length of road to suit finished levels.

h) Obtain quotes from the Water Corporation for the relocation of existing valves by the intersection, and adjustment of valve and hydrant lids along the road to suit finished levels.

i) The DCP report indicates that 50% of the roadwork upgrade costs will be borne by the DCP. The City should review how the remaining funding is secured as this is not clear in the DCP report.

10.6 Milner Road and Nardine Close intersection

Future reviews of the DCP costs should include any costs that may arise during the defects liability period which would be expected to be negligible.

10.7 Berkshire Road and Ashby Close intersection

Future reviews of the DCP costs should include any costs that may arise during the defects liability period which would be expected to be negligible.

10.8 Dundas Road, Berkshire Road and Milner Road intersection

Future reviews of the DCP costs should include any costs that may arise during the defects liability period which would be expected to be negligible.

Attachment 1:
Local Structure Plan

Structure Plan Notes
Subdivision and Strata Titling Requirements

General

1. Berkshire Road / Milner Road / Dundas Road is a full movement intersection.

Lot Size

2. Industrial subdivision is to meet the requirements of the Scheme and WAPC Policy DC4.1 – Industrial Subdivision unless otherwise specified.
3. The following minimum lot sizes apply to any subdivision within the Structure Plan area:
   a. Lot 50 Sultana Road West - 3,000m², subject to:
      i. The construction of Road 2A;
      ii. Minimum lot frontage of 30m; and
      iii. Compliance with all development requirements of this Structure Plan.
   b. All other lots within the Structure Plan area - approximately one (1) hectare.

Battleaxe Development

4. No battleaxe subdivision will be supported unless otherwise depicted on the Structure Plan Map.
5. Single or shared battleaxe legs are not permitted to service industrial development on existing Lots 50, 51 and 308 Sultana Road West and Lots 305, 306 and 307 Ashby Close. Approval to non-residential development is contingent on securing direct access to a constructed public road.
6. No further subdivision will be permitted on Lots 50, 51 and 308 Sultana Road West and Lots 305, 306 and 307 Ashby Close based on a shared battleaxe leg access arrangement.

Industrial Strata Titling

7. Industrial unit strata titling will only be supported in circumstances where a management statement is imposed as a condition of strata approval to the satisfaction of the City that ensures appropriate management arrangements and ongoing compliance with all development criteria as contained with the Scheme, this Structure Plan, any supporting planning policy or design guidelines, or any other requirements specified by the City.

Development Criteria and Requirements

Land Use Permissibility

8. Although the permissibility of uses is as set out in Table 1 in the Scheme, the Structure Plan intent is to facilitate land uses that take advantage of the lands strategic location in respect to major transport infrastructure, including Perth Airport, Roe Highway and Tonkin Highway. On this basis, logistics and other transport based industries are preferred land uses to take advantage of the lands locational attributes.
9. When considering development applications for 'D' and 'A' uses under the Scheme, due regard will be given to the extent that the proposed use supports the Structure Plan intent in accordance with 8 above and the requirements relating to Lot 50 Sultana Road West as specified below.

Built Form

10. In addition to the requirements of the Scheme, any applicable planning policy and design guidelines, any wall or building facing any street is to be painted or otherwise treated to ensure an appropriate standard of visual amenity to the satisfaction of the City.
11. In addition to the requirements of the Scheme, any applicable planning policy and design guidelines, service areas, bin and storage areas and services such as air conditioners and other machinery are to be screened such that they are not visible from the street.

Vehicle Access and Movement

12. Vehicular access for non-residential development is not permitted via existing battleaxe legs.
13. Vehicular access for all non-residential development is to be taken directly from a gazetted and constructed public road.
14. In addition to the requirements of the Scheme, any applicable planning policy and design guidelines, internal driveways and car parks are to be designed to ensure slow speeds. Lengths of driveway or car parks exceeding 50 metres are to incorporate speed control devices including minor level changes.
15. In regard to Lot 50 Sultana Road West, vehicle access from Sultana Road West shall be permitted for residential purposes only. All other vehicle access shall be from Road 2A (Nardine Close Extension).
16. Vehicle access at the intersection of Ashby Close and Berkshire Road will be restricted to left in, left out only.

Pedestrian Movement and Amenity

17. In addition to the requirements of the Scheme, any applicable planning policy and design guidelines, footpaths are to be provided connecting car parking areas to buildings to the satisfaction of the City.

Landscaping

18. In addition to the requirements of the Scheme, any applicable planning policy and design guidelines, landscaping is to be provided within any development site of a sufficient quality to ensure an attractive well-landscaped environment.
19. Landscaping within car parks throughout the Structure Plan area is to be in accordance with the requirements of the Scheme, any applicable planning policy and design guidelines.
20. In addition to the requirements of the Scheme, any applicable planning policy and design guidelines, the tree species implemented, when not used for screening purposes, shall be of a type having high branch free stems to facilitate surveillance and visibility of building fronts and with a large canopy to achieve adequate shading of car parking areas.

Signage

21. In addition to the requirements of the Scheme, any applicable planning policy and design guidelines, signage is to relate directly to the building containing the use or service and any associated products for advertising purposes, and is not to be excessive or unnecessary. Third party signage is not permitted.

Energy Efficiency

22. In addition to the requirements of the Scheme, any applicable planning policy and design guidelines, building openings should be orientated to benefit from passive climatic heating and cooling opportunities to reduce fixed energy consumption.
23. In addition to the requirements of the Scheme, any applicable planning policy and design guidelines, all new buildings should incorporate energy saving design and technology where practical to do so.

Design Guidelines

24. For additional development criteria and requirements applicable in the Structure Plan area, refer to the Forrestfield/High Wycombe Industrial Area Design Guidelines.

Development Requirements for Lot 50 Sultana Road West, High Wycombe

25. Any development on lots created under the provisions of 3 above is required to demonstrate compliance with the following composite Residential / Light Industry provisions:
   a. The land within 30 metres of the front lot boundary, taken from Sultana Road West, shall be used for residential purposes only.
   b. Notwithstanding the provisions contained within the Structure Plan, any development for residential purposes, shall be subject to those provisions of the Scheme relating to the Residential Zone and State Planning Policy 3.1 – Residential Design Codes (R5).
   c. Any development for the light industrial component of the composite land uses shall be subject to those provisions of the Scheme relating to the Light Industry Zone.
   d. Any development for light industrial purposes shall be subject to the provisions of the Forrestfield / High Wycombe Industrial Area Design Guidelines Local Planning Policy.
   e. The lot shall not be developed or used for light industry purposes unless a dwelling is built to plate height first.
   f. Vehicle access from Sultana Road West shall be permitted for residential purposes only. All other vehicle access shall be from Road 2A (Nardine Close Extension).

26. Any light industrial development which does not form part of a composite residential/light Industrial subdivision and development in 3(a)(i) and 25 above, shall be subject to those provisions of the Scheme relating to the Light Industry Zone and the Forrestfield / High Wycombe Industrial Area Design Guidelines Local Planning Policy.

Bushfire

27. Any development requires assessment in accordance with State Planning Policy 3.7 – Planning in Bushfire Prone Areas, which may take the form of a bushfire management plan.

Noise Attenuation for Residential Land Uses

28. Any residential land uses are required to noise attenuation in accordance with State Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning.

Developer Contributions

29. Developer contributions within this Structure Plan are as set out in Schedule 12 – Development Contribution Areas of the City of Kalamunda Local Planning Scheme No. 3.

Structure Plan

Forrestfield/High Wycombe Industrial Area

LEGEND

- Structure Plan Boundary
- Metropolitan Region Scheme Reserve - Parks and Recreation
- Local Planning Scheme No. 3 - Industrial Development Zone
- Local Planning Scheme No. 3 - Special Use Zone - Composite
- Existing Road
- New Road
- Potential New Road
- New road connection/intersection
- Emergency Access
- Roe Highway
- Pedestrian Path
- Shared Path
- 20 metre setback line (main street)
- Potential Road Subject to Subdivision of Lot 50 Sultana Road West
- 10 metre Setback Line (minor street)
- 8 metre Landscaped Buffer to Sultana West Road
- 6 metre Landscaping Strip
- Bush Forever Interface Treatment

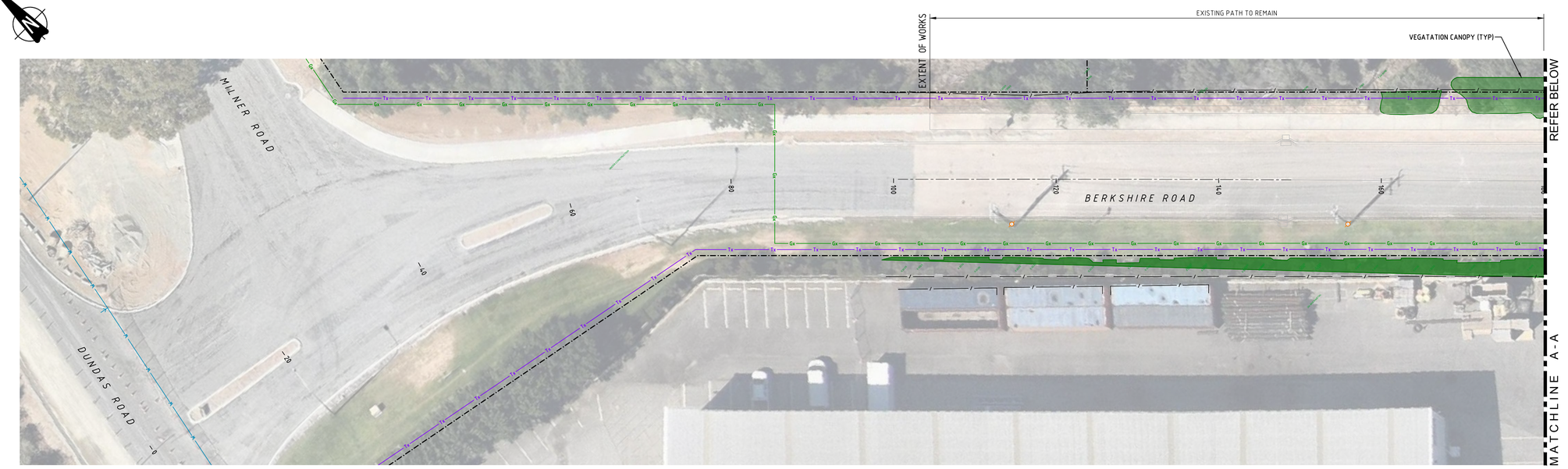
0 50m

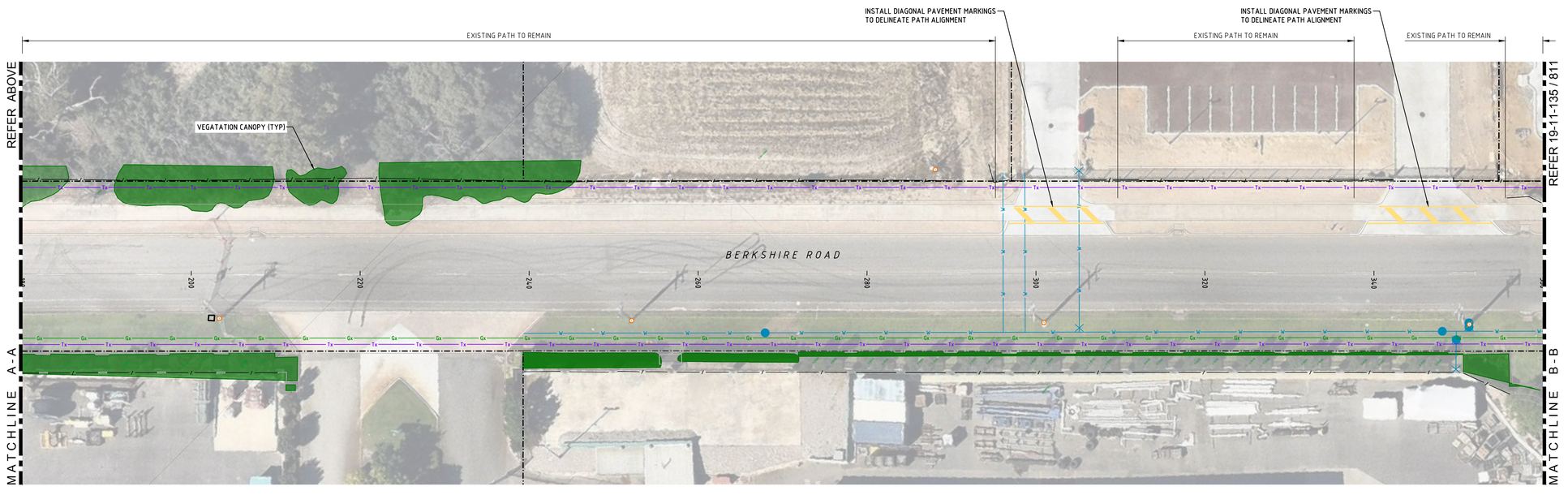
File: **19-521 STH1A** Staff: LR Checked: MC

Date: 26 November 2019 Scale: 1:5000 @ A3

City of Kalamunda

Attachment 2:
Berkshire Road footpath upgrade drawings (**85% design status drawings)**





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PROJECT:
BERKSHIRE ROAD PATH UPGRADE HIGH WYCOMBE

No.	DATE	REVISION	BY
C	16-6-2020	EXTENT OF PATH TO BE REPLACED AMENDED	MEG
B	7-2-2020	PATH DESIGN AMENDED	DLC
A	4-2-2020	ISSUED FOR 25% DESIGN COMMENT	DPE

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TUONO Pty Ltd ACN 070 097 168 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:
CITY OF KALAMUNDA

DRAWING:
FOOTPATH UPGRADE CONCEPT PLAN - SHEET 1

STATUS: **FOR COMMENT**

SCALE	1:250
DATE	NOV 2019
DESIGN	DPE
DRAWN	DPE
CHECK	
APP'D	

DRAWING No. 19-11-135/810

REV No. C

ORIGINAL DRAWING SIZE A1

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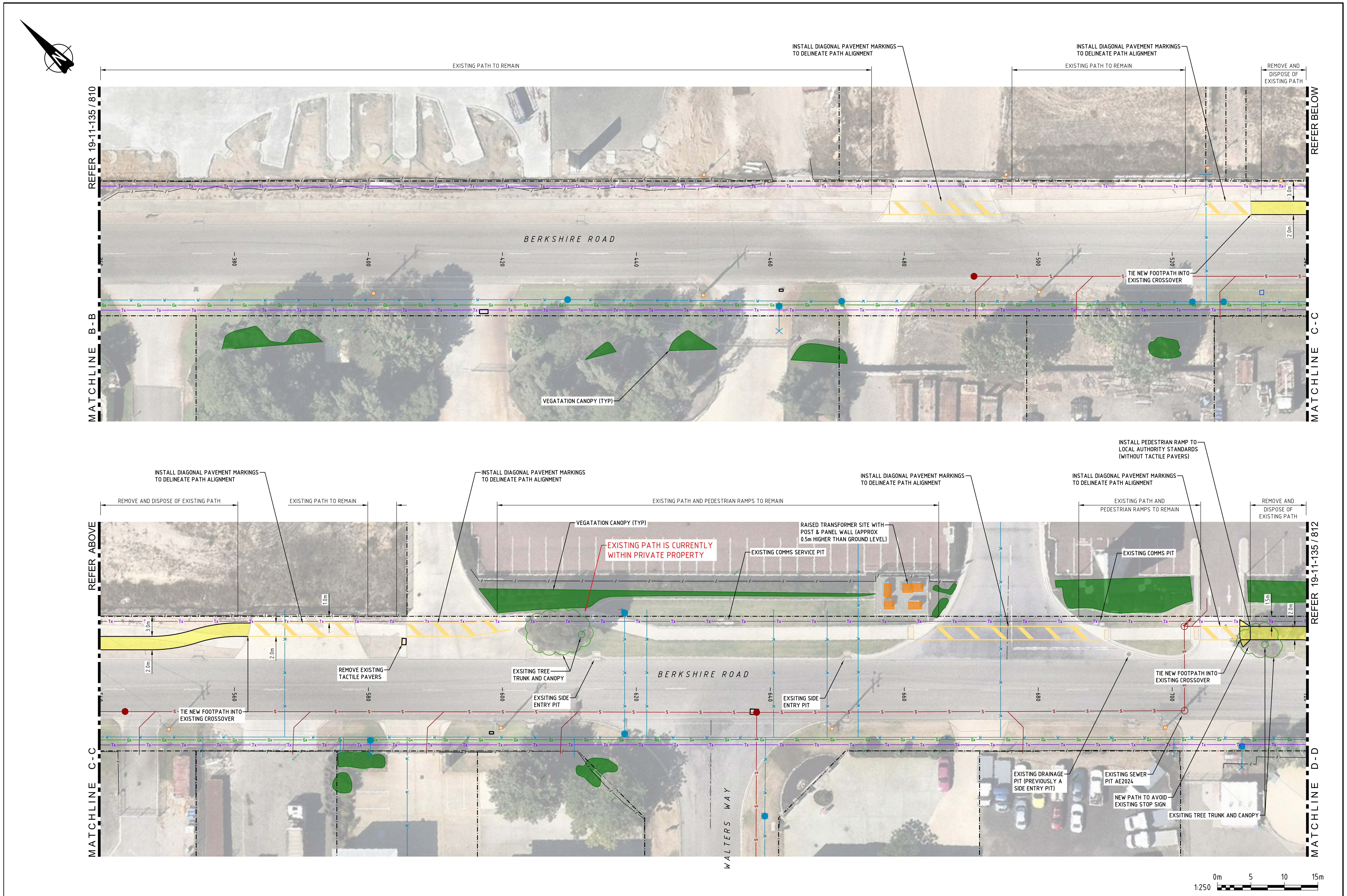

PROJECT:

BERKSHIRE ROAD PATH UPGRADE
HIGH WYCOMBE

No.	DATE	REVISION	BY
C	16-6-2020	EXTENT OF PATH TO BE REPLACED AMENDED	MEG
B	7-2-2020	PATH DESIGN AMENDED	DLC
A	4-2-2020	ISSUED FOR 25% DESIGN COMMENT	DPE

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CITY OF KALAMUNDA

DRAWING:

FOOTPATH UPGRADE CONCEPT PLAN - SHEET 2

STATUS: **FOR COMMENT**

SCALE 1:250
DATE NOV 2019
DESIGN DPE
DRAWN DPE
CHECK

DRAWING No. **19-11-135/811** REV No. **C** ORIGINAL DRAWING SIZE **A1**

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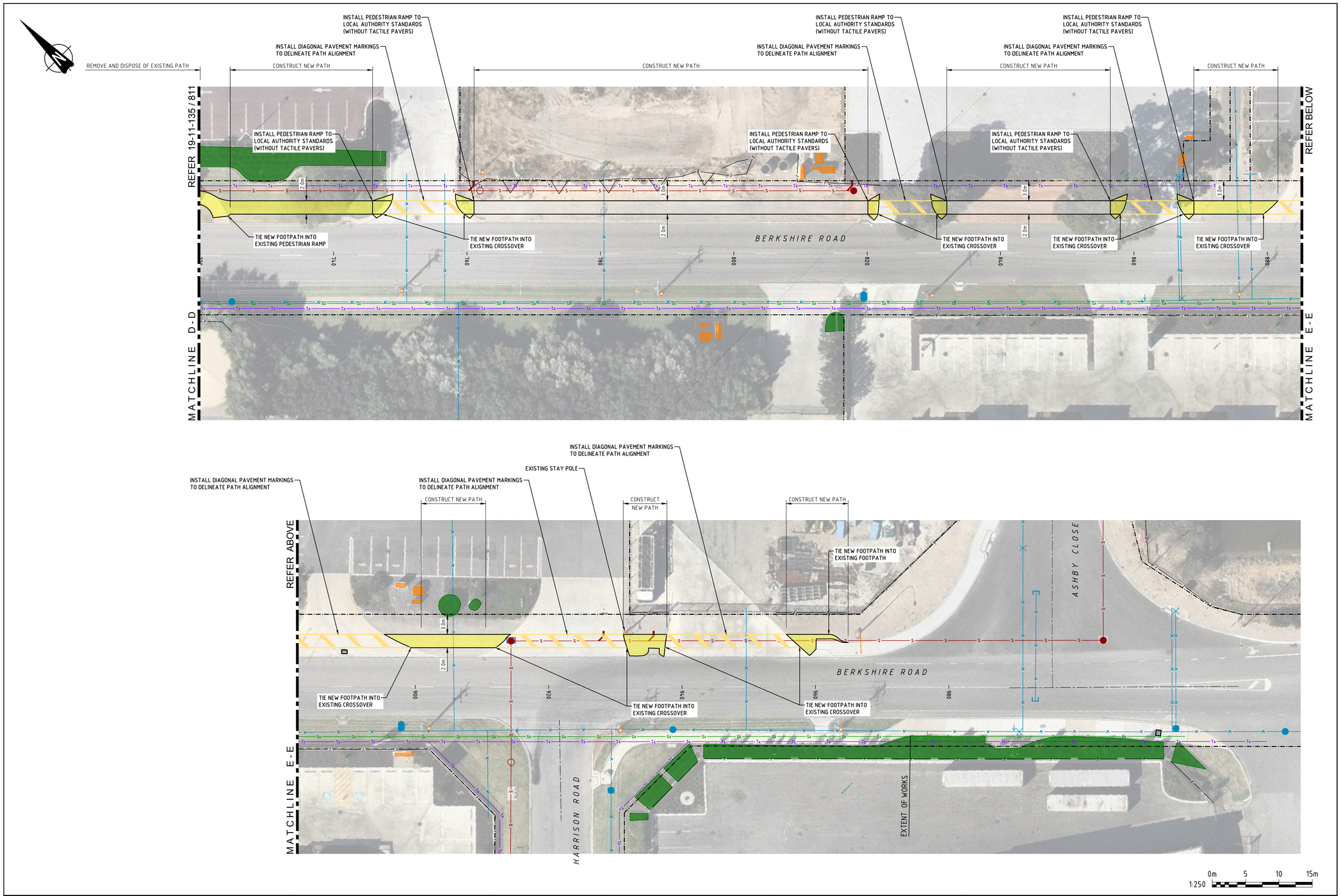
APPD



PROJECT: **BERKSHIRE ROAD PATH UPGRADE HIGH WYCOMBE**	B 7-2-2020 PATH DESIGN AMENDED DLC A 4-2-2020 ISSUED FOR 25% DESIGN COMMENT DPE No. DATE REVISION BY	COPYRIGHT COPYRIGHT IN THIS DRAWING IS THE PROPERTY OF THE CONSULTANT. THE CLIENT HAS LICENSE TO USE THIS DRAWING FOR THE PROJECT ONLY. THE USER SHALL BE RESPONSIBLE FOR "SITE CHECKING" ALL DIMENSIONS BEFORE COMMENCEMENT OF WORK. CAD DRAWING DO NOT MANUALLY ALTER. ONLY PLANS WITH NUMERICAL REVISION (REV 'B' OR HIGHER) AND SIGNED AS APPROVED SHALL BE USED FOR CONSTRUCTION.	Porter Consulting Engineers Level 2 Kishorn Court 58 Kishorn Road Mt Pleasant 6153 WA PO Box 1036 Canning Bridge 6153 WA Tel (08) 9315 9955 Email office@porterseng.com.au www.porterseng.com.au TUOAD Pty Ltd ACN 070 097 168 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385	CLIENT: **CITY OF KALAMUNDA**	DRAWING: **FOOTPATH UPGRADE CONCEPT PLAN - SHEET 3** STATUS: **FOR COMMENT**	SCALE 1:250 DATE NOV 2019 DESIGN DPE DRAWN DPE CHECK	DRAWING No. **19-11-135/812** REV No. **B** ORIGINAL DRAWING SIZE **A1** FILE NAME: S:\ACTIVE PROJECTS\19-11-135\ACAD\191135-810-812.dwg APP'D

Attachment 3:
Review of overhead electrical lines along Berkshire Road

PROJECT:

BERKSHIRE ROAD, FORRESTFIELD
OVERHEAD AERIALS VEHICLE CLEARANCE ASSESSMENT

REPORT FOR:

SITE ELECTRICAL SERVICES

DOCUMENT NO: **3E19102-R-01**

CIVIL ENGINEERS:

PORTER CONSULTING ENGINEERS

DOCUMENT PREPARED BY:

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Document History and Status

Revision	Date issued	Author	Reviewed by	Approved by	Revision Description
1	31/03/2020	VH	DJ	DJ	For Information
2	01/04/2020	VH	DJ	DJ	For Information

Distribution of copies

Revision	Copy no	Quantity	Issued to
1	Digital PDF	1	PORTER CONSULTING ENGINEERS
2	Digital PDF	1	PORTER CONSULTING ENGINEERS

Contents

SECTION 1 INTRODUCTION

1.1 SCOPE AND ASSUMPTIONS

We understand that the City of Kalamunda is considering the use of Berkshire Road as a RAV7 vehicle thoroughfare between Milner Road and Roe Highway.

This report shall provide information on the existing electrical networks within this road reserve and inform of any likely vehicle traffic obstructions. Lastly, it will provide an order of cost estimates for the required works to remove these obstructions to provide unrestricted clearance for RAV7 vehicles.

In accordance with Main Roads WA's Standard Restricted Access Vehicle Route Assessment Guidelines, RAV routes must provide adequate overhead clearance for a load/vehicle height of 4.6m:

- With 300mm clearances to overhead obstructions (except power lines)
- Power lines – at least the minimum clearance required by telecommunications and electrical transmission cable providers

The vehicle clearance to overhead aerials assessment in the below sections have been completed on this basis.

SECTION 2 ELECTRICAL SERVICES

2.1 EXISTING POWER DISTRIBUTION NETWORK

The existing Western Power (WP) distribution infrastructure in the vicinity of the site comprises of a 22kV three phase High Voltage (HV) and three phase Low Voltage (LV) aerial and underground network.

HV and LV aerials primarily exist along the western side of Berkshire Road running in a southeast to northwest direction. The aerial network supplies power to several commercial/light industrial premises located on the eastern side via aerial consumer cables. Existing stay wires supporting the current pole arrangements also cross over Berkshire Road. Possible clearances issues for RAV7 vehicles travelling through Berkshire Road are identified below.

2.2 POSSIBLE OVERHEAD CLEARANCE ISSUES

The following electrical infrastructure crossing over Berkshire Road has been identified:

Electrical Asset
Pole S132830 – Consumer Aerials
Pole S122686 – Consumer Aerials
Pole S122688 – Consumer Aerials
Pole S122689 – Consumer Aerials
Pole S122696 – Consumer Aerials
Pole S122698 – Stay Wire

Refer to Figure 1 in the Appendix for the location of the aforementioned electrical assets.

With conductors/wire crossing over Berkshire Road, a possible hazard exists for RAV7 vehicles in terms of vehicle clearance to aerials and therefore unrestricted access may not be provided.

2.3 OVERHEAD AERIAL VEHICLE CLEARANCE ASSESSMENT

A power line survey in accordance to Western Power's Survey Brief has been conducted by BCE Spatial. From the data collected, a preliminary assessment of vehicle to aerial conductor clearance can be completed. The following conclusion can be deducted from the survey points gathered.

Electrical Asset	Asset Survey Point ¾ Span (AHD)	Ground Survey Point (AHD)	Asset to Ground Clearance
Pole S132830 – Consumer Aerials	34.739	29.404	5.33m
Pole S122686 – Consumer Aerials	34.390	29.056	5.33m
Pole S122688 – Consumer Aerials	34.734	29.405	5.32m
Pole S122689 – Consumer Aerials	34.974	29.665	5.30m
Pole S122696 – Consumer Aerials	37.874	32.878	4.99m
Pole S122698 – Stay Wire	41.149	33.8210	7.32m

The ¾ span survey point produces the lowest clearance over the roadway and has therefore been used in this assessment.

Danger zones for live electrical apparatus are prescribed in Section 3.64 of the Occupational Safety and Health Regulations 1996. No person, plant or materials shall enter the danger zone of any electrical network asset. With consumer aerials insulated and less than 1000 volts, a danger zone of 0.5m is applicable. Western Power policies however inform of a greater danger zone of 1m for overhead powerlines up to 1000 volts. No clarifications were provided during discussion with Western Power and therefore the more stringent requirement of 1m is to be applied.

Overhead line clearance calculations involve a more complex process than reviewing surveyed points. Special situations such as sag and blowout are to be considered and are to be based off the Service Authority's design parameters. For Western Power, such design parameters are of their intellectual property and therefore calculations can only be completed by Western Power however it has been advised that they do not assess clearances on consumer aerial conductors.

Based on the above, the following conclusions can be made:

Electrical Asset	Asset to Ground Clearance	Load/Vehicle Height	Vehicle to Asset Clearance	Within Danger Zone
Pole S132830 – Consumer Aerials	5.33m	4.6m	0.73m	Yes
Pole S122686 – Consumer Aerials	5.33m	4.6m	0.73m	Yes
Pole S122688 – Consumer Aerials	5.32m	4.6m	0.72m	Yes
Pole S122689 – Consumer Aerials	5.30m	4.6m	0.70m	Yes
Pole S122696 – Consumer Aerials	4.99m	4.6m	0.33m	Yes
Pole S122698 – Stay Wire	7.32m	4.6m	2.72m	No

All consumer aerial conductors need to be undergrounded to provide unrestricted access for RAV7 vehicles.

With the tension of stay wires, sag and blowout does not play a factor and therefore this asset should pose no obstruction to vehicles of 4.6m height.

2.4 LIKELY POWER SUPPLY SCENARIO AND OPTIONS

Western Power has confirmed that they will not consider the use of taller consumer poles to raise the height of consumer aerials as they do not own the poles and therefore an underground conversion solution will only be presented. In an Industrial/commercial lot, this is implemented by WP owned and maintained URD 3-phase direct buried underground cabling from Western Power's LV network to uni-pillars serving each lot on the general basis of one uni-pillar per industrial/commercial lot.

The following options are available to the City:

1.) For temporary arrangement: Oversize Load Movement Application
    a. Submit application to WP in advance of planned vehicle movement
    b. Western Power to assess if the load can travel safely and advise what special conditions are required.
    c. Where possible, Western Power will consider the temporary disconnection and reconnection of consumer aerials as the vehicle passes through. This will require approval from affected consumers.
    d. In some cases, substantial planning and/or construction works are required (e.g. undergrounding powerlines). In these cases, Western Power will quote on the work required and therefore there are potential delays to allow for design and construction.

2.) For a permanent arrangement: Overhead to Underground Power Conversion Application
    a. Submit application to Western Power for the undergrounding conversion of consumer mains to provide unrestricted vehicle movement in the future
    b. With this type of application, WP to design and construct
    c. Note: MRWA & Western Power's Transporting Oversize Loads processes will still need to be followed.

SECTION 3 BUDGET ESTIMATES

3.1 ELECTRICAL SERVICES

For Option 2, we understand that the Network Augmented Costs for the overhead to underground supply conversion will be charged at Western Power's full cost method.

Our very early pre-design, pre-feasibility study order of probable cost estimates for the underground conversion of five overheard consumer supplies is in the order of $75k.

WP scope to include the following:

- Western Power to design and complete overhead to underground conversion as per consultant's site plan
- WP to design to include:
    - Removal of existing consumer aerials
    - Installation of new underground cable from pole to new pillar supply
    - Installation of new pillar supply

3.2 QUALIFICATIONS AND EXCLUSIONS

The above preliminary cost estimate excludes surveyor costs (pegging of lot boundaries and proposed pillar locations), switchboard upgrades/replacement, private cabling from customer switchboard to new pillar supply, design fees and consultant costs.

An electrical contractor is to be engaged for the new internal private wiring from the existing switchboard to the new pillar supply. A site audit may be required to determine if any additional works are required for the reconnection works to comply with current standards. For these reasons, an estimate for the reconnection works have been excluded in the above cost estimate.

Existing Western Power distribution poles appears to be in good order and suitable for new cable terminations, therefore the assumption has been made that no existing poles will require replacing. This cost has been excluded from the estimate.

We confirm that the budgets presented are indicative only. If the reader intends to use these costs for financial purposes they should be satisfied that they are adequate. 3E Consulting Engineers does not accept liability or responsibility for their interpretation or use.

APPENDIX

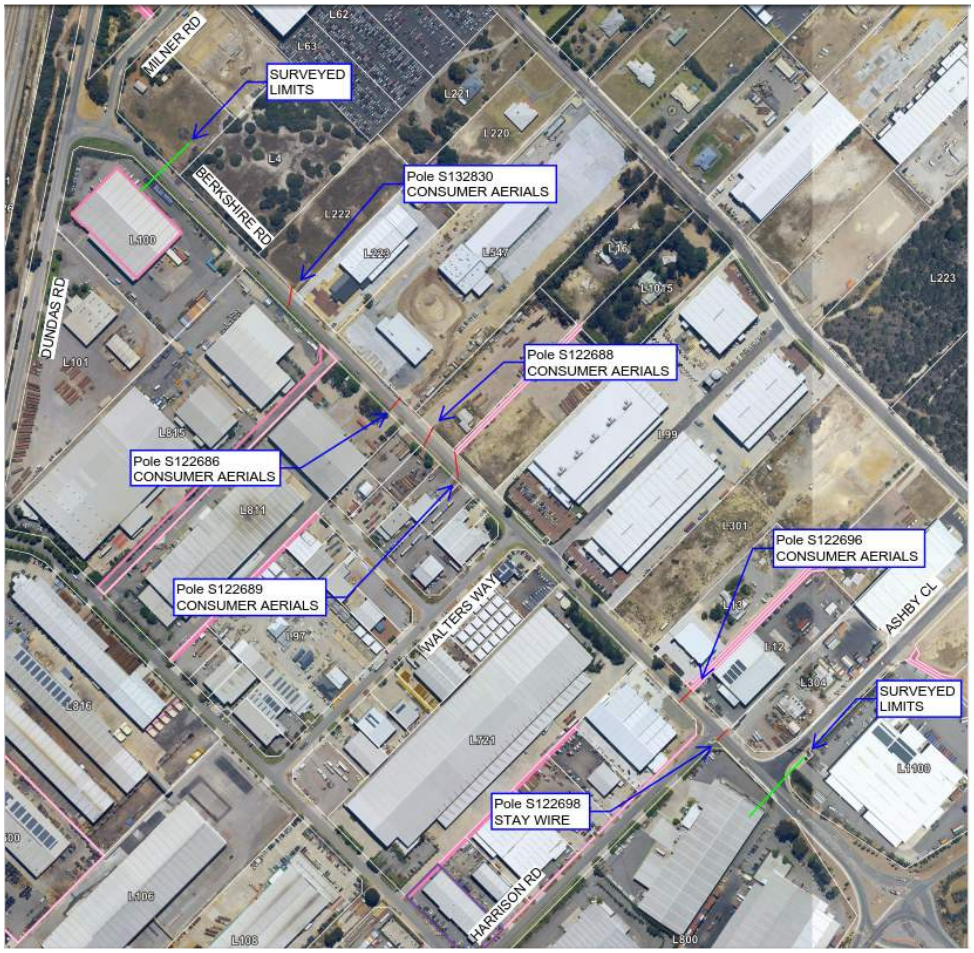
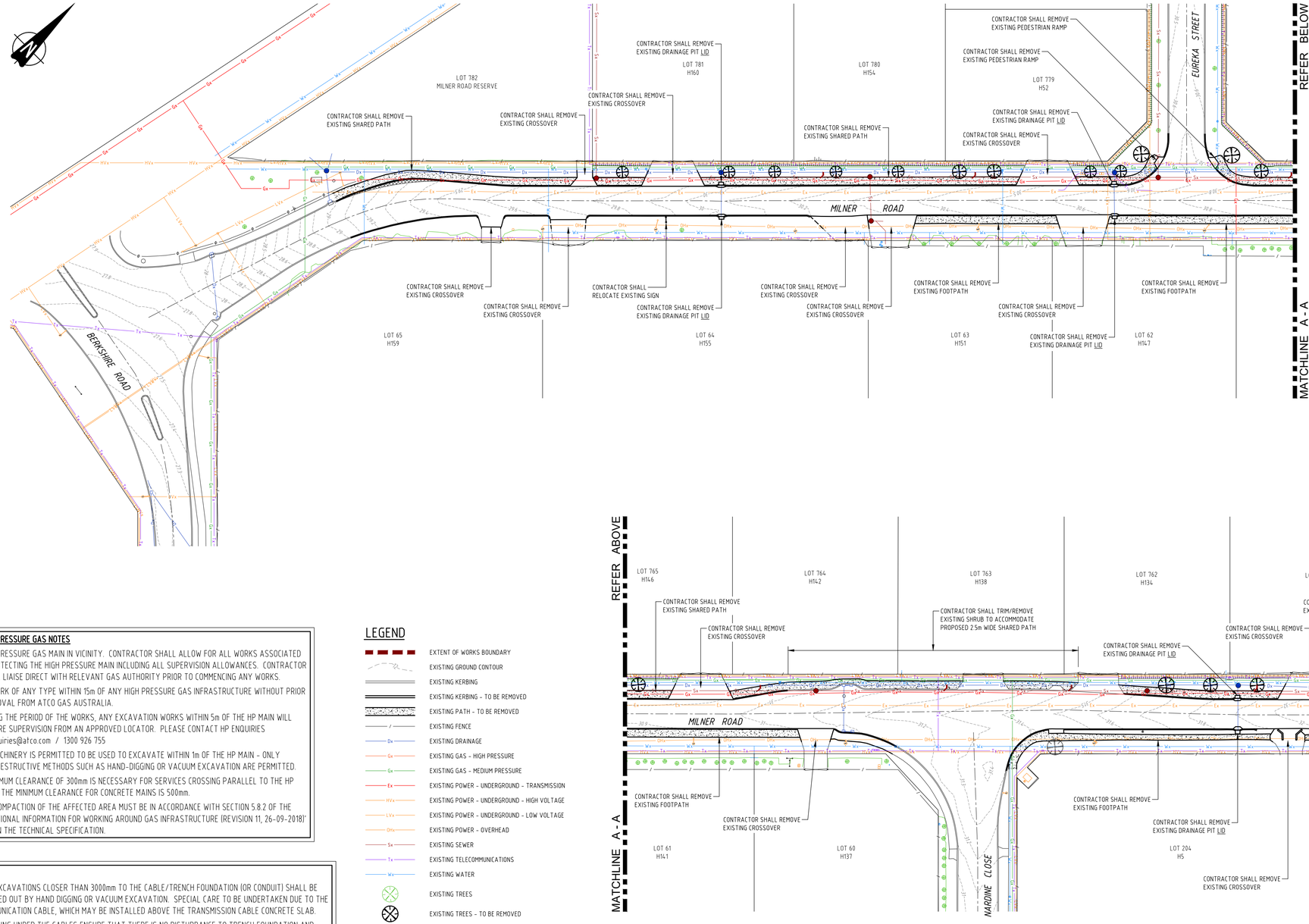


Figure 1: Electrical Assets Crossing Over Berkshire Road

Attachment 4:
Milner Road (85% design status drawings)



HIGH PRESSURE GAS NOTES

HIGH PRESSURE GAS MAIN IN VICINITY. CONTRACTOR SHALL ALLOW FOR ALL WORKS ASSOCIATED IN PROTECTING THE HIGH PRESSURE MAIN INCLUDING ALL SUPERVISION ALLOWANCES. CONTRACTOR SHALL LIAISE DIRECT WITH RELEVANT GAS AUTHORITY PRIOR TO COMMENCING ANY WORKS.

NO WORK OF ANY TYPE WITHIN 15m OF ANY HIGH PRESSURE GAS INFRASTRUCTURE WITHOUT PRIOR APPROVAL FROM ATCO GAS AUSTRALIA.

DURING THE PERIOD OF THE WORKS, ANY EXCAVATION WORKS WITHIN 5m OF THE HP MAIN WILL REQUIRE SUPERVISION FROM AN APPROVED LOCATOR. PLEASE CONTACT HP ENQUIRIES hpenquiries@atco.com / 1300 926 755

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A MINIMUM CLEARANCE OF 300mm IS NECESSARY FOR SERVICES CROSSING PARALLEL TO THE HP MAIN. THE MINIMUM CLEARANCE FOR CONCRETE MAINS IS 500mm.

ALL COMPACTION OF THE AFFECTED AREA MUST BE IN ACCORDANCE WITH SECTION 5.8.2 OF THE 'ADDITIONAL INFORMATION FOR WORKING AROUND GAS INFRASTRUCTURE (REVISION 11, 26-09-2018)' WITHIN THE TECHNICAL SPECIFICATION.

NOTE

ALL EXCAVATIONS CLOSER THAN 3000mm TO THE CABLE/TRENCH FOUNDATION (OR CONDUIT) SHALL BE CARRIED OUT BY HAND DIGGING OR VACUUM EXCAVATION. SPECIAL CARE TO BE UNDERTAKEN DUE TO THE COMMUNICATION CABLE, WHICH MAY BE INSTALLED ABOVE THE TRANSMISSION CABLE CONCRETE SLAB.

CROSSING UNDER THE CABLES ENSURE THAT THERE IS NO DISTURBANCE TO TRENCH FOUNDATION AND MAINTAIN A MINIMUM OF 500mm FROM THE BOTTOM MOST EDGE OF THE CEMENTITIOUS MATERIAL.

MECHANICAL EXCAVATION SHALL ONLY BE PERMITTED FOR EXCAVATION DOWN TO A MAXIMUM OF 250mm REMOVING THE BITUMEN AND ROAD BASE

PARALLEL TRENCHING - MAINTAIN A MINIMUM OF 1m FROM THE OUTER EDGE OF THE CABLE, ENSURING THAT THERE IS NO DISTURBANCE TO THE CABLE OR ITS FOUNDATION. SHORING MAY BE REQUIRED.

LEGEND

- EXTENT OF WORKS BOUNDARY
- EXISTING GROUND CONTOUR
- EXISTING KERBING
- EXISTING KERBING - TO BE REMOVED
- EXISTING PATH - TO BE REMOVED
- EXISTING FENCE
- EXISTING DRAINAGE
- EXISTING GAS - HIGH PRESSURE
- EXISTING GAS - MEDIUM PRESSURE
- EXISTING POWER - UNDERGROUND - TRANSMISSION
- EXISTING POWER - UNDERGROUND - HIGH VOLTAGE
- EXISTING POWER - UNDERGROUND - LOW VOLTAGE
- EXISTING POWER - OVERHEAD
- EXISTING SEWER
- EXISTING TELECOMMUNICATIONS
- EXISTING WATER
- EXISTING TREES
- EXISTING TREES - TO BE REMOVED

NOTE

OPTIC FIBRE CABLE IN VICINITY OF WORKS. CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITY AT LEAST TWO (2) BUSINESS DAYS BEFORE STARTING ACTIVITY.

REFER TO DRAWING 19-11-135/M/101 FOR SITEWORKS NOTES

1:500 0 5 10 20 30
Half Size 1:1000 - SCALE (m)

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PROJECT: **MILNER ROAD WIDENING HIGH WYCOMBE**

No.	DATE	REVISION	BY
A	17-6-2020	ISSUED FOR COMMENT. 85% DESIGN STATUS.	DLC

Porter Consulting Engineers

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TUONO Pty Ltd ACN 070 097 168 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 616 396 385

CLIENT: **CITY OF KALAMUNDA**

DRAWING: **SITEWORKS PLAN SHEET 1**

STATUS: **FOR COMMENT**

SCALE	1:500
DATE	APR 2020
DESIGN	DLC
DRAWN	DLC
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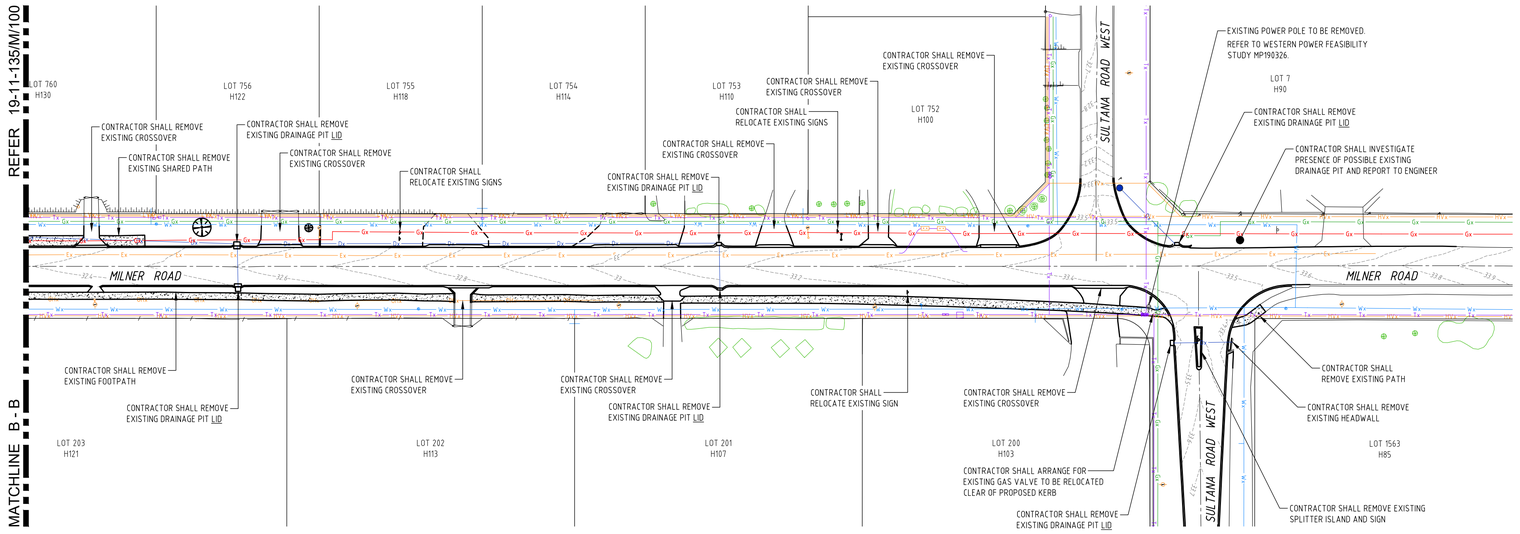

LEGEND

- EXTENT OF WORKS BOUNDARY
- EXISTING GROUND CONTOUR
- EXISTING KERBING
- EXISTING KERBING - TO BE REMOVED
- EXISTING PATH - TO BE REMOVED
- EXISTING FENCE
- EXISTING DRAINAGE
- EXISTING GAS - HIGH PRESSURE
- EXISTING GAS - MEDIUM PRESSURE
- EXISTING POWER - UNDERGROUND - TRANSMISSION
- EXISTING POWER - UNDERGROUND - HIGH VOLTAGE
- EXISTING POWER - UNDERGROUND - LOW VOLTAGE
- EXISTING POWER - OVERHEAD
- EXISTING SEWER
- EXISTING TELECOMMUNICATIONS
- EXISTING WATER

SITEWORKS NOTES

1. VERTICAL DATUM : AUSTRALIAN HEIGHT DATUM (AHD)
   HORIZONTAL DATUM : PERTH COASTAL GRID 1994 (PCG94)
2. EXISTING SURVEY/CONTOURS FROM SITE SURVEY BY BCE SURVEYING.
3. **SERVICES, SUCH AS SEWER, WATER, GAS, COMMUNICATIONS, ELECTRICITY AND DRAINAGE MAY BE ENCOUNTERED DURING CONSTRUCTION OF THE WORKS. SERVICES INFORMATION SHOWN ON DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. BEFORE EXCAVATION COMMENCES THE LOCATION OF ALL SUCH SERVICES SHALL BE OBTAINED FROM THE RELEVANT AUTHORITIES BY THE CONTRACTOR.**
4. **THE CONTRACTOR SHALL CO-ORDINATE THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO COMMENCEMENT OF WORK. ANY CONFLICTS ARE TO BE REPORTED TO THE SUPERINTENDENT IMMEDIATELY.**
5. THE CONTRACTOR SHALL PROVIDE A SAFE WORKING ENVIRONMENT FOR THE DURATION OF THE WORKS. CONTRACTOR SHALL HAVE IN PLACE A PROJECT SAFETY AND RISK MANAGEMENT SYSTEM WHICH COMPLIES WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT AND WORK SAFE WA REQUIREMENTS.
6. THE CONTRACTOR SHALL LIMIT ACCESS TO THE WORKS TO THE SITEWORKS BOUNDARY. EXISTING VEGETATION OUTSIDE OF BOUNDARY TO BE PROTECTED.
7. THE CONTRACTOR SHALL PREPARE AND IMPLEMENT A DUST MANAGEMENT PLAN IN ACCORDANCE WITH THE DEPARTMENT OF ENVIRONMENT AND CONSERVATION'S GUIDELINES. THE CONTRACTOR SHALL PAY ALL FEES AND OBTAIN ALL APPROVALS FROM THE LOCAL AUTHORITY FOR THIS DUST MANAGEMENT PLAN PRIOR TO ANY WORKS STARTING ON SITE.
8. DUST SUPPRESSION METHODS SHALL BE APPLIED BY THE CONTRACTOR IN ACCORDANCE WITH THE SPECIFICATION.
9. ALL TREES SHALL REMAIN UNDISTURBED UNLESS SPECIFICALLY NOTED ON THE PLANS OR ADVISED BY THE ENGINEER. THE CONTRACTOR SHALL FENCE OFF ALL TREES TO BE PROTECTED, FOR ACCEPTANCE BY THE PRINCIPAL, PRIOR TO COMMENCEMENT OF WORK.
10. THE CONTRACTOR SHALL REMOVE FROM SITE ALL RUBBISH (INCLUDED BUT NOT LIMITED TO: CAR BODIES, DRUMS, ETC.) WITHIN SITEWORKS BOUNDARY TO AN APPROVED DISPOSAL SITE.
11. THE CONTRACTOR SHALL COMPLETE ALL WORKS AS REQUIRED IN THE GEOTECHNICAL REPORT AND IN ACCORDANCE WITH THE REQUIREMENTS OF THE GEOTECHNICAL REPORT.
12. THE CONTRACTOR SHALL REMOVE REDUNDANT CROSSOVERS AND CONSTRUCT KERB TO MATCH EXISTING, VERGE TO BE MADE GOOD.

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1:500 0 5 10 20 30
Half Size 1:1000 - SCALE (m)

DIAL BEFORE YOU DIG www.1100.com.au

PROJECT:
MILNER ROAD WIDENING HIGH WYCOMBE

No.	DATE	REVISION	BY
A	17-6-2020	ISSUED FOR COMMENT. @5% DESIGN STATUS.	DLC

Porter Consulting Engineers

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www.portereng.com.au

TUOAD Pty Ltd ACN 070 097 148 as Trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:
CITY OF KALAMUNDA

DRAWING:
SITEWORKS PLAN SHEET 2

STATUS: **FOR COMMENT**

SCALE	1:500
DATE	APR 2020
DESIGN	DLC
DRAWN	DLC
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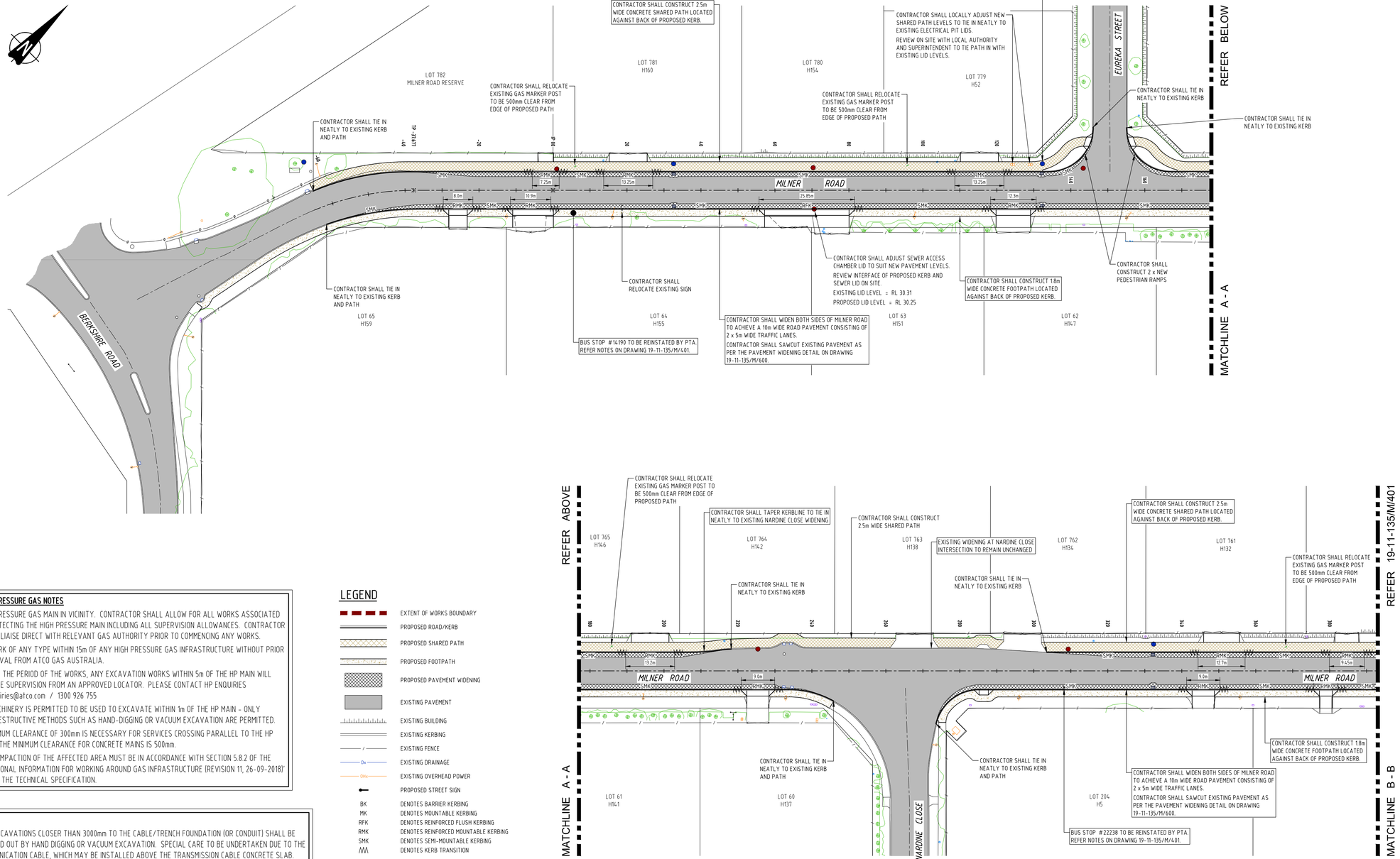

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LEGEND

- EXTENT OF WORKS BOUNDARY
- PROPOSED ROAD/KERB
- PROPOSED SHARED PATH
- PROPOSED FOOTPATH
- PROPOSED PAVEMENT WIDENING
- EXISTING PAVEMENT
- EXISTING BUILDING
- EXISTING KERBING
- EXISTING FENCE
- EXISTING DRAINAGE
- EXISTING OVERHEAD POWER
- PROPOSED STREET SIGN
- BK DENOTES BARRIER KERBING
- MK DENOTES MOUNTABLE KERBING
- RFK DENOTES REINFORCED FLUSH KERBING
- RMK DENOTES REINFORCED MOUNTABLE KERBING
- SMK DENOTES SEMI-MOUNTABLE KERBING
- DENOTES KERB TRANSITION

NOTE

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NOTE

CONTRACTOR SHALL LOCALLY ADJUST PATH CROSSFALL TO TIE IN NEATLY TO EXISTING SERVICE PIT LIDS. ENSURE PATH GRADES TOWARDS ROAD SO THAT NO PONDING OCCURS.

REFER TO DRAWING 19-11-135/M/401 FOR ROAD & PATH NOTES

1:500 0 5 10 20 30 Half Size 1:1000 - SCALE (m)

DIAL BEFORE YOU DIG www.1100.com.au

PROJECT:

MILNER ROAD WIDENING HIGH WYCOMBE

No.	DATE	REVISION	BY
A	17-6-2020	ISSUED FOR COMMENT. 85% DESIGN STATUS.	DLC

Porter Consulting Engineers

TI/DAD Pty Ltd ACN 070 097 148 as Trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

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CLIENT:

CITY OF KALAMUNDA

DRAWING:

ROAD LAYOUT PLAN SHEET 1

STATUS: **FOR COMMENT**

SCALE	1:500
DATE	APR 2020
DESIGN	DLC
DRAWN	DLC
CHECK	

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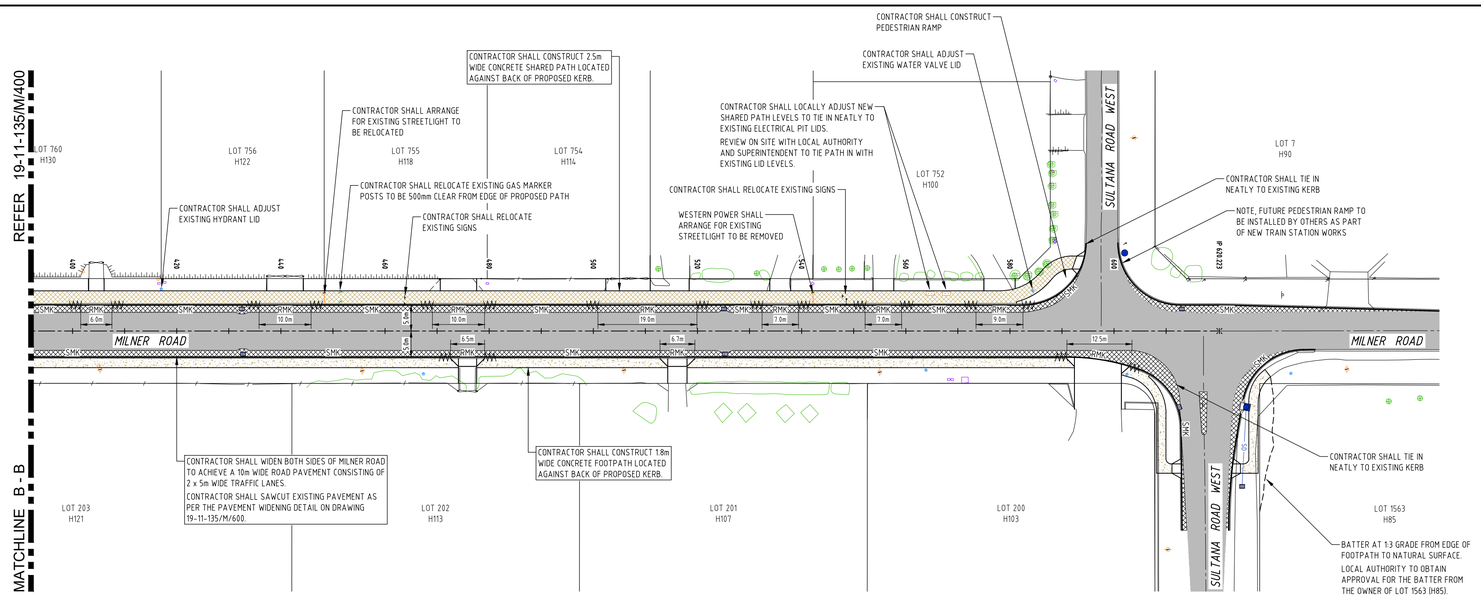

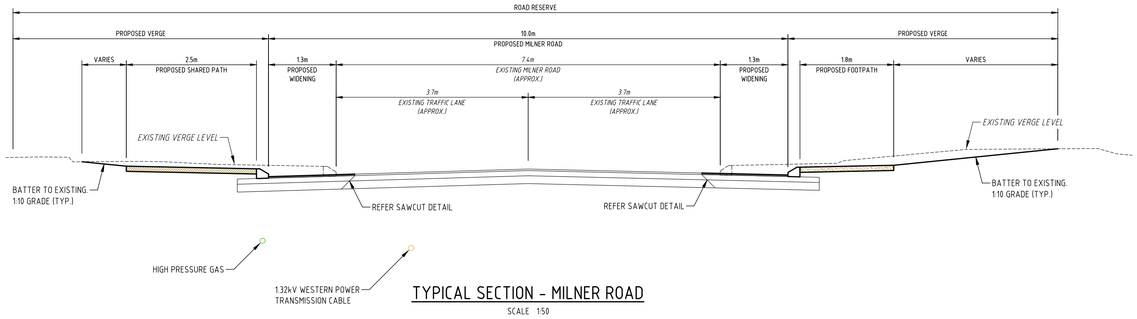

TYPICAL SECTION - MILNER ROAD

SCALE 1:50

LEGEND

- EXTENT OF WORKS BOUNDARY
- PROPOSED ROAD/KERB
- PROPOSED SHARED PATH
- PROPOSED FOOTPATH
- PROPOSED PAVEMENT WIDENING
- EXISTING PAVEMENT
- EXISTING BUILDING
- EXISTING KERBING
- EXISTING FENCE
- EXISTING DRAINAGE
- EXISTING OVERHEAD POWER
- PROPOSED STREET SIGN

BK	DENOTES BARRIER KERBING
MK	DENOTES MOUNTABLE KERBING
RFK	DENOTES FLUSH KERBING
RMK	DENOTES REINFORCED MOUNTABLE KERBING
SMK	DENOTES SEMI-MOUNTABLE KERBING
	DENOTES KERB TRANSITION

ROAD NOTES

1. VERTICAL DATUM : AUSTRALIAN HEIGHT DATUM (AHD)
   HORIZONTAL DATUM : PERTH COASTAL GRID 1994 (PCG94)
2. **SERVICES, SUCH AS SEWER, WATER, GAS, TELEPHONE, ELECTRICITY, AND DRAINAGE MAY BE ENCOUNTERED DURING CONSTRUCTION OF THE WORKS. SERVICES INFORMATION SHOWN ON DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. BEFORE EXCAVATION COMMENCES THE LOCATION OF ALL SUCH SERVICES SHALL BE OBTAINED FROM THE RELEVANT AUTHORITIES.**
3. **THE CONTRACTOR SHALL CO-ORDINATE THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO COMMENCEMENT OF WORK. ANY CONFLICTS SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY.**
4. ALL WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PROJECT SPECIFICATION, BUT WHERE NO DETAIL PROVIDED, TO THE REQUIREMENTS OF THE LOCAL AUTHORITY.
5. CONTRACTOR SHALL PROVIDE ALL SIGNING, LIGHTING AND FLAGMEN NECESSARY TO ENSURE SAFETY OF THE PUBLIC AND OF THE WORKS.
6. LOCATE ALL LEVELS FROM EXISTING SURVEY MARKS. ALL SURVEY MARKS SHALL BE PROTECTED.
7. EXISTING VERGES SHALL NOT BE DISTURBED BEYOND THE EXTENT OF WORK.
8. ALL FILL SHALL BE CLEAN NON-PLASTIC MATERIAL FREE FROM VEGETATION AND OTHER DELETERIOUS MATERIAL AND CERTIFIED AS SUITABLE FOR RESIDENTIAL LAND USE.
9. ALL FILL SHALL BE PLACED IN UNIFORM LAYERS NOT EXCEEDING 300mm THICKNESS AND COMPACTED TO A DENSITY NOT LESS THAN 95% MAXIMUM DRY DENSITY.
10. CONTRACTOR SHALL TIE IN NEW SURFACE TO FINISH FLUSH WITH EXISTING SURFACE.
11. ALL EDGE KERBING SHALL BE SEMI-MOUNTABLE (SMK) UNLESS OTHERWISE NOTED. TRANSITIONS BETWEEN DIFFERENT KERBS SHALL BE OVER 2m.
12. SIGN POSTS AND STREET NAME PLATES SHALL BE SUPPLIED AND INSTALLED TO LOCAL AUTHORITY REQUIREMENTS. CONTRACTOR SHALL FIT STREET NAME PLATES TO ADJACENT LIGHT POLES WHERE APPROPRIATE.
13. THE CONTRACTOR SHALL SPOT OUT THE LINE MARKING. THE CONTRACTOR SHALL ADVISE MAIN ROADS WHEN THE SITE IS READY FOR LINE MARKING AND SIGNAGE INSTALLATION. LINE MARKING AND SIGNAGE SHALL BE UNDERTAKEN BY MAIN ROADS.
14. THE CONTRACTOR SHALL PREPARE AS-CONSTRUCTED ROADS AND PATH DRAWINGS (INCLUDING SURVEY) TO THE SATISFACTION OF THE LOCAL AUTHORITY. AS-CONSTRUCTED PLANS SHALL BE ISSUED TO THE ENGINEER FOR SIGNING AND PRESENTATION TO THE LOCAL AUTHORITY.
15. THE CONTRACTOR SHALL PREPARE AND PROVIDE ROAD AND PATH AS-CONSTRUCTED DOCUMENTS IN 'R' SPEC FORMAT AS PER LOCAL AUTHORITY REQUIREMENTS.
16. IT IS DEEMED THAT THE AS-CONSTRUCTED DOCUMENTS FORM PART OF THE WORKS. PRACTICAL COMPLETION CAN NOT BE AWARDED IF ACCEPTABLE AS-CONSTRUCTED DOCUMENTS HAVE NOT BEEN PROVIDED TO THE ENGINEER.
17. THE CONTRACTOR SHALL LIAISE WITH PTA (Transperth.ServiceDisruptions@pta.wa.gov.au) AT LEAST 14 DAYS PRIOR TO WORKS COMMENCING SO THAT PTA CAN ARRANGE DEVIATIONS OF SERVICES (IF NECESSARY), TEMPORARY STOP LOCATIONS, AND RE-INSTALL THE BUS STOP POST. THE CONTRACTOR SHALL COORDINATE THE WORKS WITH PTA.

PATH NOTES

1. ALL FOOTPATHS AND PEDESTRIAN RAMPS SHALL BE CONSTRUCTED TO LOCAL AUTHORITY STANDARDS. ALL MATERIAL USED SHALL BE IN ACCORDANCE WITH LOCAL AUTHORITY SPECIFICATION.
2. THE CONTRACTOR SHALL PROTECT ALL EXISTING WORKS, AND SUPPLY AND MAINTAIN ALL SAFETY DEVICES TO PROTECT VEHICLES, PEDESTRIANS AND THE WORKS.
3. UNLESS OTHERWISE SHOWN, ALL FOOTPATHS SHALL BE 1.8m WIDE LOCATED AGAINST BACK OF KERB.
4. UNLESS OTHERWISE SHOWN, ALL SHARED USE PATHS SHALL BE 2.5m WIDE LOCATED AGAINST BACK OF KERB.
5. UNLESS OTHERWISE SHOWN, ALL JOINTS SHALL BE SPACED IN ACCORDANCE WITH THE LOCAL AUTHORITY REQUIREMENTS. IF NOT AVAILABLE , THEY SHALL BE AS PER THE IPWEA REQUIREMENTS. JOINTS SHALL TIE IN WITH KERB JOINTS.
6. EXPANSION JOINT TO BE PROVIDED AT ANY SIGNIFICANT CHANGE IN WIDTH AND DIRECTION OR WHERE ADJACENT TO SOLID OBJECT, OTHERWISE AT MAX SPACING OF 4.0m.
7. PRIOR TO PLACING CONCRETE THE BASE SHALL BE FREE FROM DELETERIOUS MATERIAL, UNIFORMLY COMPACTED TO 95% MAXIMUM DRY DENSITY AND LIGHTLY DAMPENED.
8. ALL CONCRETE WORK SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 32 MPa AT 28 DAYS, UNLESS OTHERWISE NOTED.
9. THE FINAL SURFACE SHALL BE BROOM FINISHED AND ALL EDGES AND JOINTS TOOL FINISHED.
10. CONTRACTOR SHALL PROTECT THE FINISHED WORK FOR 24 HOURS AFTER THE CONCRETE HAS BEEN LAID, ANY DAMAGE SHALL BE MADE GOOD AT THE CONTRACTORS EXPENSE.

HIGH PRESSURE GAS NOTES

HIGH PRESSURE GAS MAIN IN VICINITY. CONTRACTOR SHALL ALLOW FOR ALL WORKS ASSOCIATED IN PROTECTING THE HIGH PRESSURE MAIN INCLUDING ALL SUPERVISION ALLOWANCES. CONTRACTOR SHALL LIAISE DIRECT WITH RELEVANT GAS AUTHORITY PRIOR TO COMMENCING ANY WORKS.

NO WORK OF ANY TYPE WITHIN 15m OF ANY HIGH PRESSURE GAS INFRASTRUCTURE WITHOUT PRIOR APPROVAL FROM ATCO GAS AUSTRALIA.

DURING THE PERIOD OF THE WORKS, ANY EXCAVATION WORKS WITHIN 5m OF THE HP MAIN WILL REQUIRE SUPERVISION FROM AN APPROVED LOCATOR. PLEASE CONTACT HP ENQUIRIES hpenquiries@atco.com / 1300 926 755

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ALL COMPACTION OF THE AFFECTED AREA MUST BE IN ACCORDANCE WITH SECTION 5.8.2 OF THE 'ADDITIONAL INFORMATION FOR WORKING AROUND GAS INFRASTRUCTURE (REVISION 11, 26-09-2018)' WITHIN THE TECHNICAL SPECIFICATION.

NOTE

OPTIC FIBRE CABLE IN VICINITY OF WORKS. CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITY AT LEAST TWO (2) BUSINESS DAYS BEFORE STARTING ACTIVITY.

NOTE

ALL EXCAVATIONS CLOSER THAN 3000mm TO THE CABLE/TRENCH FOUNDATION (OR CONDUIT) SHALL BE CARRIED OUT BY HAND DIGGING OR VACUUM EXCAVATION. SPECIAL CARE TO BE UNDERTAKEN DUE TO THE COMMUNICATION CABLE, WHICH MAY BE INSTALLED ABOVE THE TRANSMISSION CABLE CONCRETE SLAB.

CROSSING UNDER THE CABLES ENSURE THAT THERE IS NO DISTURBANCE TO TRENCH FOUNDATION AND MAINTAIN A MINIMUM OF 500mm FROM THE BOTTOM MOST EDGE OF THE CEMENTITIOUS MATERIAL.

MECHANICAL EXCAVATION SHALL ONLY BE PERMITTED FOR EXCAVATION DOWN TO A MAXIMUM OF 250mm REMOVING THE BITUMEN AND ROAD BASE

PARALLEL TRENCHING - MAINTAIN A MINIMUM OF 1m FROM THE OUTER EDGE OF THE CABLE, ENSURING THAT THERE IS NO DISTURBANCE TO THE CABLE OR ITS FOUNDATION. SHORING MAY BE REQUIRED.

NOTE

CONTRACTOR SHALL LOCALLY ADJUST PATH CROSSFALL TO TIE IN NEATLY TO EXISTING SERVICE PIT LIDS. ENSURE PATH GRADES TOWARDS ROAD SO THAT NO PONDING OCCURS.

1:500 0 5 10 20 30 Half Size 1:1000 - SCALE (m)

DIAL BEFORE YOU DIG www.1100.com.au

PROJECT: **MILNER ROAD WIDENING HIGH WYCOMBE**

No.	DATE	REVISION	BY
A	17-6-2020	ISSUED FOR COMMENT. 85% DESIGN STATUS.	DLC

Porter Consulting Engineers

Level 2 Kishorn Court
58 Kishorn Road
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TUOAO Pty Ltd ACN 070 097 148 as Trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 18 626 396 385

CLIENT: **CITY OF KALAMUNDA**

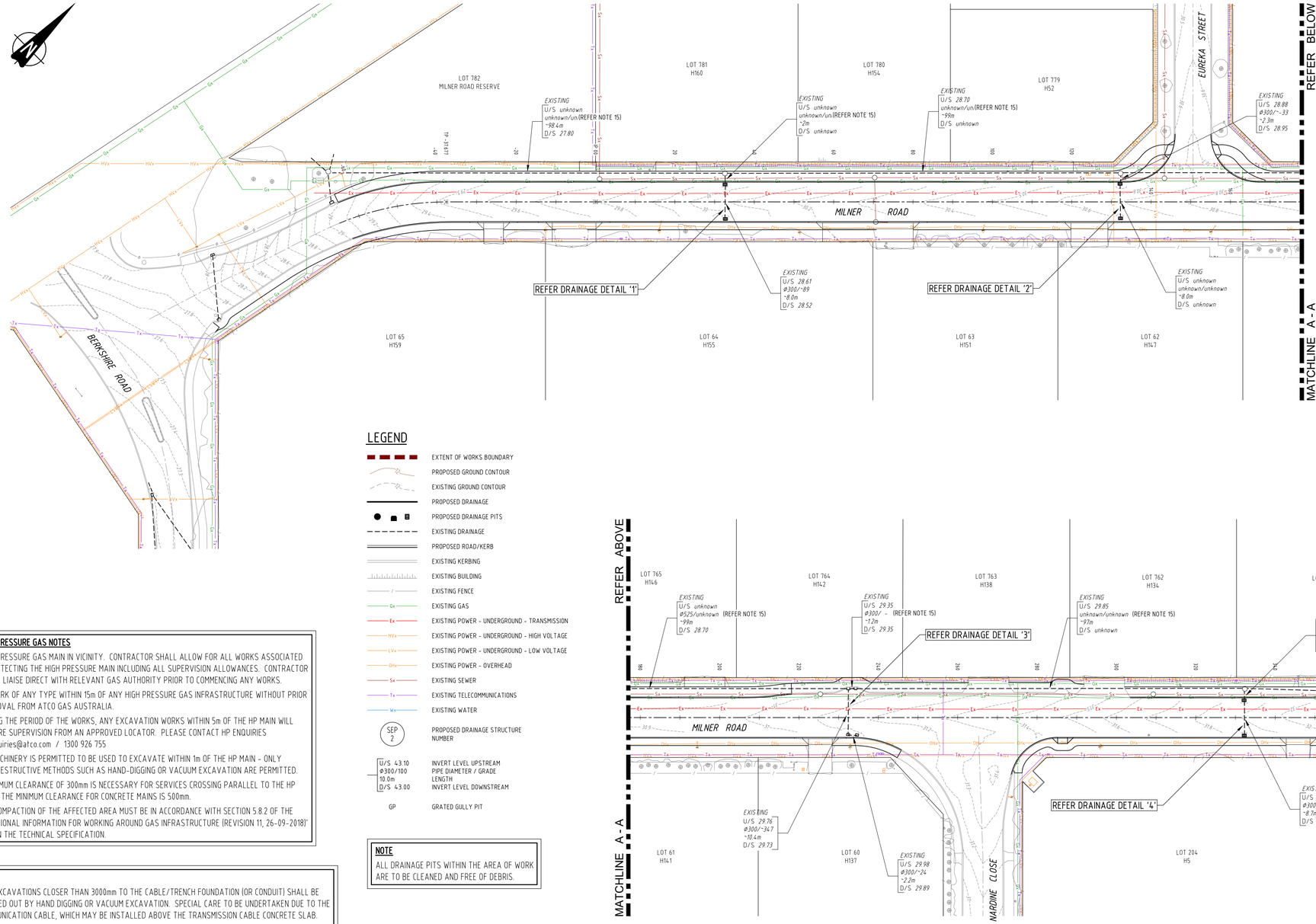
DRAWING: **ROAD LAYOUT PLAN SHEET 2**

STATUS: **FOR COMMENT**

SCALE	1:500
DATE	APRIL 2020
DESIGN	DLC
DRAWN	DLC
CHECK	
APP'D	

DRAWING No. **19-11-135/M/401** REV No. **A** ORIGINAL DRAWING SIZE **A1**

FILE NAME S:\ACTIVE PROJECTS\19-11-135\ACAD\191111135-M-400-401.dwg



HIGH PRESSURE GAS NOTES

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NOTE

ALL DRAINAGE PITS WITHIN THE AREA OF WORK ARE TO BE CLEANED AND FREE OF DEBRIS.

NOTE

OPTIC FIBRE CABLE IN VICINITY OF WORKS. CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITY AT LEAST TWO (2) BUSINESS DAYS BEFORE STARTING ACTIVITY.

REFER TO DRAWING 19-11-135/M/403 FOR DRAINAGE NOTES

1:500 0 5 10 20 30 Half Size 1:1000 - SCALE (m)

DIAL BEFORE YOU DIG www.1100.com.au

PROJECT:
MILNER ROAD WIDENING HIGH WYCOMBE

No	DATE	REVISION	BY
A	17-6-2020	ISSUED FOR COMMENT. 95% DESIGN STATUS.	DLC

Porter Consulting Engineers
Level 2 Kishorn Court
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TUOAD Pty Ltd ACN 070 097 968 as Trustee for the Consulting Engineering Unit Trust Trading as Porter Consulting Engineers ABN 78 636 396 585

CLIENT:
CITY OF KALAMUNDA

DRAWING:
DRAINAGE LAYOUT PLAN SHEET 1

STATUS: **FOR COMMENT**

SCALE	1:500
DATE	APR 2020
DESIGN	DLC
DRAWN	DLC
CHECK	
APP'D	

DRAWING No. 19-11-135/M/402 | REV No. A | ORIGINAL DRAWING SIZE A1

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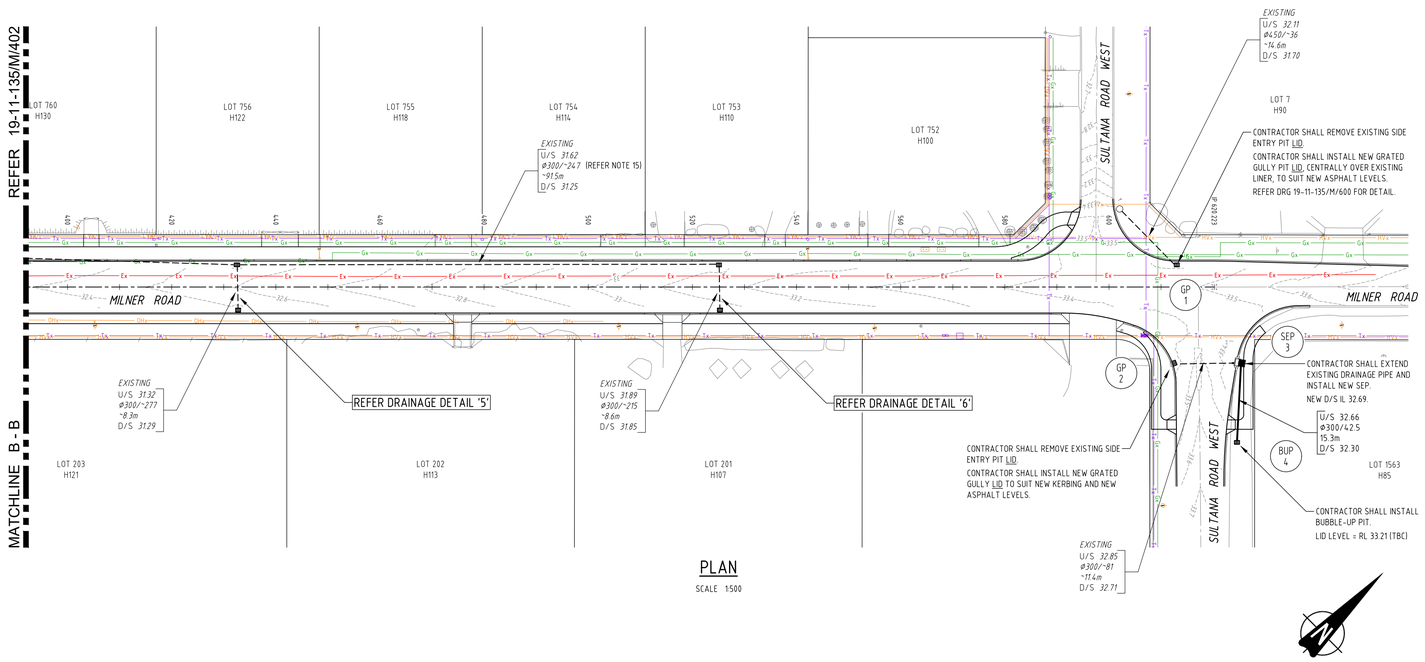


PLAN

SCALE 1:500

LEGEND

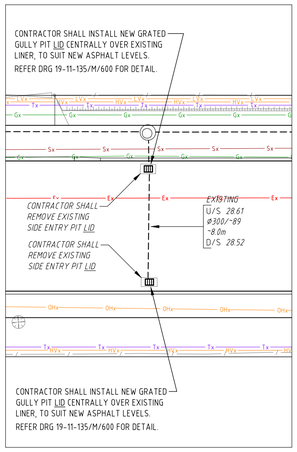
- EXTENT OF WORKS BOUNDARY
- PROPOSED GROUND CONTOUR
- EXISTING GROUND CONTOUR
- PROPOSED DRAINAGE
- PROPOSED DRAINAGE PITS
- EXISTING DRAINAGE
- PROPOSED ROAD/KERB
- EXISTING KERBING
- EXISTING BUILDING
- EXISTING FENCE
- EXISTING GAS
- EXISTING POWER - UNDERGROUND - TRANSMISSION
- EXISTING POWER - UNDERGROUND - HIGH VOLTAGE
- EXISTING POWER - UNDERGROUND - LOW VOLTAGE
- EXISTING POWER - OVERHEAD
- EXISTING SEWER
- EXISTING TELECOMMUNICATIONS
- EXISTING WATER
- SEP 2 — PROPOSED DRAINAGE STRUCTURE NUMBER
- U/S 43.10 Ø300/100 10.0m D/S 43.00 — INVERT LEVEL UPSTREAM / PIPE DIAMETER / GRADE / LENGTH / INVERT LEVEL DOWNSTREAM
- GP — GRATED GULLY PIT

NOTE

ALL DRAINAGE PITS WITHIN THE AREA OF WORK ARE TO BE CLEANED AND FREE OF DEBRIS.

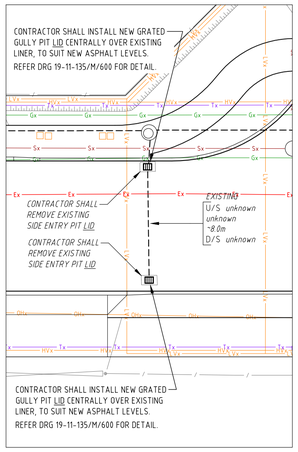
DRAINAGE NOTES

1. **THE CONTRACTOR SHALL CO-ORDINATE THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO COMMENCEMENT OF WORK. ANY CONFLICTS ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.**
2. **SERVICES, SUCH AS SEWER, WATER, GAS, TELEPHONE, ELECTRICITY, AND DRAINAGE MAY BE ENCOUNTERED DURING CONSTRUCTION OF THE WORKS. SERVICES INFORMATION SHOWN ON DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. BEFORE EXCAVATION COMMENCES THE LOCATION OF ALL SUCH SERVICES SHALL BE OBTAINED FROM THE RELEVANT AUTHORITIES.**
3. THE CONTRACTOR SHALL CHECK INVERT LEVELS OF ALL EXISTING STORMWATER PRIOR TO COMMENCEMENT OF WORK. THE CONTRACTOR SHALL NOTIFY THE ENGINEER ON ANY DISCREPANCIES.
4. ALL WORKS SHALL BE TO THE PROJECT SPECIFICATION, BUT WHERE NO DETAIL IS PROVIDED, TO THE REQUIREMENTS OF THE LOCAL AUTHORITY.
5. DRAINAGE PIPE LENGTHS ARE INDICATIVE ONLY, MANHOLES & GULLIES SHALL BE LOCATED AS SHOWN AND SETOUT IN ACCORDANCE WITH THE STANDARD DETAILS.
6. EXCAVATION SHALL BE KEPT TO A MINIMUM AND TRENCHES SUPPORTED.
7. PIPES SHALL BE LAID ON THE PREPARED BASE OF THE TRENCH, TO A UNIFORM GRADE AT DESIGN LEVELS.
8. THE CONTRACTOR SHALL PILE AND KEEL IN SOFT GROUND AND WHERE DRAINS CROSS EXISTING SERVICES.
9. ALL PIPES SHALL BE CLASS (2) UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL NOTIFY THE ENGINEER WHERE MIN. COVER CAN NOT BE ACHIEVED. MINIMUM COVER ON DRAINAGE TO BE 900mm UNDER ROAD AND 600mm IN VERGE UNLESS OTHERWISE NOTED.
10. PIPES SHALL BE LAID OBVERT TO OBVERT TAKEN FROM THE CENTRE OF THE PITS UNLESS OTHERWISE NOTED.
11. FILLING SHALL BE CLEAN NONPLASTIC MATERIAL FREE FROM STONES OR CLAY LUMPS. EXCAVATED MATERIAL SHOULD BE USED WHERE POSSIBLE. FILLING SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 150mm IN THICKNESS AND COMPACTED TO ACHIEVE A DENSITY NOT LESS THAN 95% MAXIMUM DRY DENSITY.
12. THE CONTRACTOR SHALL PREPARE AS-CONSTRUCTED DRAINAGE DRAWINGS (INCLUDING SURVEY) TO THE SATISFACTION OF THE LOCAL AUTHORITY. AS CONSTRUCTED PLANS TO BE ISSUED TO THE ENGINEER FOR SIGNING AND PRESENTATION TO THE LOCAL AUTHORITY.
13. THE CONTRACTOR SHALL PREPARE AND PROVIDE DRAINAGE AS CONSTRUCTED DOCUMENTS IN 'D' SPEC FORMAT AS PER LOCAL AUTHORITY REQUIREMENTS
14. IT IS DEEMED THAT THE AS-CONSTRUCTED DOCUMENTS FORM PART OF THE WORKS. PRACTICAL COMPLETION CAN NOT BE AWARDED IF ACCEPTABLE AS-CONSTRUCTED DOCUMENTS HAVE NOT BEEN PROVIDED TO THE ENGINEER.
15. AS NOTED IN THE FORRESTFIELD NORTH RESIDENTIAL PRECINCT LWMS (STRATEGEN-JBS&G, MAY 2020), TO SUPPORT THE FUTURE RESIDENTIAL PRECINCT (EAST OF SULTANA ROAD WEST), A 600mm DIA. DRAINAGE PIPE IS NOTED TO BE REQUIRED FROM THE CORNER OF SULTANA ROAD WEST / MILNER ROAD INTERSECTION THROUGH TO THE BASIN BY MILNER ROAD / DUNDAS ST, AS IS SUBJECT TO FURTHER INVESTIGATION.



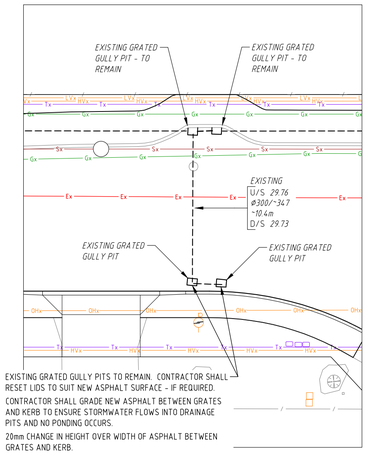
DRAINAGE DETAIL '1'

SCALE 1:200



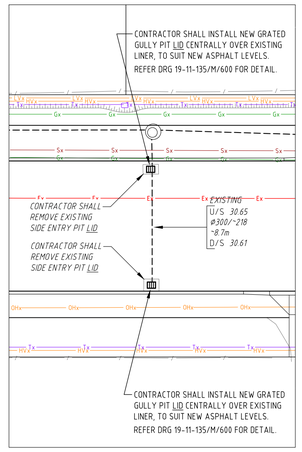
DRAINAGE DETAIL '2'

SCALE 1:200



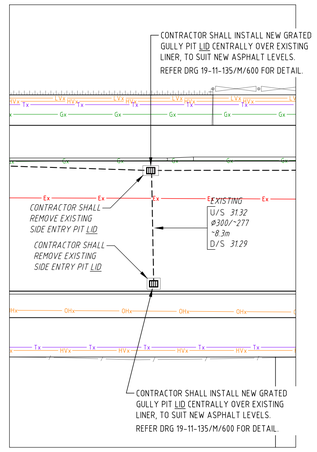
DRAINAGE DETAIL '3'

SCALE 1:200



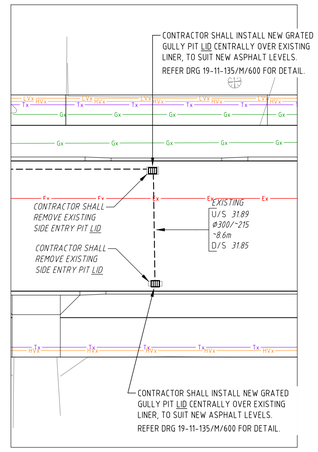
DRAINAGE DETAIL '4'

SCALE 1:200



DRAINAGE DETAIL '5'

SCALE 1:200



DRAINAGE DETAIL '6'

SCALE 1:200

REFER TO DRAWING 19-11-135/M/402 FOR POWER & GAS NOTES

1:500 0 5 10 20 30 — Half Size 1:1000 - SCALE (m)

1:200 0 2 4 8 12 — Half Size 1:400 - SCALE (m)

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PROJECT: **MILNER ROAD WIDENING HIGH WYCOMBE**	A	17-6-2020	ISSUED FOR COMMENT. 85% DESIGN STATUS.	DLC	
	No.	DATE	REVISION	BY	

Porter Consulting Engineers

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Mt Pleasant 6153 WA

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TUOAD Pty Ltd ACN 070 097 948 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT: **CITY OF KALAMUNDA**

DRAWING: **DRAINAGE LAYOUT PLAN SHEET 2**

STATUS: **FOR COMMENT**

SCALE	1:500
DATE	APR 2020
DESIGN	DLC
DRAWN	DLC
CHECK	

DRAWING No. **19-11-135/M/403** REV No. **A** ORIGINAL DRAWING SIZE **A1**

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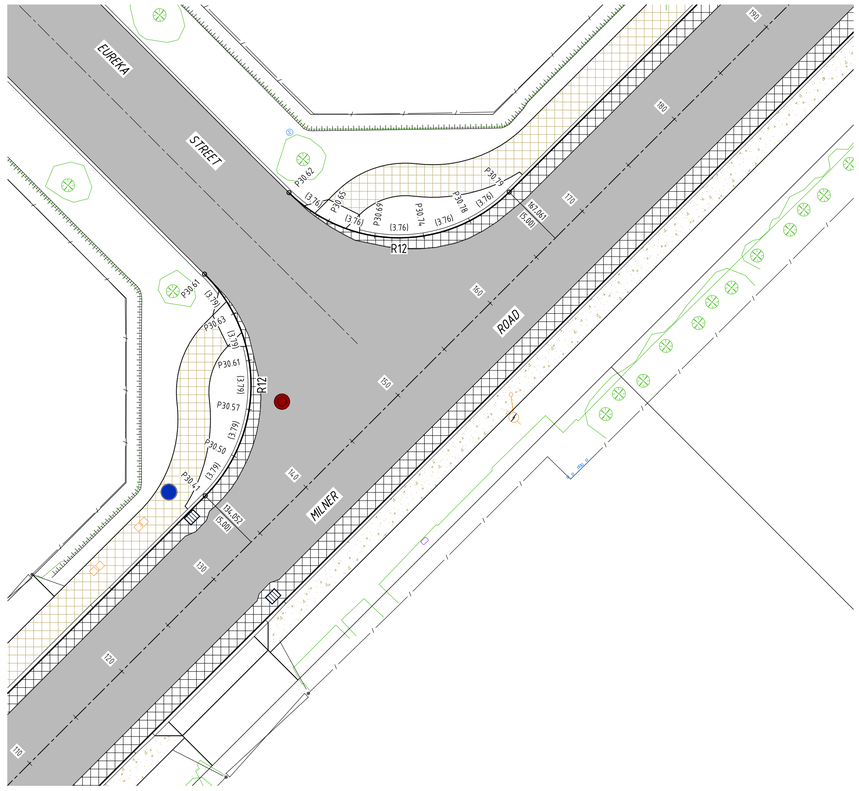
APP'D



HIGH PRESSURE GAS NOTES

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LEGEND

▬ ▬ ▬	EXTENT OF WORKS BOUNDARY
═	PROPOSED ROAD/KERB
▨	PROPOSED SHARED PATH
═	PROPOSED FOOTPATH
▦	PROPOSED PAVEMENT WIDENING
■	EXISTING PAVEMENT
⊥⊥⊥	EXISTING BUILDING
═	EXISTING KERBING
— / —	EXISTING FENCE

NOTE

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1:250 0 2.5 5 10 15
Half Size 1:500 - SCALE (m)

DIAL BEFORE YOU DIG
www.1100.com.au

PROJECT:
MILNER ROAD WIDENING
HIGH WYCOMBE

No.	DATE	REVISION	BY
A	17-6-2020	ISSUED FOR COMMENT. 85% DESIGN STATUS.	DLC

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ONLY PLANS WITH NUMERICAL REVISION (REV '0' OR HIGHER) AND SIGNED AS APPROVED SHALL BE USED FOR CONSTRUCTION.

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Level 2 Kishorn Court
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TUSNO Pty Ltd ACN 070 097 148 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:
CITY OF KALAMUNDA

DRAWING:
ROAD INTERSECTION DETAILS
SHEET 1

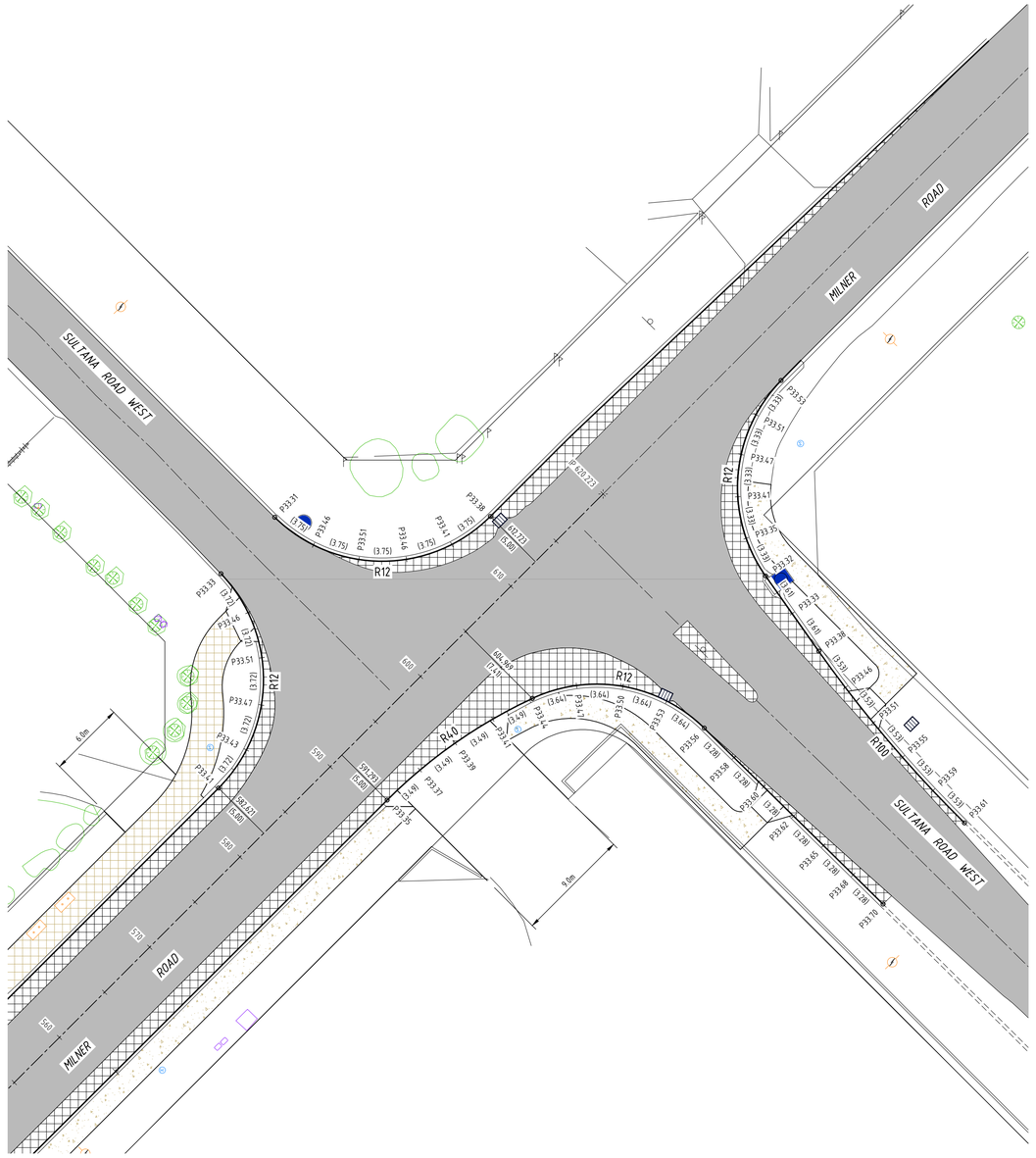
STATUS: **FOR COMMENT**

SCALE	1:250
DATE	APR 2020
DESIGN	DLC
DRAWN	DLC
CHECK	

DRAWING No.	REV No.	ORIGINAL DRAWING SIZE
19-11-135/M/420	A	A1

FILE NAME S:\ACTIVE PROJECTS\19-11-135\ACAD\1911135-M-420-421.dwg
APP'D

CONSULT AUSTRALIA



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LEGEND

- EXTENT OF WORKS BOUNDARY
- PROPOSED ROAD/KERB
- PROPOSED SHARED PATH
- PROPOSED FOOTPATH
- PROPOSED PAVEMENT WIDENING
- EXISTING PAVEMENT
- EXISTING BUILDING
- EXISTING KERBING
- EXISTING FENCE

NOTE

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REFER TO DRAWING 19-11-135/M/401 FOR ROAD & PATH NOTES

1:200 Half Size 1:400 - SCALE (m) 0 2 4 8 12

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PROJECT:

MILNER ROAD WIDENING HIGH WYCOMBE

No.	DATE	REVISION	BY
A	17-6-2020	ISSUED FOR COMMENT. IBSN DESIGN STATUS.	DLC

Porter Consulting Engineers

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CLIENT:

CITY OF KALAMUNDA

DRAWING:

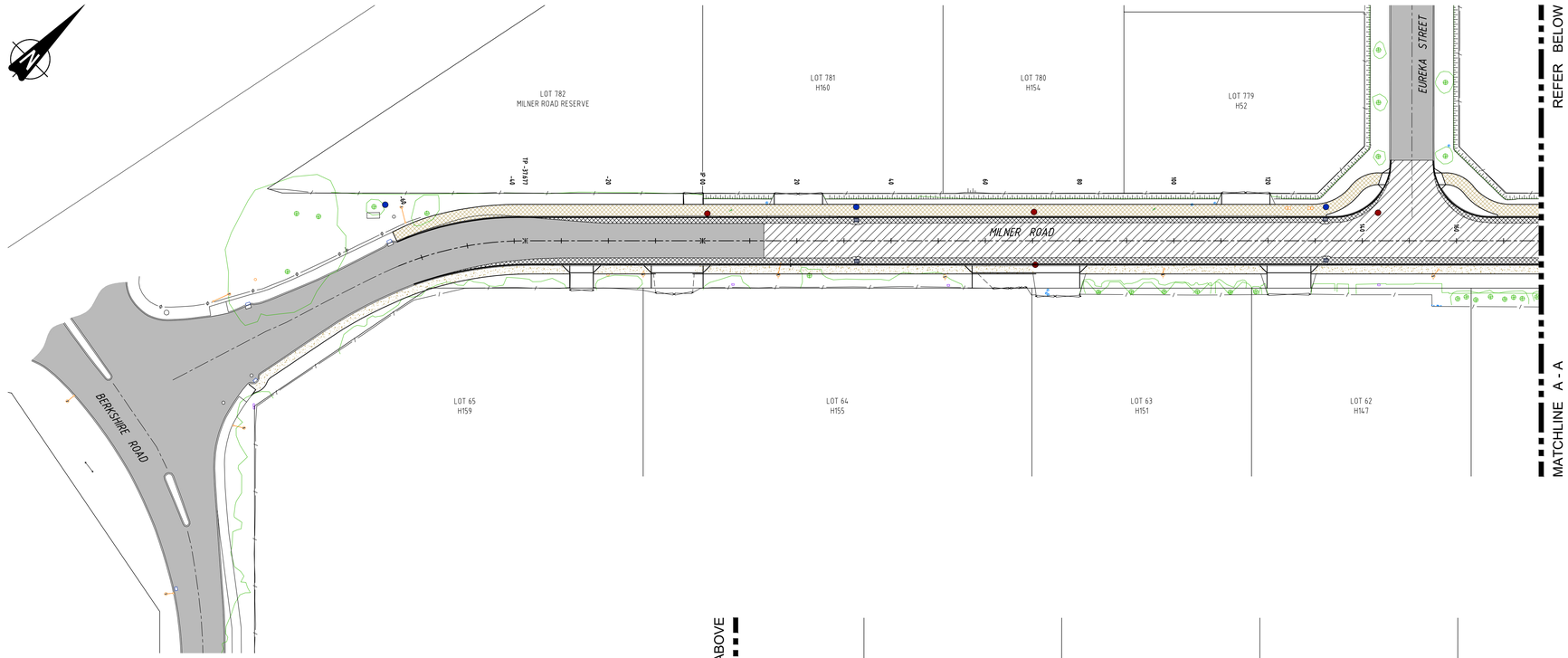
ROAD INTERSECTION DETAILS SHEET 2

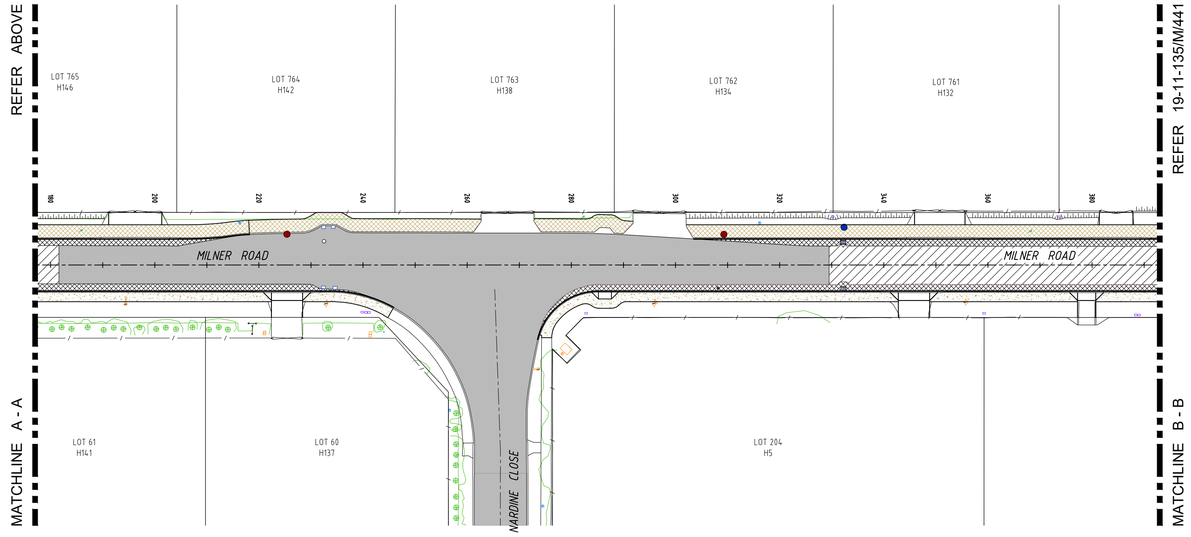
STATUS: **FOR COMMENT**

SCALE	1:200
DATE	APRIL 2020
DESIGN	DLC
DRAWN	DLC
CHECK	
APP'D	

DRAWING No. **19-11-135/M/421** REV No. **A** ORIGINAL DRAWING SIZE **A1**

FILE NAME: S:\ACTIVE PROJECTS\19-11-135\ACAD\1911135-M-420-421.dwg





HIGH PRESSURE GAS NOTES

HIGH PRESSURE GAS MAIN IN VICINITY. CONTRACTOR SHALL ALLOW FOR ALL WORKS ASSOCIATED IN PROTECTING THE HIGH PRESSURE MAIN INCLUDING ALL SUPERVISION ALLOWANCES. CONTRACTOR SHALL LIAISE DIRECT WITH RELEVANT GAS AUTHORITY PRIOR TO COMMENCING ANY WORKS.

NO WORK OF ANY TYPE WITHIN 15m OF ANY HIGH PRESSURE GAS INFRASTRUCTURE WITHOUT PRIOR APPROVAL FROM ATCO GAS AUSTRALIA.

DURING THE PERIOD OF THE WORKS, ANY EXCAVATION WORKS WITHIN 5m OF THE HP MAIN WILL REQUIRE SUPERVISION FROM AN APPROVED LOCATOR. PLEASE CONTACT HP ENQUIRIES hpenquiries@atco.com / 1300 926 755

NO MACHINERY IS PERMITTED TO BE USED TO EXCAVATE WITHIN 1m OF THE HP MAIN - ONLY NON-DESTRUCTIVE METHODS SUCH AS HAND-DIGGING OR VACUUM EXCAVATION ARE PERMITTED.

A MINIMUM CLEARANCE OF 300mm IS NECESSARY FOR SERVICES CROSSING PARALLEL TO THE HP MAIN. THE MINIMUM CLEARANCE FOR CONCRETE MAINS IS 500mm.

ALL COMPACTION OF THE AFFECTED AREA MUST BE IN ACCORDANCE WITH SECTION 5.8.2 OF THE 'ADDITIONAL INFORMATION FOR WORKING AROUND GAS INFRASTRUCTURE (REVISION 11, 26-09-2018)' WITHIN THE TECHNICAL SPECIFICATION.

NOTE

ALL EXCAVATIONS CLOSER THAN 3000mm TO THE CABLE/TRENCH FOUNDATION (OR CONDUIT) SHALL BE CARRIED OUT BY HAND DIGGING OR VACUUM EXCAVATION. SPECIAL CARE TO BE UNDERTAKEN DUE TO THE COMMUNICATION CABLE, WHICH MAY BE INSTALLED ABOVE THE TRANSMISSION CABLE CONCRETE SLAB.

CROSSING UNDER THE CABLES ENSURE THAT THERE IS NO DISTURBANCE TO TRENCH FOUNDATION AND MAINTAIN A MINIMUM OF 500mm FROM THE BOTTOM MOST EDGE OF THE CEMENTITIOUS MATERIAL.

MECHANICAL EXCAVATION SHALL ONLY BE PERMITTED FOR EXCAVATION DOWN TO A MAXIMUM OF 250mm REMOVING THE BITUMEN AND ROAD BASE

PARALLEL TRENCHING - MAINTAIN A MINIMUM OF 1m FROM THE OUTER EDGE OF THE CABLE, ENSURING THAT THERE IS NO DISTURBANCE TO THE CABLE OR ITS FOUNDATION. SHORING MAY BE REQUIRED.

LEGEND

- EXTENT OF WORKS BOUNDARY
- PROPOSED ROAD/KERB
- PROPOSED SHARED PATH
- PROPOSED FOOTPATH
- PROPOSED PAVEMENT WIDENING
- EXISTING PAVEMENT - TO BE RESURFACED
- EXISTING PAVEMENT - TO BE RETAINED
- EXISTING BUILDING
- EXISTING KERBING
- EXISTING FENCE

NOTE

OPTIC FIBRE CABLE IN VICINITY OF WORKS. CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITY AT LEAST TWO (2) BUSINESS DAYS BEFORE STARTING ACTIVITY.

1:500 0 5 10 20 30
Half Size 1:1000 - SCALE (m)

DIAL BEFORE YOU DIG www.1100.com.au

PROJECT:
MILNER ROAD WIDENING HIGH WYCOMBE

No.	DATE	REVISION	BY
A	17-6-2020	ISSUED FOR COMMENT. 85% DESIGN STATUS.	DLC

Porter Consulting Engineers

TUDAD Pty Ltd ACN 070 097 948 as Trustee for the Consulting Engineering Unit Trust Trading as Porter Consulting Engineers ABN 78 636 396 585

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Mt Pleasant 6153 WA

PO Box 1036
Canning Bridge 6153 WA

Tel (08) 9315 9955
Email office@porterceng.com.au
www.porterceng.com.au

CLIENT:
CITY OF KALAMUNDA

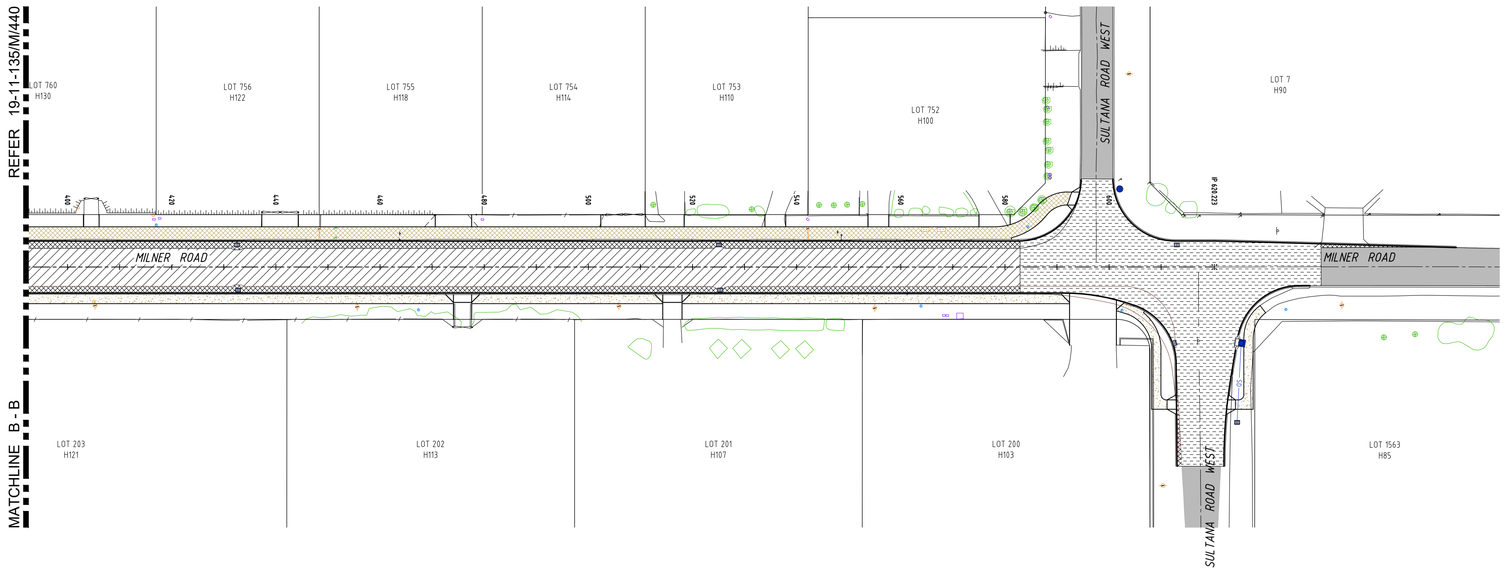
DRAWING:
ROAD PAVEMENT PLAN SHEET 1

STATUS: **FOR COMMENT**

SCALE	1:500
DATE	APR 2020
DESIGN	DLC
DRAWN	DLC
CHECK	
APP'D	

DRAWING No. **19-11-135/M/440** REV No. **A** ORIGINAL DRAWING SIZE **A1**

FILE NAME: S:\ACTIVE PROJECTS\19-11-135\ACAD\1911135-M-440-A41.dwg



LEGEND

- EXTENT OF WORKS BOUNDARY
- PROPOSED ROAD/KERB
- PROPOSED SHARED PATH
- PROPOSED FOOTPATH
- PROPOSED PAVEMENT WIDENING
- PROPOSED PAVEMENT - INTERSECTION MIX
- EXISTING PAVEMENT - TO BE RESURFACED
- EXISTING PAVEMENT - TO BE RETAINED
- EXISTING BUILDING
- EXISTING KERBING
- EXISTING FENCE

HIGH PRESSURE GAS NOTES

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NOTE

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NOTE

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CROSSING UNDER THE CABLES ENSURE THAT THERE IS NO DISTURBANCE TO TRENCH FOUNDATION AND MAINTAIN A MINIMUM OF 500mm FROM THE BOTTOM MOST EDGE OF THE CEMENTITIOUS MATERIAL.

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PARALLEL TRENCHING - MAINTAIN A MINIMUM OF 1m FROM THE OUTER EDGE OF THE CABLE, ENSURING THAT THERE IS NO DISTURBANCE TO THE CABLE OR ITS FOUNDATION. SHORING MAY BE REQUIRED.

1:500 0 5 10 20 30
Half Size 1:1000 - SCALE (m)

DIAL BEFORE YOU DIG www.1100.com.au

PROJECT:
MILNER ROAD WIDENING HIGH WYCOMBE

No.	DATE	REVISION	BY
A	17-6-2020	ISSUED FOR COMMENT. 85% DESIGN STATUS.	DLC

Porter Consulting Engineers

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Canning Bridge 6153 WA

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Email office@porterseng.com.au
www.porterseng.com.au

TUONO Pty Ltd ACN 070 097 168 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:
CITY OF KALAMUNDA

DRAWING:
ROAD PAVEMENT PLAN SHEET 2

STATUS: **FOR COMMENT**

SCALE	1:500
DATE	APRIL 2020
DESIGN	DLC
DRAWN	DLC
CHECK	
APP'D	

DRAWING No. 19-11-135/M/441 | REV No. A | ORIGINAL DRAWING SIZE A1

FILE NAME: S:\ACTIVE PROJECTS\19-11-135\ACAD\1911135-M-440-441.dwg

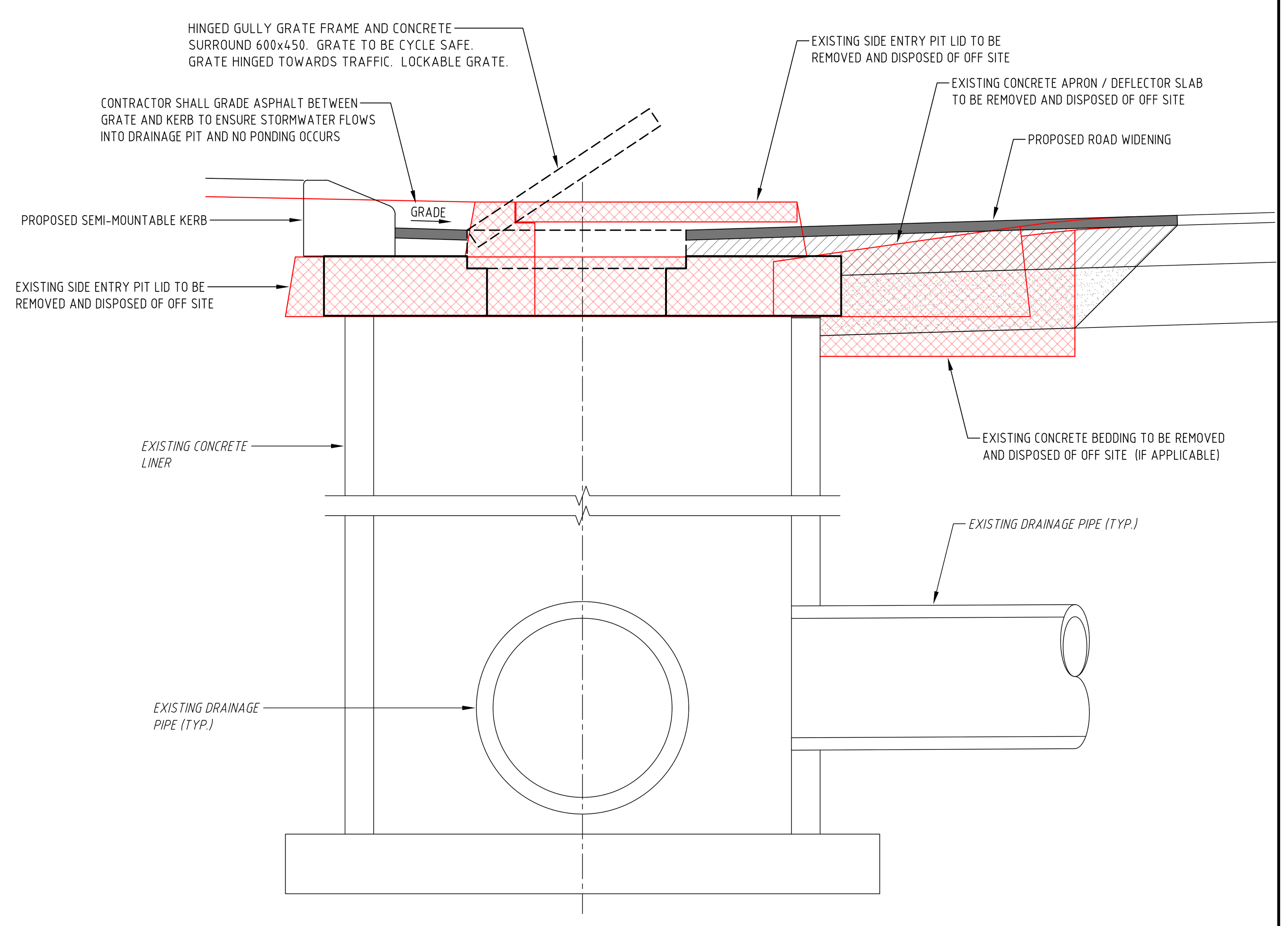
CITY OF KALAMUNDA STANDARD DRAWINGS:

REFER CITY OF KALAMUNDA WEBSITE TO CHECK FOR CURRENT REVISIONS

https://www.kalamunda.wa.gov.au/building-development/city-assets/engineering-services

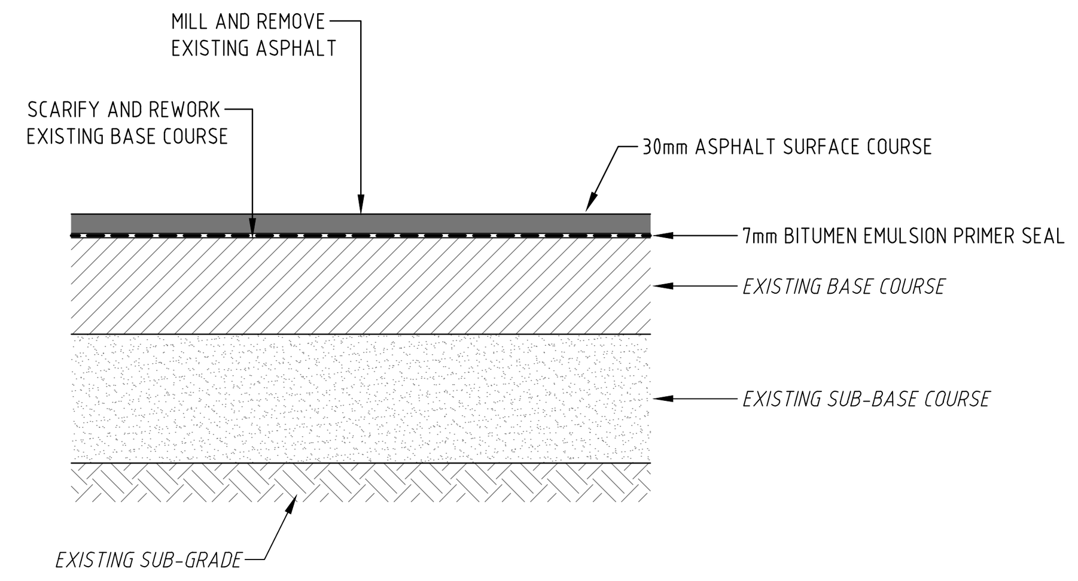
CROSSOVER REINSTATEMENT NOTES:

1. CONCRETE CROSSOVERS FOR COMMERCIAL/INDUSTRIAL PROPERTIES TO BE 150mm THICK N32 MPa CONCRETE WITH SL62 MESH CENTRALLY LOCATED WITH A 100mm LIMESTONE BASE COURSE. TIE INTO RETAINED PORTION OF THE CONCRETE CROSSOVER WITH N20/R20 DOWELS, 600mm LONG @ 300mm CTRS.
2. ASPHALT CROSSOVERS FOR COMMERCIAL/INDUSTRIAL PROPERTIES TO BE 150mm THICK ROCK ROAD BASE, 7mm PRIMER SEAL WITH 30mm ASPHALT WEARING COURSE.
3. CONCRETE CROSSOVERS TO RESIDENTIAL PROPERTIES TO BE 100mm THICK N32 MPa WITH 150mm LIMESTONE BASE. TIE INTO RETAINED PORTION OF THE CONCRETE CROSSOVER WITH N20/R20 DOWELS, 600mm LONG @ 300mm CTRS.
4. ASPHALT CROSSOVERS TO RESIDENTIAL PROPERTIES TO BE 100mm THICK ROCK ROAD BASE, PRIMER SEAL WITH 30mm ASPHALT WEARING COURSE.
5. EXISTING BLOCK PAVING CROSSOVERS TO HAVE THE EXISTING BRICKS RETAINED FOR RE-USE TOWARDS REINSTATING THE CROSSOVER ON A 150mm LIMESTONE BASE.



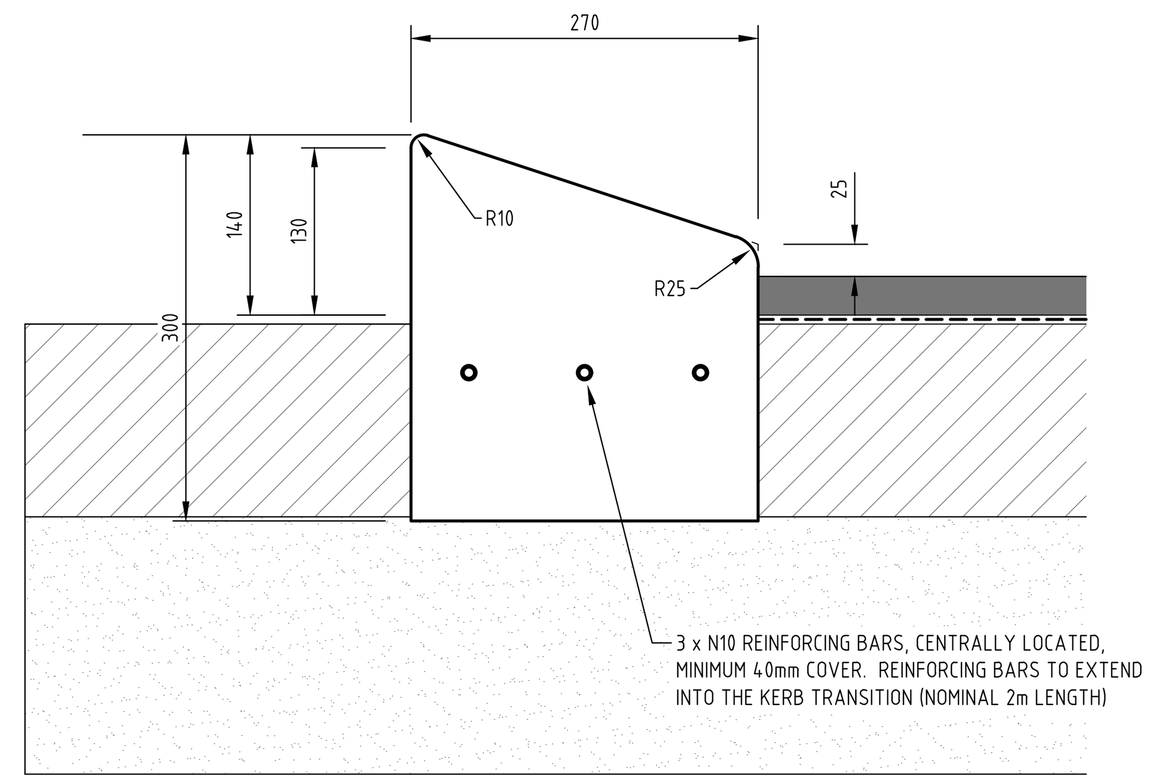
DRAINAGE PIT LID CONVERSION DETAIL (SEP to GG)

SCALE 1:10



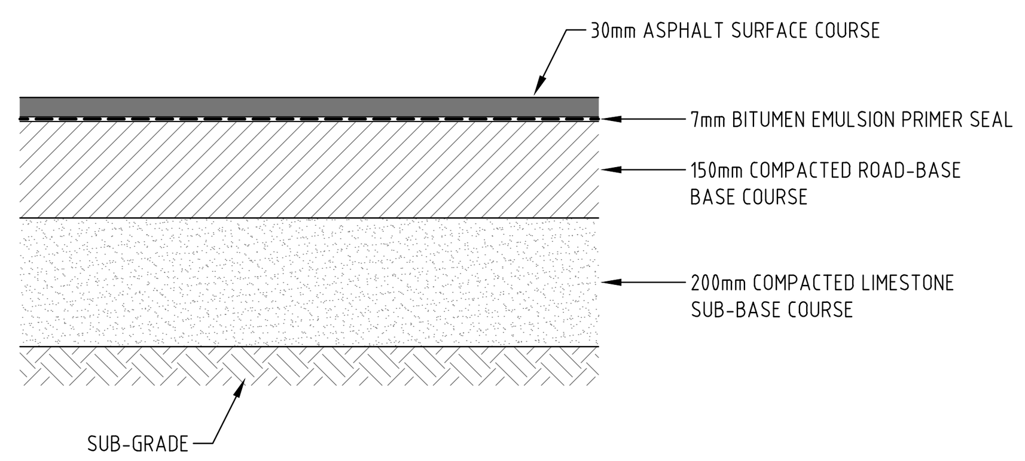
PAVEMENT DETAIL - RESURFACING

SCALE 1:10



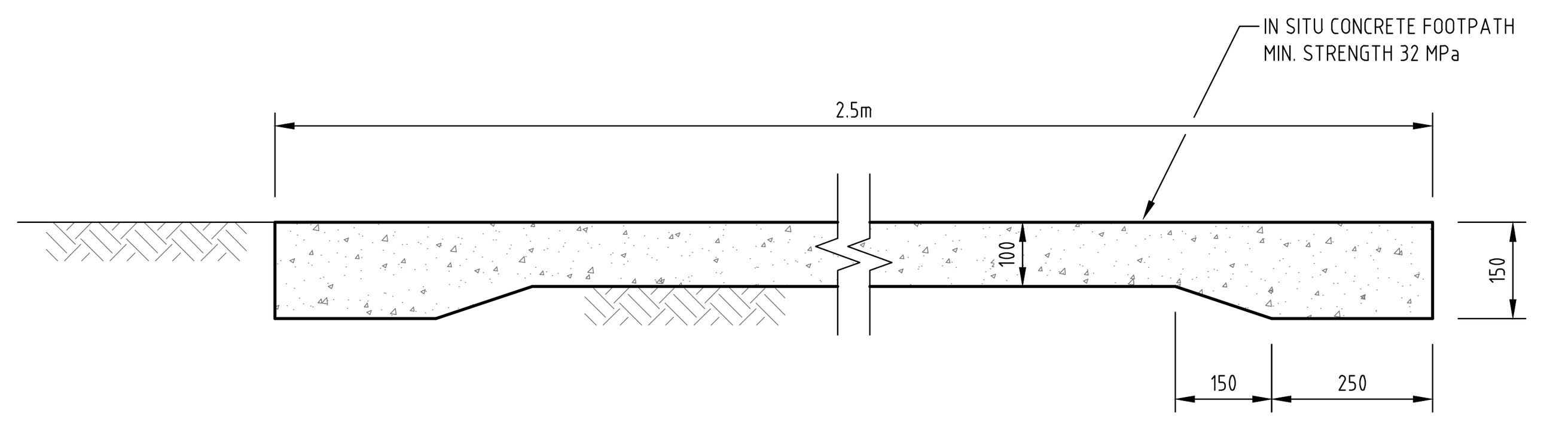
REINFORCED MOUNTABLE KERB DETAIL (KEYED)

SCALE 1:10



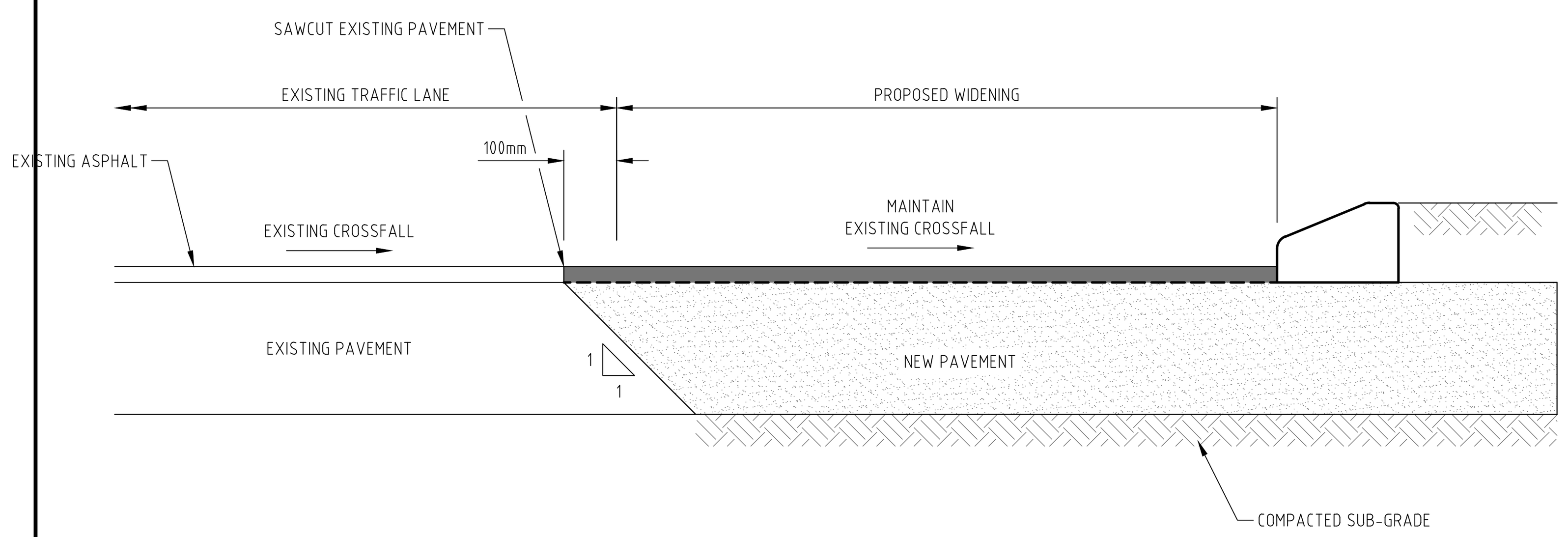
PAVEMENT DETAIL (ON SAND SUB-GRADE)

SCALE 1:10



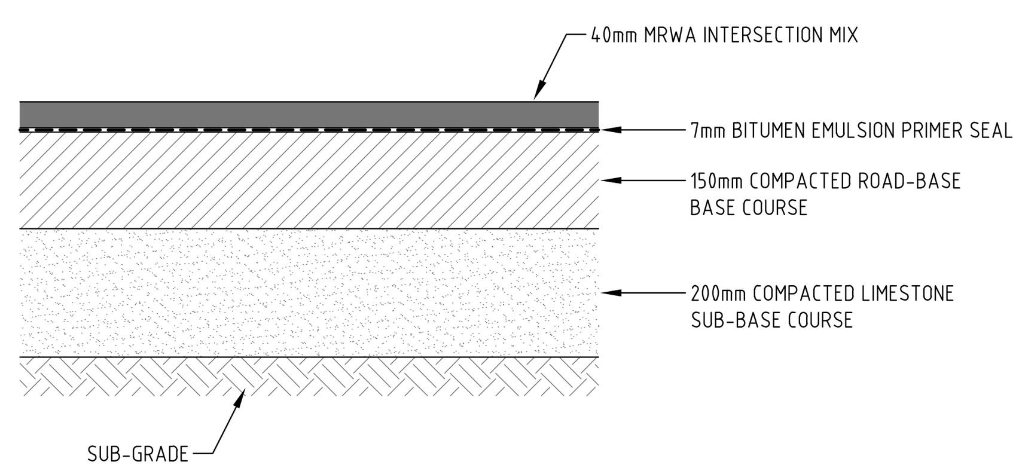
SHARED PATH PAVEMENT DETAIL

NOT TO SCALE



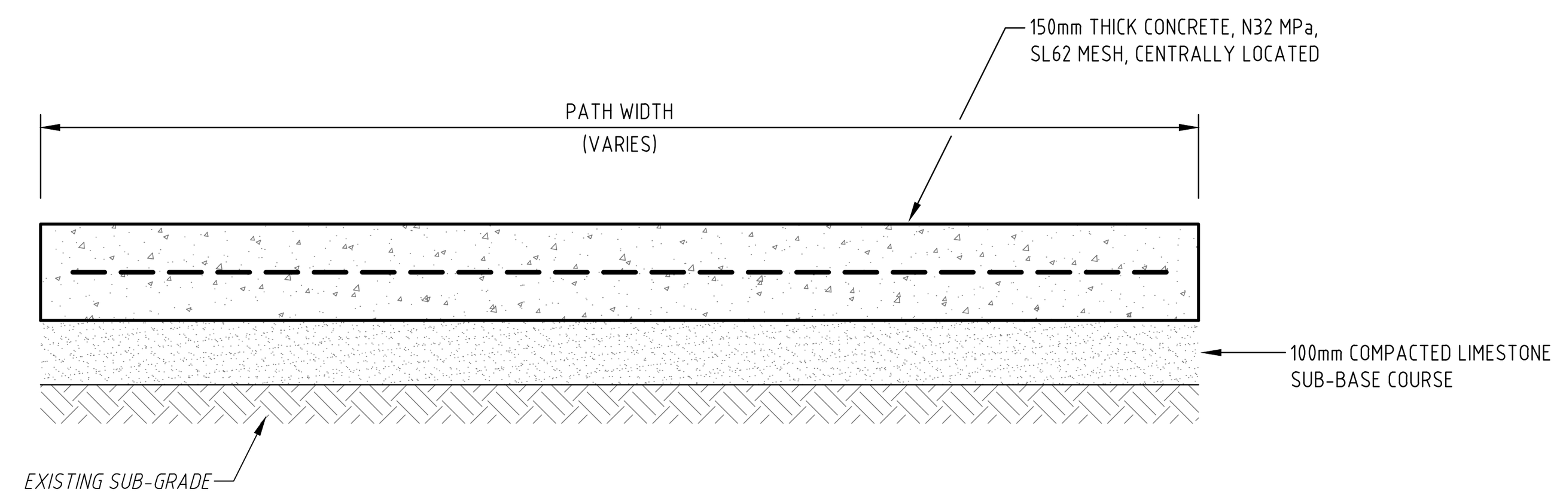
TYPICAL PAVEMENT WIDENING

NOT TO SCALE



PAVEMENT DETAIL - INTERSECTION (ON SAND SUB-GRADE)

SCALE 1:10



SHARED PATH PAVEMENT DETAIL AT CROSSOVERS

NOT TO SCALE

1:50 0 0.5 1 2 3
Half Size 1:100 - SCALE (m)

DIAL BEFORE YOU DIG www.1100.com.au

PROJECT:	No.	DATE	REVISION	BY
MILNER ROAD WIDENING HIGH WYCOMBE	A	17-6-2020	ISSUED FOR COMMENT. 85% DESIGN STATUS.	DLC

Porter Consulting Engineers

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www.portereng.com.au

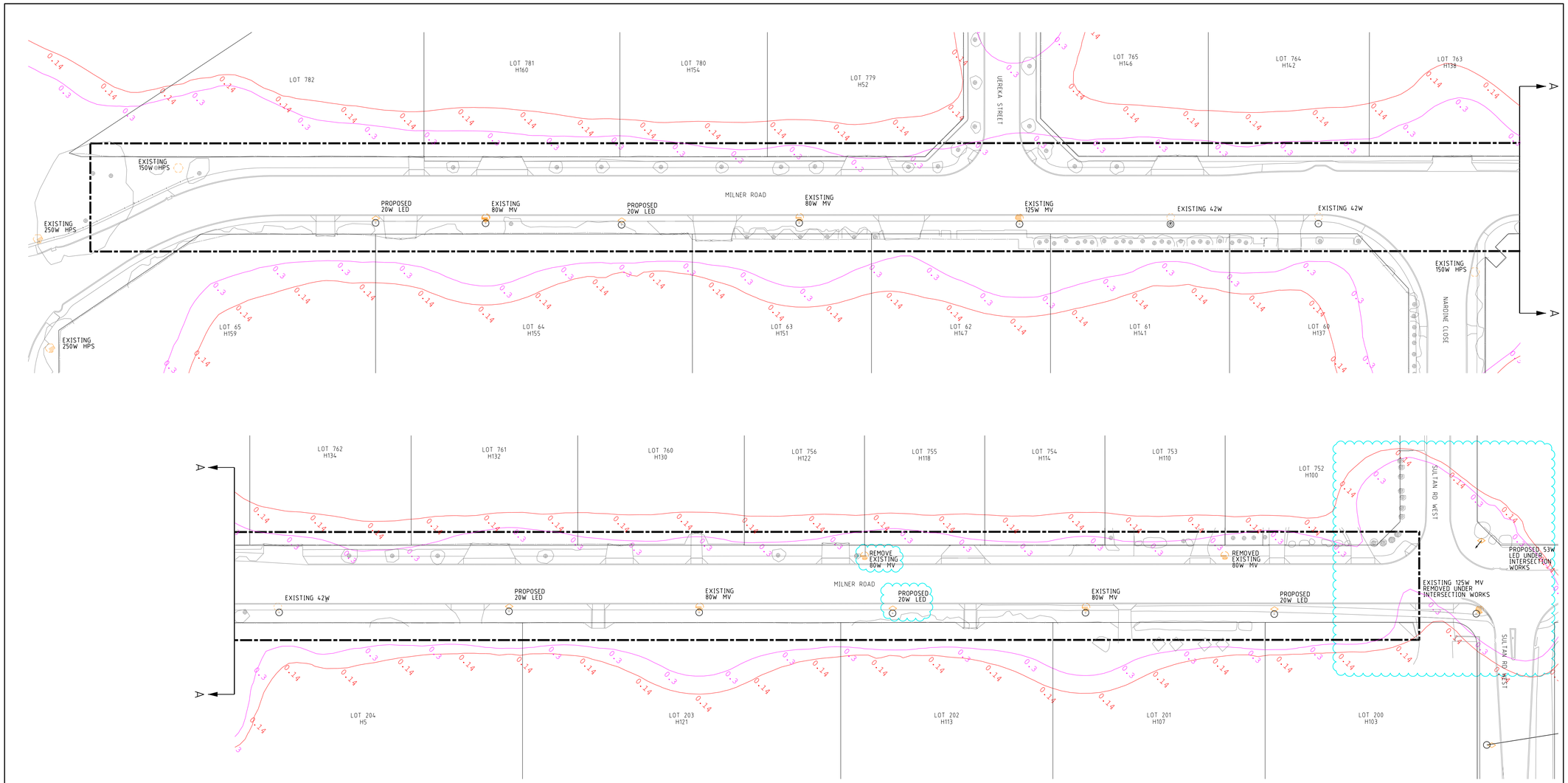
TUSNO Pty Ltd ACN 070 097 148 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT: CITY OF KALAMUNDA

DRAWING: STANDARD DETAILS

STATUS: FOR COMMENT

SCALE	AS SHOWN
DATE	APR 2020
DESIGN	DLC
DRAWN	DLC
CHECK	
DRAWING No.	19-11-135/M/600
REV No.	A
ORIGINAL DRAWING SIZE	A1
FILE NAME	S:\ACTIVE PROJECTS\19-11-135\ACAD\1911135-M-600.dwg
APP'D	



CALC. POINTS
LEGEND

> 0.14 LUX (PR5)

> 0.3 LUX (PR3)

Luminaire Schedule					
Symbol	Qty	Label	Mounting Type	Total Lamp Lumens	LLF
	3	EXISTING 42W CF	OVERHEAD POLE	3200	0.700
	3	EXISTING 80W MV	OVERHEAD POLE	3800	0.700
	1	EXISTING 80W MV	6.5m WP POLE	3800	0.700
	1	EXISTING 125W MV	OVERHEAD POLE	6300	0.700
	2	EXISTING 150W HPS	12.5m WP POLE	14500	0.700
	2	EXISTING 250W HPS	12.5m WP POLE	28000	0.700
	5	PROPOSED 20W LED	OVERHEAD POLE	2300	0.800

Calculation Summary						
Label	CalcType	Units	Avg	Max	Min	Max/Avg
Milner Road	Illuminance	Lux	1.68	12.91	0.22	7.68

REV	DESCRIPTION	DATE	DRAWN	CHKD
2	PR5 - LOT 756 LIGHT POLE REMOVED.LUMINAIRE ADDED TO EX OH POLE. LUMINAIRE ARRANGEMENT AT SULTANA RD WEST UPDATED TO MATCH MP190326	17.06.2020	DA	VH
1	ISSUED TO CLIENT FOR COMMENT	12.05.2020	DA	VH

3E CONSULTING ENGINEERS PTY LTD

Electrical Engineering Excellence

Suite 1, Level 2, Condor Tower
22 St George's Tce Perth WA 6000
PO Box 3184 East Perth WA 6892
Tel: 08 6314 9000 Email: admin@3ece.com.au

Preliminary
Not For Construction

IF WORKING IN THE VICINITY OF EXISTING OVERHEAD DISTRIBUTION OR TRANSMISSION LINES.
REFER TO "WORKSAFE" REGULATION 3.64

THE LOCATION OF EXISTING SERVICES IS APPROXIMATE ONLY. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.ALWAYS REFER TO CURRENT DBYD PLANS AND PEGGED ASSET LOCATIONS ON SITE BEFORE COMMENCEMENT OF WORK.
REFER TO 'WORKSAFE' REGULATION 3.21

LAT 31° 57' 31" S
LONG 115° 59' 56" E

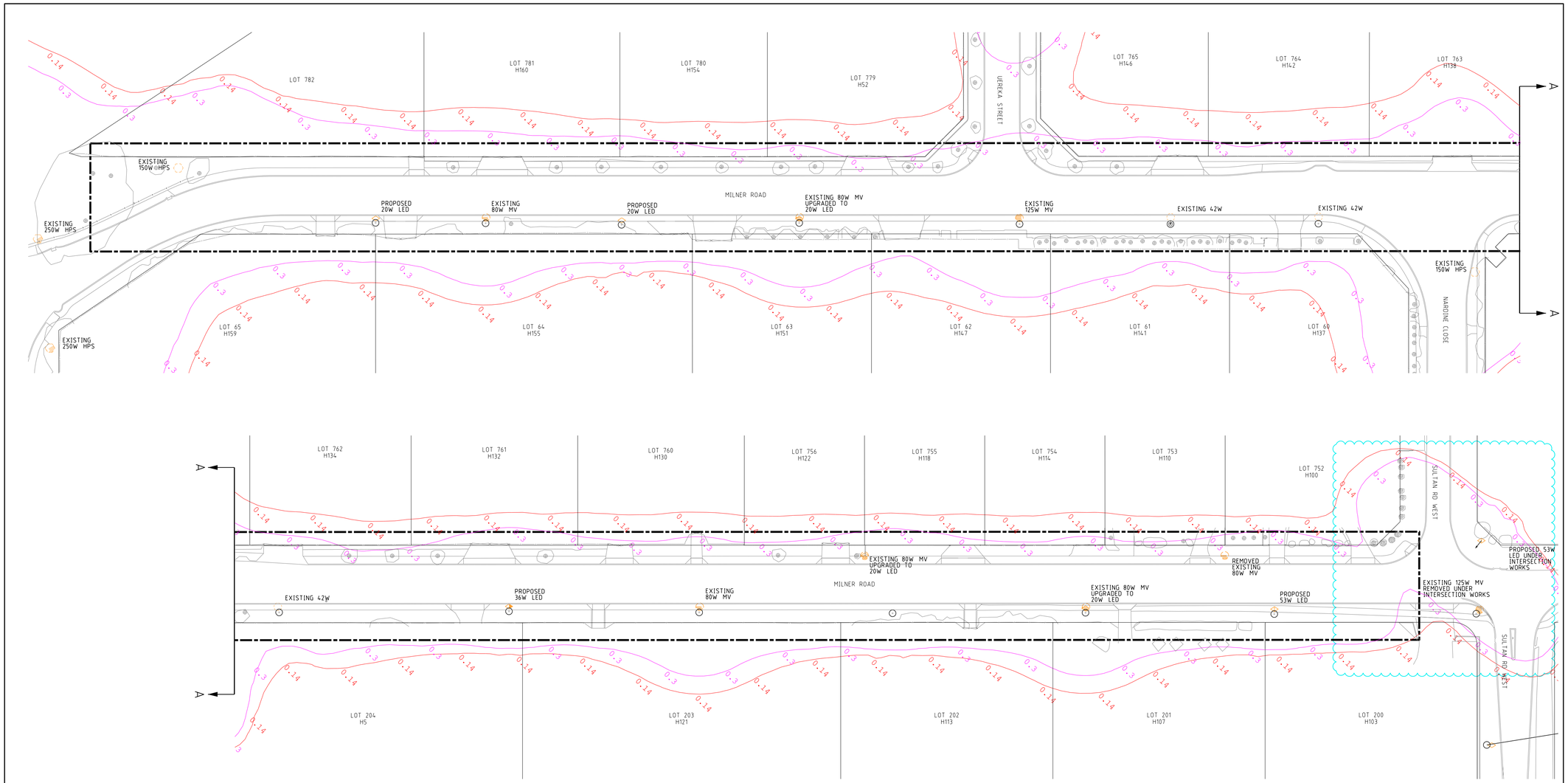
0 5 10 20 30 40

Scale	1:500 @ A1 Original Paper Size
Base File Date	22-04-2020 H.Datum PCG94
Designed: DA	Drawn: DA Checked: VH Appr: DLJ
Western Power Reference No.	TBA WAPC No. N/A
Local Authority	CITY OF KALAMUNDA
Civil Consultant	PORTER CONSULTING ENGINEERS

MILNER ROAD, HIGH WYCOMBE

DEMONSTRATION OF COMPLIANCE OF ILLUMINANCE & LUMINANCE TO AS1158.3.1 - PR5

Sheet Of	3E Drawing Number	Revision
1 2	3E19102-04	2



CALC. POINTS
LEGEND

- > 0.14 LUX (PR5)
- > 0.3 LUX (PR3)

Luminaire Schedule

Symbol	Qty	Label	Mounting Type	Total Lamp Lumens	LLF
	3	EXISTING 42W CF	OVERHEAD POLE	3200	0.700
	2	EXISTING 80W MV	OVERHEAD POLE	3800	0.700
	1	EXISTING 125W MV	OVERHEAD POLE	6300	0.700
	2	EXISTING 150W HPS	12.5m WP POLE	14500	0.700
	2	EXISTING 250W HPS	12.5m WP POLE	28000	0.700
	4	PROPOSED 20W LED	OVERHEAD POLE	2300	0.800
	1	PROPOSED 20W LED UPGRADE	6.5m WP POLE	2300	0.800
	1	PROPOSED 36W LED	OVERHEAD POLE	4003	0.800
	1	PROPOSED 53W LED	OVERHEAD POLE	6104	0.800

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Max/Avg
Milner Road	Illuminance	Lux	1.98	12.91	0.31	6.52

REV	DESCRIPTION	DATE	DRAWN	CHKD
2	PR5 - LOT 756 LIGHT POLE REMOVED.LUMINAIRE ADDED TO EX OH POLE. LUMINAIRE ARRANGEMENT AT SULTANA RD WEST UPDATED TO MATCH MP190326	17.06.2020	DA	VH
1	ISSUED TO CLIENT FOR COMMENT	12.05.2020	DA	VH

3E CONSULTING ENGINEERS PTY LTD
Electrical Engineering Excellence

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22 St George's Tce Perth WA 6000
PO Box 3184 East Perth WA 6892
Tel: 08 6314 9000 Email: admin@3ece.com.au

Preliminary
Not For Construction

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REFER TO 'WORKSAFE' REGULATION 3.21

LAT 31° 57' 31" S
LONG 115° 59' 56" E

0 5 10 20 30 40

Scale	1:500 @ A1 Original Paper Size
Base File Date	22-04-2020 H.Datum PCG94
Designed: DA	Drawn: DA Checked: VH Appr: DLJ
Western Power Reference No.	TBA WAPC No. N/A
Local Authority	CITY OF KALAMUNDA
Civil Consultant	PORTER CONSULTING ENGINEERS

MILNER ROAD, HIGH WYCOMBE

DEMONSTRATION OF COMPLIANCE OF ILLUMINANCE & LUMINANCE TO AS1158.3.1 - PR3

Sheet Of	3E Drawing Number	Revision
2 2	3E19102-04	2

Attachment 5:
Nardine Close Extension (Road 2A) – Stage 1 Drawings

FORRESTFIELD INDUSTRIAL AREA

ROAD 2A – STAGE 1

NARDINE CLOSE EXTENSTION

TABLE OF CONTENTS

CITY OF KALAMUNDA

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www.portereng.com.au

TUSNO Pty Ltd ACN 070 097 148 as trustee for the Consulting Engineering Unit Trust
trading as Porter Consulting Engineers ABN 78 636 396 385

JOB No. 16-9-116

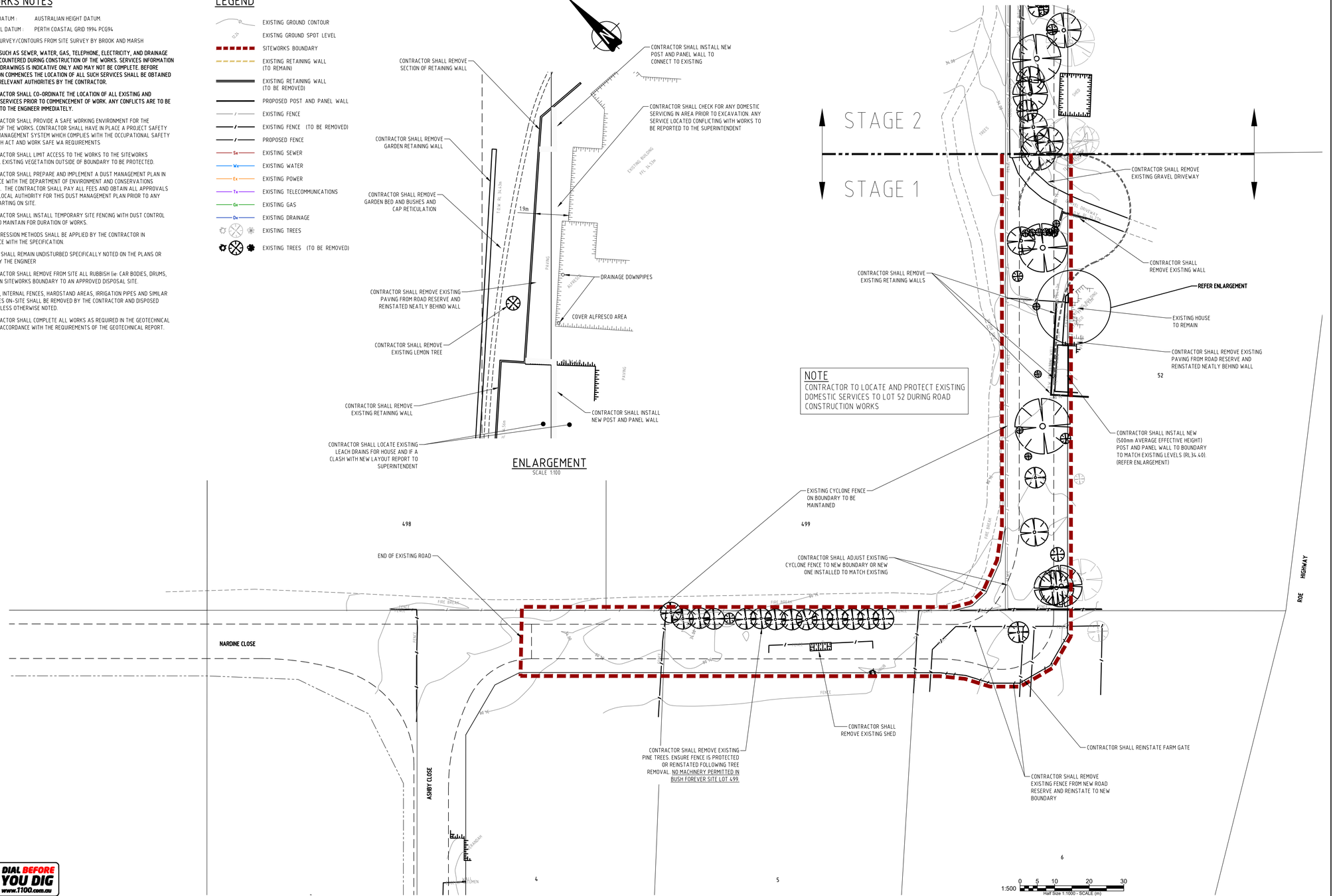
SITEWORKS NOTES

1. VERTICAL DATUM : AUSTRALIAN HEIGHT DATUM.
   HORIZONTAL DATUM : PERTH COASTAL GRID 1994 PCG94
2. EXISTING SURVEY/CONTOURS FROM SITE SURVEY BY BROOK AND MARSH
3. **SERVICES, SUCH AS SEWER, WATER, GAS, TELEPHONE, ELECTRICITY, AND DRAINAGE MAY BE ENCOUNTERED DURING CONSTRUCTION OF THE WORKS. SERVICES INFORMATION SHOWN ON DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. BEFORE EXCAVATION COMMENCES THE LOCATION OF ALL SUCH SERVICES SHALL BE OBTAINED FROM THE RELEVANT AUTHORITIES BY THE CONTRACTOR.**
4. **THE CONTRACTOR SHALL CO-ORDINATE THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO COMMENCEMENT OF WORK. ANY CONFLICTS ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.**
5. THE CONTRACTOR SHALL PROVIDE A SAFE WORKING ENVIRONMENT FOR THE DURATION OF THE WORKS. CONTRACTOR SHALL HAVE IN PLACE A PROJECT SAFETY AND RISK MANAGEMENT SYSTEM WHICH COMPLIES WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT AND WORK SAFE WA REQUIREMENTS
6. THE CONTRACTOR SHALL LIMIT ACCESS TO THE WORKS TO THE SITEWORKS BOUNDARY. EXISTING VEGETATION OUTSIDE OF BOUNDARY TO BE PROTECTED.
7. THE CONTRACTOR SHALL PREPARE AND IMPLEMENT A DUST MANAGEMENT PLAN IN ACCORDANCE WITH THE DEPARTMENT OF ENVIRONMENT AND CONSERVATIONS GUIDELINES. THE CONTRACTOR SHALL PAY ALL FEES AND OBTAIN ALL APPROVALS FROM THE LOCAL AUTHORITY FOR THIS DUST MANAGEMENT PLAN PRIOR TO ANY WORKS STARTING ON SITE.
8. THE CONTRACTOR SHALL INSTALL TEMPORARY SITE FENCING WITH DUST CONTROL FABRIC AND MAINTAIN FOR DURATION OF WORKS.
9. DUST SUPPRESSION METHODS SHALL BE APPLIED BY THE CONTRACTOR IN ACCORDANCE WITH THE SPECIFICATION.
10. ALL TREES SHALL REMAIN UNDISTURBED SPECIFICALLY NOTED ON THE PLANS OR ADVISED BY THE ENGINEER
11. THE CONTRACTOR SHALL REMOVE FROM SITE ALL RUBBISH (ie: CAR BODIES, DRUMS, ETC.) WITHIN SITEWORKS BOUNDARY TO AN APPROVED DISPOSAL SITE.
12. ALL SHEDS, INTERNAL FENCES, HARDSTAND AREAS, IRRIGATION PIPES AND SIMILAR STRUCTURES ON-SITE SHALL BE REMOVED BY THE CONTRACTOR AND DISPOSED OFFSITE UNLESS OTHERWISE NOTED.
13. THE CONTRACTOR SHALL COMPLETE ALL WORKS AS REQUIRED IN THE GEOTECHNICAL REPORT IN ACCORDANCE WITH THE REQUIREMENTS OF THE GEOTECHNICAL REPORT.

LEGEND

- EXISTING GROUND CONTOUR
- EXISTING GROUND SPOT LEVEL
- SITEWORKS BOUNDARY
- EXISTING RETAINING WALL (TO REMAIN)
- EXISTING RETAINING WALL (TO BE REMOVED)
- PROPOSED POST AND PANEL WALL
- EXISTING FENCE
- EXISTING FENCE (TO BE REMOVED)
- PROPOSED FENCE
- EXISTING SEWER
- EXISTING WATER
- EXISTING POWER
- EXISTING TELECOMMUNICATIONS
- EXISTING GAS
- EXISTING DRAINAGE
- EXISTING TREES
- EXISTING TREES (TO BE REMOVED)

ENLARGEMENT
SCALE 1:100



DIAL BEFORE YOU DIG www.1100.com.au

PROJECT:
FORRESTFIELD INDUSTRIAL AREA ROAD 2A - STAGE 1

No.	DATE	REVISION	BY
G	21-12-2018	ISSUED FOR TENDER	DLC
F	16-11-2018	NOTES, ROAD UPDATED, ENLARGEMENT ADDED	MEG
D	19-01-2017	SPLIT INTO 2 STAGES, NOTES ADDED	MEG
C	13-12-2016	ROAD NAMES ADDED, PROJECT TITLE CHANGE	MEG
B	6-12-2016	ROAD RESERVE WIDTHS AMENDED	DLC
A	24-10-2016	ISSUED FOR APPROVAL	MEG

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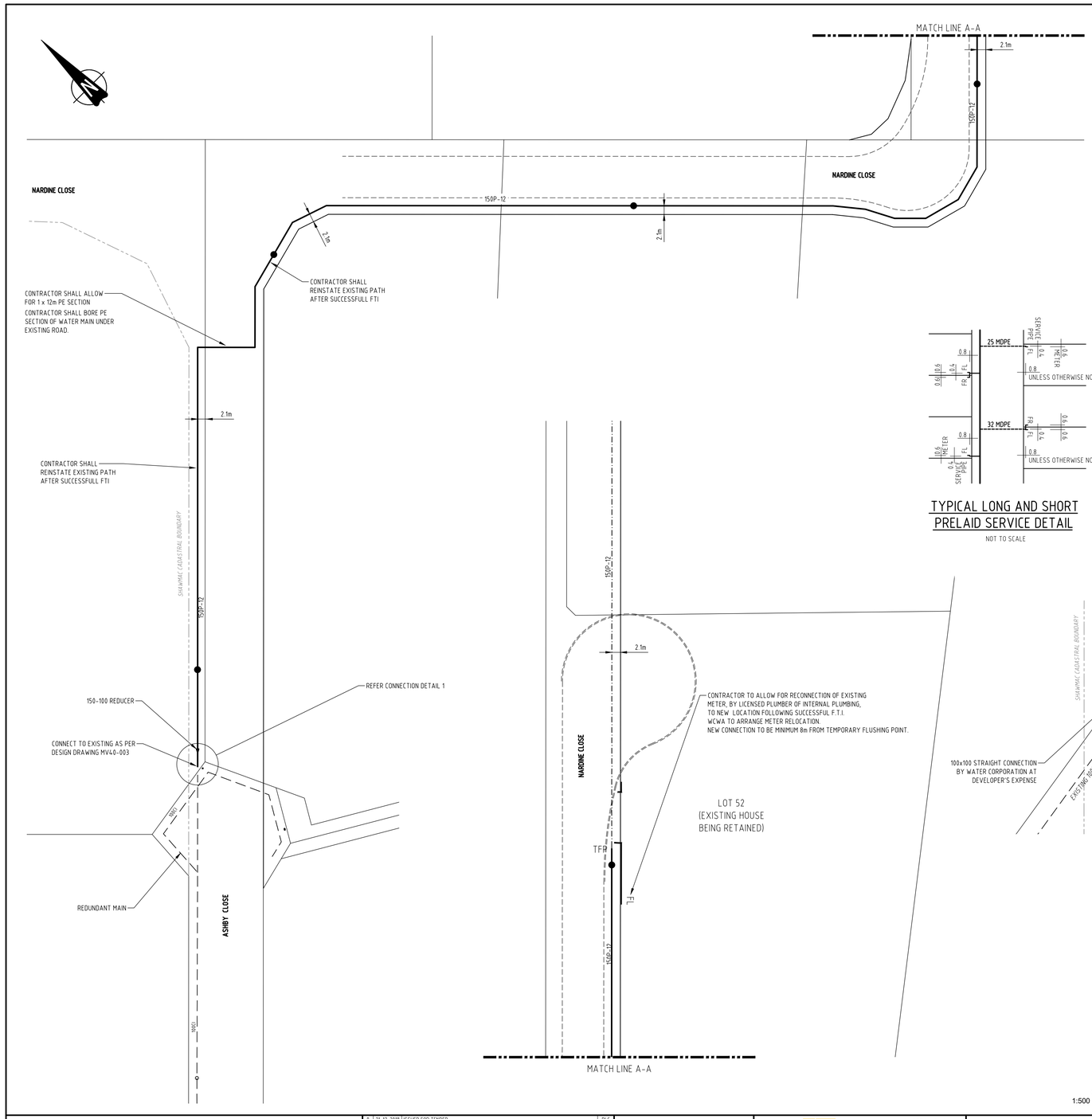
Email office@porterseng.com.au
www.porterseng.com.au
TUOAD Pty Ltd ACN 070 097 948 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 18 626 396 385

CLIENT:
CITY OF KALAMUNDA

DRAWING:
SITEWORKS PLAN STAGE 1

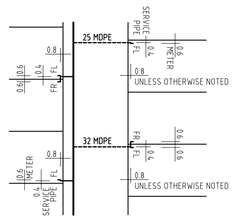
STATUS: **FOR TENDER**

SCALE	1:500
DATE	OCT 2016
DESIGN	BJH
DRAWN	MJV
CHECK	
DRAWING No.	16-9-116/100
REV No.	0
ORIGINAL DRAWING SIZE	A1
FILE NAME	S:\ACTIVE PROJECTS\16-09-116\ACAD\16916-100-101.dwg
APP'D	



TYPICAL LONG AND SHORT PRELAID SERVICE DETAIL

NOT TO SCALE



CONNECTION DETAIL 1

NTS

LEGEND

- WATER RETICULATION BOUNDARY
- EXISTING RETAINING WALL
- PROPOSED POST AND PANEL WALL
- 150P-12 — PROPOSED WATER MAIN, PIPE SIZE AND MATERIAL DESIGNATION
- PROPOSED HYDRANT & SLUICE VALVE
- EXISTING WATER MAIN, HYDRANT & SLUICE VALVE
- FUTURE WATER MAIN, HYDRANT & SLUICE VALVE
- CHANGE IN PIPE DIAMETER
- "FL" OR "FR" — DENOTES SIDE OF LOT TO BE SERVICED (VIEWED FROM THE ROAD)
- "D" — DEFERRED CONNECTION
- FP — FLUSHING POINT (X)
- HYDRANT RRPM (BLUE) 120mm OFFSET FROM CENTRELINE
- SERVICE LAID IN THIS STAGE FOR RELEASE IN FUTURE STAGE
- SERVICE LAID IN PREVIOUS STAGE TO BE RELEASED IN THIS STAGE

NUMBER OF SERVICES

PRELAID SHORT SINGLE	- 1
PRELAID SHORT DUAL	- 0
PRELAID LONG SINGLE	- 0
PRELAID LONG DUAL	- 0
DEFERRED SERVICES	- 0
TOTAL CONNECTION	- 1
TOTAL LOTS SERVED	- 1

EXTENSION

CONTRACTOR TO LAY 403m OF 150P-12

CONNECTION

CONNECTIONS (1) TO BE MADE BY WATER CORPORATION

GENERAL NOTES

1. ALL WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH WATER CORPORATION MANUALS AND STANDARDS.
2. **SERVICES, SUCH AS SEWER, WATER, GAS, TELEPHONE, ELECTRICITY, AND DRAINAGE MAY BE ENCOUNTERED DURING CONSTRUCTION OF THE WORKS. SERVICES INFORMATION SHOWN ON DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. BEFORE EXCAVATION COMMENCES THE LOCATION OF ALL SUCH SERVICES SHALL BE OBTAINED FROM THE RELEVANT AUTHORITIES.**
3. **CO-ORDINATE THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO COMMENCEMENT OF WORK. ANY CONFLICTS ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.**
4. UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN METRES.
5. ALL PIPES SHALL BE INSTALLED TO WITHIN 3.5m OF EXISTING MAIN. CONNECTION TO EXISTING BY WATER CORPORATION TO BE ORGANISED BY CONTRACTOR.
6. UNLESS OTHERWISE DIRECTED BY THE ENGINEER, COVER REQUIREMENTS SHALL COMPLY WITH THE WATER CORPORATION STANDARDS.
7. MINIMUM CLEARANCE TO GAS = 300mm, MINIMUM CLEARANCE TO OTHER SERVICES = 150mm.
8. ALL WORKS SHALL BE IN DRY GROUND. GROUND WATER SHALL NOT BE PERMITTED TO ENTER PIPES.
9. UNLESS OTHERWISE SHOWN ON THIS DRAWING OR VARIED BY THE ENGINEER ALL PIPES AND FITTINGS SHALL BE LAID ON AN ALIGNMENT OF 2.1m FROM THE CENTRE OF THE PIPE TO THE ROAD RESERVE BOUNDARY.
10. FLUSHING POINTS SHALL BE INSTALLED ON ALL MAINS AT CONNECTION POINTS TO EXISTING MAINS OR WHERE SPECIFIED.
11. CONTRACTOR SHALL INSTALL FLUSHING POINTS AT ALL DEAD ENDS.
12. UNLESS DIMENSIONED OTHERWISE, MAINS SHALL EXTEND AT LEAST 8m ALONG THE FRONT OF LAST LOT SERVED.
13. ALL VALVES SHALL BE OPPOSITE BOUNDARY PEGS UNLESS DIMENSIONED OTHERWISE, ALL HYDRANTS SHALL BE POSITIONED IN THE MIDDLE OF LOTS OR OPPOSITE BOUNDARY PEGS AS SHOWN.
14. SERVICE CROSSINGS SHALL BE LOCATED AT RIGHT ANGLES TO BOUNDARY AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE WATER CORPORATION.
15. THE CONTRACTOR SHALL ALLOW FOR ALL AS CONSTRUCTED INFORMATION (INCLUDING SURVEY) TO BE PLOTTED IN ACCORDANCE WITH THE WATER CORPORATIONS CURRENT PRACTICE AND DELIVERED TO THE ENGINEER FOR SIGNING AND PRESENTATION TO THE WATER CORPORATION.
16. IT IS DEEMED THAT THE AS CONSTRUCTED DOCUMENTS FORM PART OF THE WORKS. PRACTICAL COMPLETION CAN NOT BE AWARDED IF ACCEPTABLE AS CONSTRUCTED DOCUMENTS HAVE NOT BEEN PROVIDED TO THE ENGINEER.

WATER RETICULATION DETAILS

WAPC No	: 155 145
SUB FILE	:
MAIN EXT FILE	:
PLAN	:

THIS PLAN IS ACCEPTED AS COMPLYING WITH OVERALL SCHEME PLANNING

COMPLIANCE WITH RELEVANT MANUALS REMAINS THE RESPONSIBILITY OF THE CONSULTING ENGINEERS.

NO WORKS ARE TO COMMENCE ON SITE UNTIL STARTUP ARRANGEMENTS HAVE BEEN MADE WITH THE RELEVANT WORKS INSPECTOR. SEE DEVELOPER'S MANUAL FOR CONTACT DETAILS

..... FOR MANAGER LAND SERVICING

1:500 0 5 10 20 30 Half Size 1:1000 - SCALE (m)

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PROJECT:
FORRESTFIELD INDUSTRIAL AREA ROAD 2A - STAGE 1

No.	DATE	REVISION	BY
H	21-12-2018	ISSUED FOR TENDER	DLC
G	16-11-2019	ASHBY CLOSE WATER MAIN MOVE TO OPPOSITE SIDE OF ROAD, CONNECTION ALTERED	MEG
F	6-9-2017	WAPC, LOT DETAILS AND CONNECTION NOTES ADDED.	MJV
E	19-05-2017	SPLIT INTO 2 STAGES, NOTES ADDED	MEG
D	13-12-2016	ROAD NAMES ADDED, PROJECT TITLE CHANGE	MEG
C	8-12-2016	ASHBY ROAD CADASTRAL BOUNDARIES AMENDED	DLC
B	6-12-2016	ROAD RESERVE WIDTHS AMENDED, WATER AMENDED TO SUIT	DLC
A	24-10-2016	ISSUED FOR APPROVAL	MEG

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71060 Pty Ltd ACN 070 097 168 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:
CITY OF KALAMUNDA

DRAWING:
WATER RETICULATION PLAN STAGE 1

STATUS: **FOR TENDER**

SCALE	1:500
DATE	SEPT 2017
DESIGN	BIH
DRAWN	MJV
CHECK	

DRAWING No. **16-9-116/300** REV No. **0** ORIGINAL DRAWING SIZE **A1**

FILE NAME S:\ACTIVE PROJECTS\16-09-116\ACAD\16916-300-301.dwg

APP'D

ROAD NOTES

1. VERTICAL DATUM : AUSTRALIAN HEIGHT DATUM (AHD)
   HORIZONTAL DATUM : PERTH COASTAL GRID 1994 (PCG94)
2. **SERVICES, SUCH AS SEWER, WATER, GAS, TELEPHONE, ELECTRICITY, AND DRAINAGE MAY BE ENCOUNTERED DURING CONSTRUCTION OF THE WORKS. SERVICES INFORMATION SHOWN ON DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. BEFORE EXCAVATION COMMENCES THE LOCATION OF ALL SUCH SERVICES SHALL BE OBTAINED FROM THE RELEVANT AUTHORITIES.**
3. **THE CONTRACTOR SHALL CO-ORDINATE THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO COMMENCEMENT OF WORK. ANY CONFLICTS ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.**
4. ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH THE PROJECT SPECIFICATION, BUT WHERE NO DETAIL PROVIDED, TO THE REQUIREMENTS OF THE LOCAL AUTHORITY.
5. CONTRACTOR SHALL PROVIDE ALL SIGNING, LIGHTING AND FLAGMEN NECESSARY TO ENSURE SAFETY OF THE PUBLIC AND OF THE WORKS.
6. LOCATE ALL LEVELS FROM EXISTING SURVEY MARKS. ALL SURVEY MARKS ARE TO BE PROTECTED.
7. EXISTING VERGES SHALL NOT BE DISTURBED BEYOND THE EXTENT OF WORK.
8. ALL FILL SHALL BE CLEAN NON PLASTIC MATERIAL FREE FROM VEGETATION AND OTHER DELETERIOUS MATERIAL AND CERTIFIED AS SUITABLE FOR RESIDENTIAL LANDUSE.
9. ALL FILL SHALL BE PLACED IN UNIFORM LAYERS NOT EXCEEDING 300mm THICKNESS AND COMPACTED TO A DENSITY NOT LESS THAN 95% MAXIMUM DRY DENSITY.
10. CONTRACTOR SHALL TIE IN OF NEW SURFACE TO FINISH FLUSH WITH EXISTING SURFACE.
11. ALL EDGE KERBING SHALL BE MOUNTABLE UNLESS OTHERWISE NOTED.
12. SIGN POSTS AND STREET NAME PLATES TO BE SUPPLIED AND INSTALLED TO LOCAL AUTHORITY REQUIREMENTS. CONTRACTOR SHALL FIT STREET NAME PLATES TO ADJACENT LIGHT POLES WHERE APPROPRIATE.
13. THE CONTRACTOR SHALL SPOT OUT THE LINE MARKING. THE CONTRACTOR SHALL ADVISE MAIN ROADS WHEN THE SITE IS READY FOR LINEMARKING AND SIGNAGE INSTALLATION. LINE MARKING AND SIGNING TO BE UNDERTAKEN BY MAIN ROADS.
14. THE CONTRACTOR SHALL PREPARE AS-CONSTRUCTED ROADS AND PATH DRAWINGS (INCLUDING SURVEY) TO THE SATISFACTION OF THE LOCAL AUTHORITY. AS CONSTRUCTED PLANS TO BE ISSUED TO THE ENGINEER FOR SIGNING AND PRESENTATION TO THE LOCAL AUTHORITY.
15. THE CONTRACTOR SHALL PREPARE AND PROVIDE ROAD AND PATH AS CONSTRUCTED DOCUMENTS IN 'R' SPEC FORMAT AS PER LOCAL AUTHORITY REQUIREMENTS
16. IT IS DEEMED THAT THE AS CONSTRUCTED DOCUMENTS FORM PART OF THE WORKS. PRACTICAL COMPLETION CAN NOT BE AWARDED IF ACCEPTABLE AS CONSTRUCTED DOCUMENTS HAVE NOT BEEN PROVIDED TO THE ENGINEER.

PATH NOTES

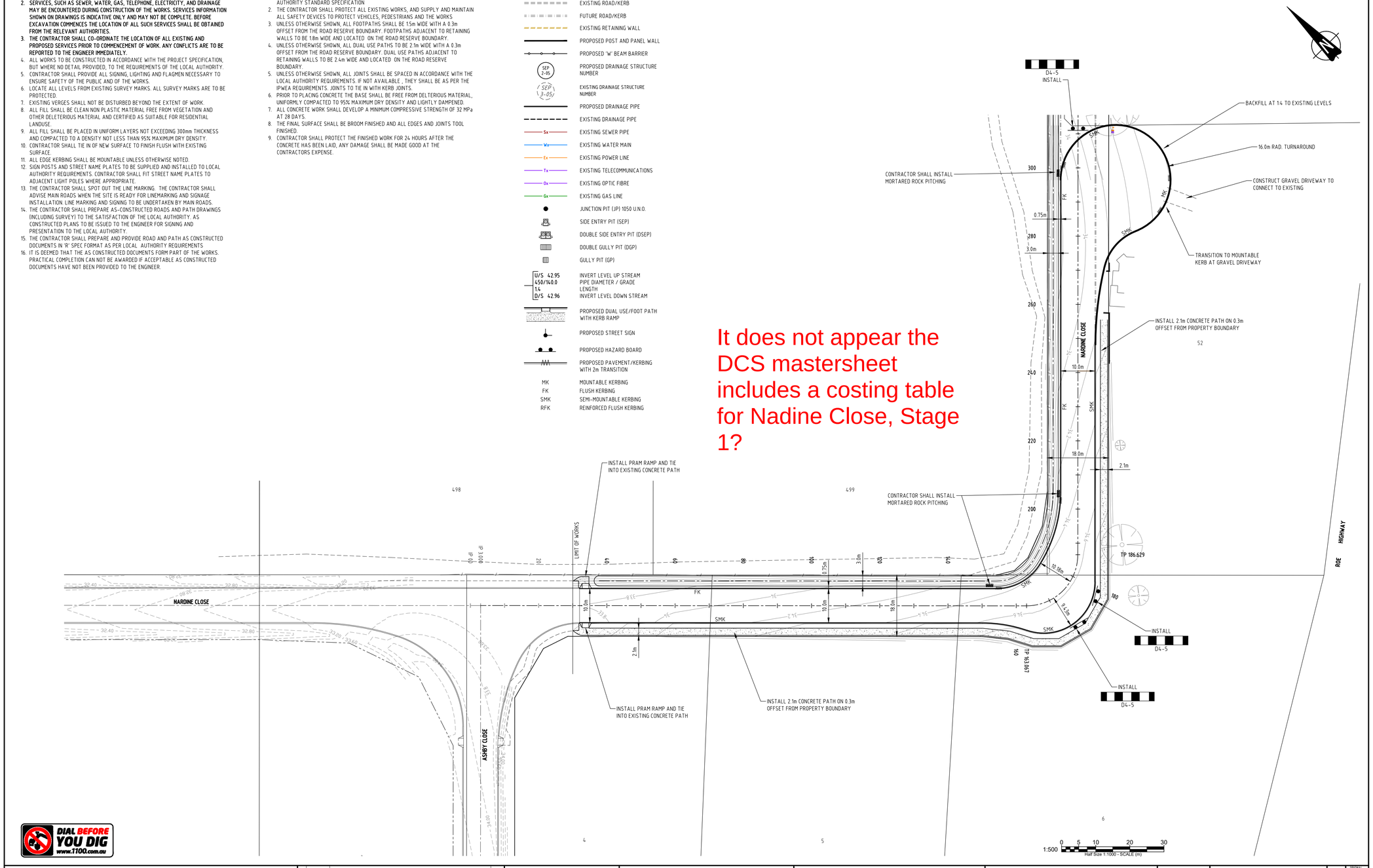
1. ALL FOOTPATHS AND PEDESTRIAN RAMPS SHALL BE CONSTRUCTED TO LOCAL AUTHORITY STANDARD. ALL MATERIAL USED SHALL BE IN ACCORDANCE WITH LOCAL AUTHORITY STANDARD SPECIFICATION
2. THE CONTRACTOR SHALL PROTECT ALL EXISTING WORKS, AND SUPPLY AND MAINTAIN ALL SAFETY DEVICES TO PROTECT VEHICLES, PEDESTRIANS AND THE WORKS
3. UNLESS OTHERWISE SHOWN, ALL FOOTPATHS SHALL BE 1.5m WIDE WITH A 0.3m OFFSET FROM THE ROAD RESERVE BOUNDARY. FOOTPATHS ADJACENT TO RETAINING WALLS TO BE 1.8m WIDE AND LOCATED ON THE ROAD RESERVE BOUNDARY.
4. UNLESS OTHERWISE SHOWN, ALL DUAL USE PATHS TO BE 2.1m WIDE WITH A 0.3m OFFSET FROM THE ROAD RESERVE BOUNDARY. DUAL USE PATHS ADJACENT TO RETAINING WALLS TO BE 2.4m WIDE AND LOCATED ON THE ROAD RESERVE BOUNDARY.
5. UNLESS OTHERWISE SHOWN, ALL JOINTS SHALL BE SPACED IN ACCORDANCE WITH THE LOCAL AUTHORITY REQUIREMENTS. IF NOT AVAILABLE , THEY SHALL BE AS PER THE IPWEA REQUIREMENTS. JOINTS TO TIE IN WITH KERB JOINTS.
6. PRIOR TO PLACING CONCRETE THE BASE SHALL BE FREE FROM DELTERIOUS MATERIAL, UNIFORMLY COMPACTED TO 95% MAXIMUM DRY DENSITY AND LIGHTLY DAMPENED.
7. ALL CONCRETE WORK SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 32 MPa AT 28 DAYS.
8. THE FINAL SURFACE SHALL BE BROOM FINISHED AND ALL EDGES AND JOINTS TOOL FINISHED.
9. CONTRACTOR SHALL PROTECT THE FINISHED WORK FOR 24 HOURS AFTER THE CONCRETE HAS BEEN LAID, ANY DAMAGE SHALL BE MADE GOOD AT THE CONTRACTORS EXPENSE.

LEGEND

- PROPOSED ROAD/KERB
- EXISTING ROAD/KERB
- FUTURE ROAD/KERB
- EXISTING RETAINING WALL
- PROPOSED POST AND PANEL WALL
- PROPOSED 'W' BEAM BARRIER
- SEP 2-95 — PROPOSED DRAINAGE STRUCTURE NUMBER
- SEP 3-05 — EXISTING DRAINAGE STRUCTURE NUMBER
- PROPOSED DRAINAGE PIPE
- EXISTING DRAINAGE PIPE
- Sx — EXISTING SEWER PIPE
- Wx — EXISTING WATER MAIN
- Ex — EXISTING POWER LINE
- Tx — EXISTING TELECOMMUNICATIONS
- Ox — EXISTING OPTIC FIBRE
- Gx — EXISTING GAS LINE
- JUNCTION PIT (JP) 1050 U.N.O.
- SIDE ENTRY PIT (SEP)
- DOUBLE SIDE ENTRY PIT (DSEP)
- DOUBLE GULLY PIT (DGP)
- GULLY PIT (GP)
- U/S 42.95 / 450/140.0 / 1.4 / D/S 42.96 — INVERT LEVEL UP STREAM / PIPE DIAMETER / GRADE / LENGTH / INVERT LEVEL DOWN STREAM
- PROPOSED DUAL USE/FOOT PATH WITH KERB RAMP
- PROPOSED STREET SIGN
- PROPOSED HAZARD BOARD
- PROPOSED PAVEMENT/KERBING WITH 2m TRANSITION

MK	MOUNTABLE KERBING
FK	FLUSH KERBING
SMK	SEMI-MOUNTABLE KERBING
RFK	REINFORCED FLUSH KERBING

It does not appear the DCS mastersheet includes a costing table for Nadine Close, Stage 1?



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PROJECT:
FORRESTFIELD INDUSTRIAL AREA
ROAD 2A - STAGE 1

No	DATE	REVISION	BY
J	21-12-2018	ISSUED FOR TENDER	DLC
F	19-1-2017	SPLIT INTO 2 STAGES, NOTES ADDED	MEG
E	16-1-2016	PATH SHIFTED TO PROPERTY BOUNDARY	MEG
D	15-12-2016	ROAD NAMES ADDED, PROJECT TITLE CHANGE, ROCK PITCHING ADDED	MEG
C	8-12-2016	DESIGN CONTOURS AND TEMPORARY TURNAROUNDS ADDED	DLC
B	6-12-2016	ROAD RESERVE WIDTHS AMENDED, ROAD LAYOUT AMENDED TO SUIT	DLC
A	24-10-2016	ISSUED FOR APPROVAL	MEG

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CLIENT:
CITY OF KALAMUNDA

DRAWING:
ROADWORKS AND DRAINAGE LAYOUT PLAN STAGE 1

STATUS: **FOR TENDER**

SCALE	1:500
DATE	OCT 2016
DESIGN	BIH
DRAWN	MJV
CHECK	APP'D

DRAWING No. **16-9-116/400** REV No. **0** ORIGINAL DRAWING SIZE **A1**

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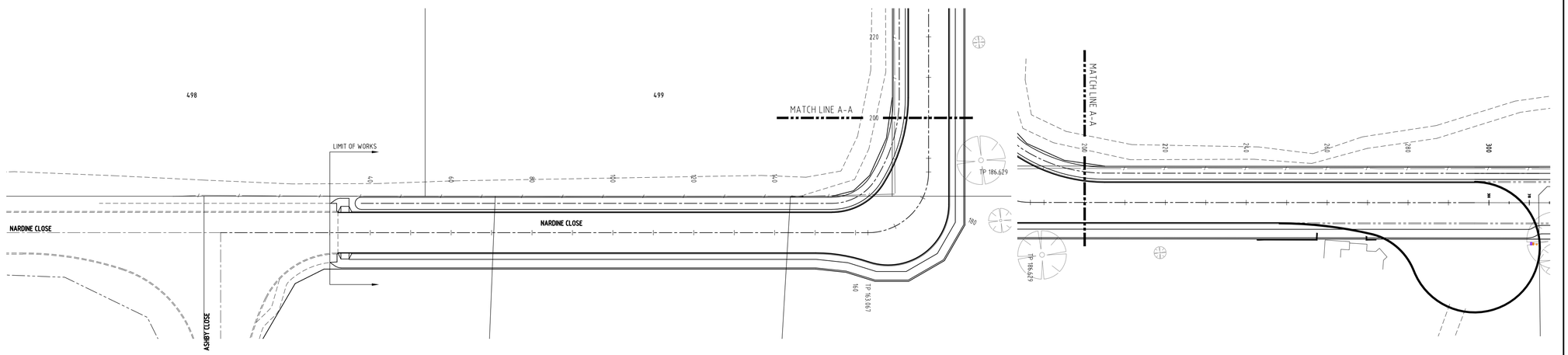

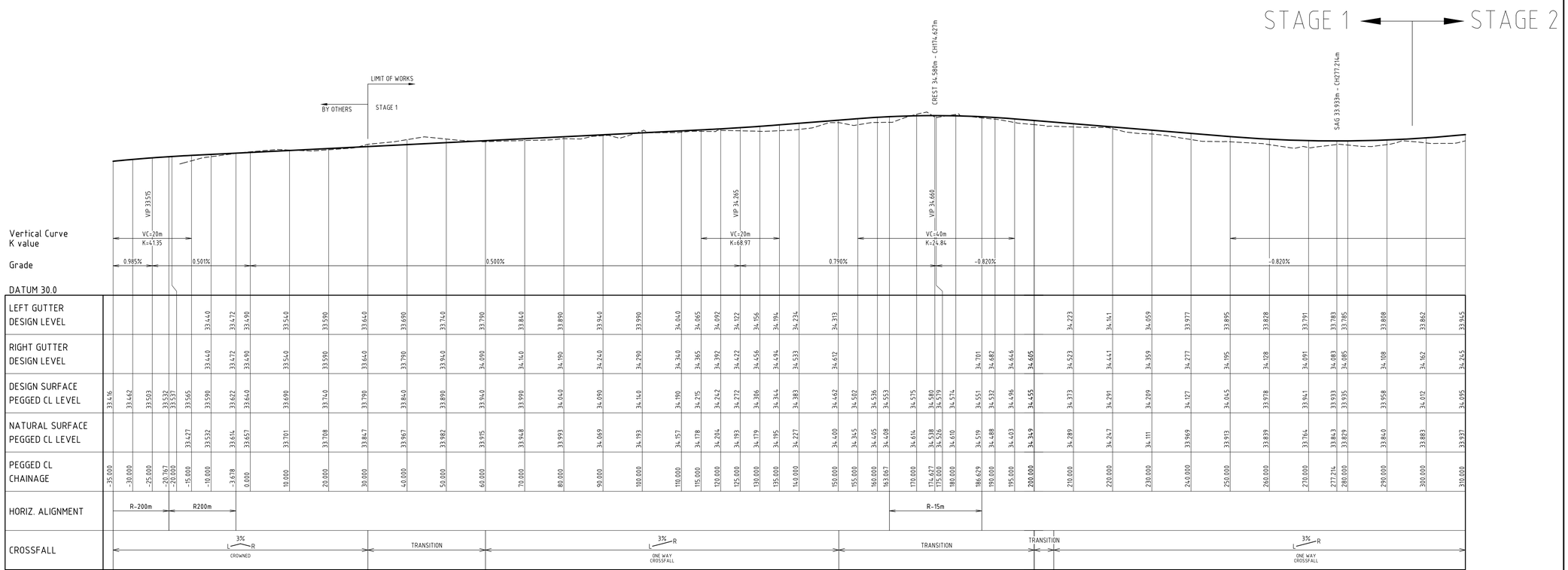

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NARDINE CLOSE LONGITUDINAL SECTION

SCALE : HORIZONTAL - 1:500
VERTICAL - 1:50

1:500 0 5 10 20 30 Half Size 1:1000 - SCALE (m)

1:50 0 0.5 1 2 3 Half Size 1:100 - SCALE (m)

PROJECT:
FORRESTFIELD INDUSTRIAL AREA
ROAD 2A - STAGE 1

No.	DATE	REVISION	BY
G	21-12-2018	ISSUED FOR TENDER	DLC
F	19-01-2017	SPLIT INTO 2 STAGES, NOTES ADDED	MEG
D	13-12-2016	ROAD NAMES ADDED, PROJECT TITLE CHANGE	MEG
C	8-12-2016	LONGITUDINAL SECTION AMENDED	DLC
B	6-12-2016	ROAD RESERVE WIDTHS AMENDED, ROAD LAYOUT AMENDED TO SUIT	DLC
A	24-10-2016	ISSUED FOR APPROVAL	MEG

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CLIENT:
CITY OF KALAMUNDA

DRAWING:
ROAD LAYOUT AND LONGITUDINAL SECTION PLAN STAGE 1

STATUS: **FOR TENDER**

SCALE	1:500
DATE	OCT 2016
DESIGN	BIH
DRAWN	MJV
CHECK	
APP'D	

DRAWING No. **16-9-116/410** REV No. **0** ORIGINAL DRAWING SIZE **A1**

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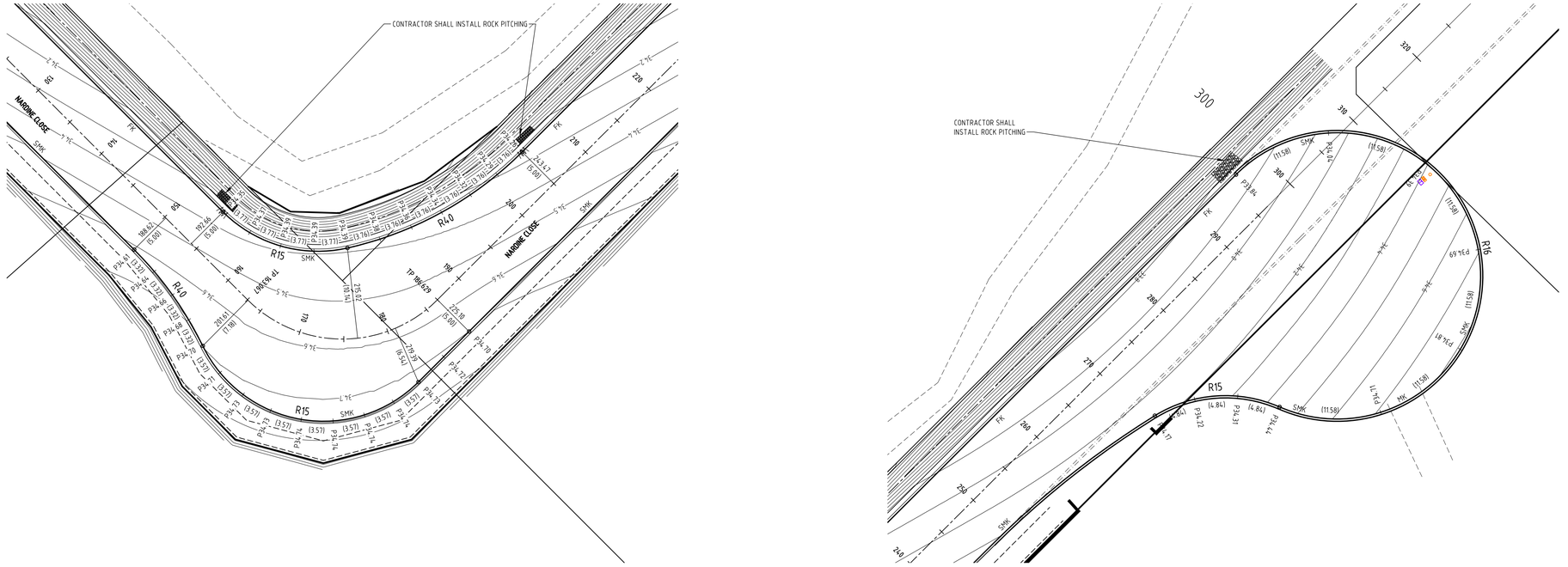

LEGEND

———	PROPOSED ROAD/KERB
MK	MOUNTABLE KERBING
FK	FLUSH KERBING
SMK	SEMI-MOUNTABLE KERBING
RFK	REINFORCED FLUSH KERBING
——MM——	PROPOSED PAVEMENT/KERBING WITH 2m TRANSITION

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1:250 0 2.5 5 10 15
Half Size 1:500 - SCALE (m)

PROJECT:
FORRESTFIELD INDUSTRIAL AREA ROAD 2A - STAGE 1

No.	DATE	REVISION	BY
E	21-12-2018	ISSUED FOR TENDER	DLC
D	19-01-2017	SPLIT INTO 2 STAGES, NOTES ADDED	MEG
C	13-12-2016	ROAD NAMES ADDED, PROJECT TITLE CHANGE, ROCK PITCHING ADDED, KERBS NOTATED	MEG
B	8-12-2016	ROAD CROSSFALL AMENDED, INTERSECTION LEVELS AMENDED TO SUIT	DLC
A	6-12-2016	ISSUED FOR APPROVAL	DLC

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CLIENT:
CITY OF KALAMUNDA

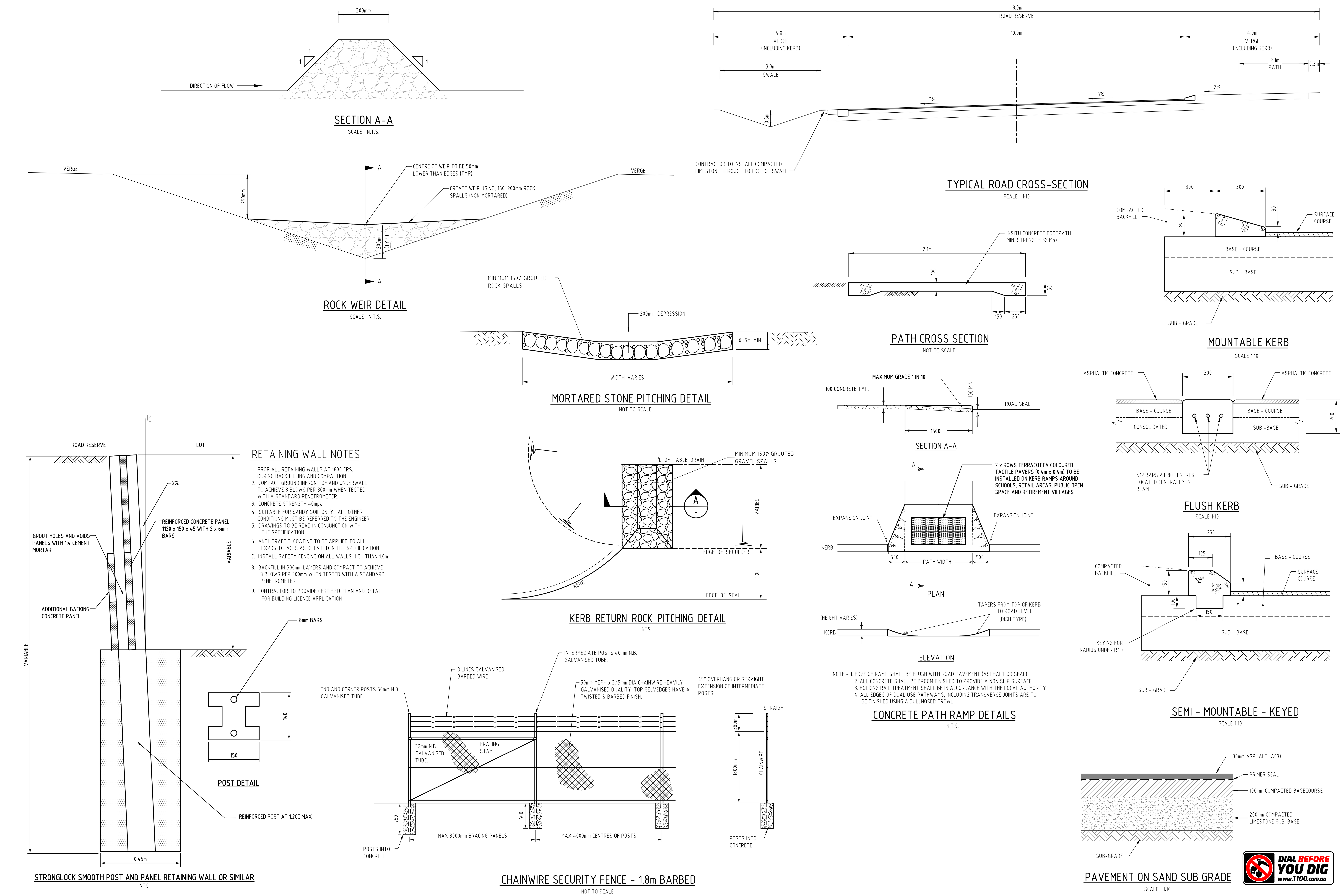
DRAWING:
INTERSECTION DETAILS PLAN STAGE 1

STATUS: **FOR TENDER**

SCALE	1:250
DATE	DEC 2016
DESIGN	DLC
DRAWN	DLC
CHECK	APP'D

DRAWING No. **16-9-116/420** REV No. **0** ORIGINAL DRAWING SIZE **A1**

FILE NAME S:\ACTIVE PROJECTS\16-09-116\ACAD\16916-420-421.dwg


SECTION A-A
SCALE N.T.S.
DIRECTION OF FLOW
300mm
ROCK WEIR DETAIL
SCALE N.T.S.
VERGE
CENTRE OF WEIR TO BE 50mm LOWER THAN EDGES (TYP)
CREATE WEIR USING, 150-200mm ROCK SPALLS (NON MORTARED)
TYPICAL ROAD CROSS-SECTION
SCALE 1:10
18.0m ROAD RESERVE
4.0m VERGE (INCLUDING KERB)
10.0m
3.0m SWALE
2.1m PATH
CONTRACTOR TO INSTALL COMPACTED LIMESTONE THROUGH TO EDGE OF SWALE
MORTARED STONE PITCHING DETAIL
NOT TO SCALE
MINIMUM 150Ø GROUTED ROCK SPALLS
200mm DEPRESSION
WIDTH VARIES
PATH CROSS SECTION
NOT TO SCALE
INSITU CONCRETE FOOTPATH MIN. STRENGTH 32 Mpa.
MOUNTABLE KERB
SCALE 1:10
COMPACTED BACKFILL
SURFACE COURSE
BASE - COURSE
SUB - BASE
SUB - GRADE
FLUSH KERB
SCALE 1:10
ASPHALTIC CONCRETE
CONSOLIDATED
N12 BARS AT 80 CENTRES LOCATED CENTRALLY IN BEAM
SEMI - MOUNTABLE - KEYED
SCALE 1:10
KEYING FOR RADIUS UNDER R40
CONCRETE PATH RAMP DETAILS
N.T.S.
SECTION A-A
MAXIMUM GRADE 1 IN 10
100 CONCRETE TYP.
ROAD SEAL
PLAN
2 x ROWS TERRACOTTA COLOURED TACTILE PAVERS (0.4m x 0.4m) TO BE INSTALLED ON KERB RAMPS AROUND SCHOOLS, RETAIL AREAS, PUBLIC OPEN SPACE AND RETIREMENT VILLAGES.
EXPANSION JOINT
PATH WIDTH
ELEVATION
TAPERS FROM TOP OF KERB TO ROAD LEVEL (DISH TYPE)
NOTE - 1. EDGE OF RAMP SHALL BE FLUSH WITH ROAD PAVEMENT (ASPHALT OR SEAL).
2. ALL CONCRETE SHALL BE BROOM FINISHED TO PROVIDE A NON SLIP SURFACE.
3. HOLDING RAIL TREATMENT SHALL BE IN ACCORDANCE WITH THE LOCAL AUTHORITY
4. ALL EDGES OF DUAL USE PATHWAYS, INCLUDING TRANSVERSE JOINTS ARE TO BE FINISHED USING A BULLNOSED TROWL.
RETAINING WALL NOTES
1. PROP ALL RETAINING WALLS AT 1800 CRS. DURING BACK FILLING AND COMPACTION.
2. COMPACT GROUND INFRONT OF AND UNDERWALL TO ACHIEVE 8 BLOWS PER 300mm WHEN TESTED WITH A STANDARD PENETROMETER.
3. CONCRETE STRENGTH 40mpa
4. SUITABLE FOR SANDY SOIL ONLY. ALL OTHER CONDITIONS MUST BE REFERRED TO THE ENGINEER
5. DRAWINGS TO BE READ IN CONJUNCTION WITH THE SPECIFICATION
6. ANTI-GRAFFITI COATING TO BE APPLIED TO ALL EXPOSED FACES AS DETAILED IN THE SPECIFICATION
7. INSTALL SAFETY FENCING ON ALL WALLS HIGH THAN 1.0m
8. BACKFILL IN 300mm LAYERS AND COMPACT TO ACHIEVE 8 BLOWS PER 300mm WHEN TESTED WITH A STANDARD PENETROMETER
9. CONTRACTOR TO PROVIDE CERTIFIED PLAN AND DETAIL FOR BUILDING LICENCE APPLICATION
KERB RETURN ROCK PITCHING DETAIL
NTS
MINIMUM 150Ø GROUTED GRAVEL SPALLS
EDGE OF SHOULDER
EDGE OF SEAL
KERB
STRONGLOCK SMOOTH POST AND PANEL RETAINING WALL OR SIMILAR
NTS
ROAD RESERVE
LOT
GROUT HOLES AND VOIDS PANELS WITH 1:4 CEMENT MORTAR
REINFORCED CONCRETE PANEL 1120 x 150 x 45 WITH 2 x 6mm BARS
ADDITIONAL BACKING CONCRETE PANEL
REINFORCED POST AT 1.2CC MAX
POST DETAIL
8mm BARS
CHAINWIRE SECURITY FENCE - 1.8m BARBED
NOT TO SCALE
END AND CORNER POSTS 50mm N.B. GALVANISED TUBE.
3 LINES GALVANISED BARBED WIRE
INTERMEDIATE POSTS 40mm N.B. GALVANISED TUBE.
50mm MESH x 3.15mm DIA CHAINWIRE HEAVILY GALVANISED QUALITY. TOP SELVEDGES HAVE A TWISTED & BARBED FINISH.
45° OVERHANG OR STRAIGHT EXTENSION OF INTERMEDIATE POSTS.
32mm N.B. GALVANISED TUBE.
BRACING STAY
MAX 3000mm BRACING PANELS
MAX 4000mm CENTRES OF POSTS
POSTS INTO CONCRETE
PAVEMENT ON SAND SUB GRADE
SCALE 1:10
30mm ASPHALT (AC7)
PRIMER SEAL
100mm COMPACTED BASECOURSE
200mm COMPACTED LIMESTONE SUB-BASE
SUB-GRADE
DIAL BEFORE YOU DIG
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PROJECT:
FORRESTFIELD INDUSTRIAL AREA ROAD 2A - STAGE 1

No	DATE	REVISION	BY
0	21-12-2016	ISSUED FOR TENDER	DLC
C	13-12-2016	PROJECT TITLE CHANGE, ROCK WEIRS, ROCK PITCHING, SMK (KEYED), FENCE, WALL AND PATH ADDED	MEG
B	8-12-2016	TYPICAL ROAD CROSS-SECTION AND PAVEMENT DETAIL ADDED	DLC
A	24-10-2016	ISSUED FOR APPROVAL	MEG

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CLIENT: **CITY OF KALAMUNDA**

DRAWING: **STANDARD DETAILS PLAN**

STATUS: **FOR TENDER**

SCALE	AS ABOVE
DATE	OCT 2016
DESIGN	BIH
DRAWN	MJV
CHECK	
DRAWING No.	16-9-116/600
REV No.	0
ORIGINAL DRAWING SIZE	A1
FILE NAME	S:\ACTIVE PROJECTS\16-09-116\ACAD\169116-600.dwg

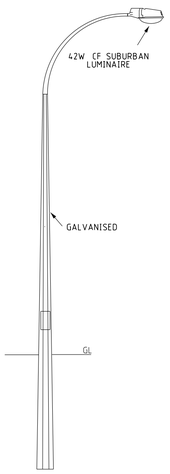
CONTRACTOR NOTES:

1. DRAWING TO BE READ IN CONJUNCTION WITH CONTRACT DRAWINGS AND SPECIFICATIONS.
2. ALL WORKS TO BE COMPLETED IN LINE WITH WESTERN POWER POLICIES, INCLUDING THE UDS, WADCM, DDC, DSM, DCSH, UCIM AND EARTHING FAQ.
3. VERIFY ALL MATERIAL QUANTITIES AGAINST SITE CONDITIONS PRIOR TO QUOTATION AND ADVISE ELECTRICAL CONSULTANTS OF ANY VARIATIONS.
4. SHOW CAUTION IN PROXIMITY TO EXISTING ASSETS. ALWAYS REFER TO CURRENT DBYD DRAWINGS.POTHOLE TO LOCATE IF NECESSARY.PROTECT SERVICES AS REQUIRED.APPLY FOR NECESSARY VICINITY ACCESS PERMITS AND OUTAGES WHERE REQUIRED.DO NOT ENCROACH MINIMUM APPROACH DISTANCES FOR UNDERGROUND OR OVERHEAD ASSETS.
5. LIAISE WITH WESTERN POWER AS REQUIRED.ORGANISE PRE-HANDOVER INSPECTION AND ENERGISATION SCHEDULE WITH WESTERN POWER PRIOR TO COMPLETION OF WORKS. WHERE REQUIRED FOR COMPLEX INTERFACE PROJECTS, ORGANISE A PRE-START SITE MEETING WITH WESTERN POWER.
6. ARRANGE WITH 3E FOR ELECTRONIC AS CONSTRUCTED DRAWING COMPLETION AND SUBMISSION TO WESTERN POWER.
7. MAKE ALLOWANCE FOR TERRACING OF CABLES WHERE REQUIRED, INCLUDING FOR ROAD CROSSINGS.
8. CLEAN BEDDING SAND TO BE IMPORTED FOR CABLE TRENCHES WHERE EXISTING MATERIALS DO NOT MEET WP REQUIREMENTS.
9. PLAN CABLE RUNS TO LIMIT THE NUMBER OF STRAIGHT JOINTS.
10. COMMENCE LAYING CABLES FROM THE TRANSFORMER, SWITCHGEAR OR UNIVERSAL PILLAR.
11. ALL CABLES LAID NEXT TO RETAINING WALLS TO BE IN CONDUIT.
12. INSTALL HEATSHRINK "END CAP" AT ALL CABLE ENDS.
13. INSTALL HEATSHRINK GLOVES ON ALL LV CABLE TERMINATION ENDS.
14. STREETLIGHT POLES MUST NOT BE INSTALLED IN FOOTPATHS,PEG POLES LOCATIONS PRIOR TO INSTALL AND NOTIFY 3E OF CLASHES IN ADVANCE.
15. ERECT LIGHT POLES ONLY AFTER NEARBY EXISTING OVERHEAD POWERLINES ARE REMOVED, WHERE NOTED.
16. BORE UNDER EXISTING ROADS.
17. CONTRACTOR TO LEAVE SUFFICIENT CABLE COILED AT ALL INTERFACE POINTS (INCLUDING JOINTS,PILLAR TERMINATIONS & POLE TERMINATIONS) TO ALLOW WP TO COMPLETE INTERFACE WORKS. INSTALL END CAPS TO PROTECT CABLE.
18. HV FEEDER CABLES TO BE INSTALLED AT MINIMUM COVER OF 1120mm, TO ALLOW REQUIRED SEPARATIONS TO BE ACHIEVED TO FUTURE LV CABLES.

WESTERN POWER SCOPE OF WORKS

(A) WP TO COST TO CARRY OUT TERMINATION OF NEW 240LV CABLE TO UNI PILLAR LOT 4 AND CONFIGURE AS SHOWN. WP TO SUPPLY ALL MATERIALS AND CARRY OUT ALL ASSOCIATED WORKS.

(B) WP TO COST TO CARRY OUT TERMINATION OF NEW 16SL CABLE TO UNI PILLAR LOT 4. WP TO SUPPLY ALL TERMINATION AND CARRY OUT ALL ASSOCIATED WORKS.



WP STANDARD 6.5m SINGLE OUTREACH POLE
NOT TO SCALE

NOTE:
6.5m STANDARD SINGLE OUTREACH POLE WITH SUBURBAN 42W CF LAMP TO BE GALVANISED

ALL STREETLIGHT CABLE TO BE IN CONDUIT IF OUTSIDE WP ALIGNMENT.

WP STREETLIGHTS TO BE LOCATED IN-LINE WITH COMMON LOT BOUNDARY ON 2.7m ALIGNMENT, UNLESS NOTED OTHERWISE.

STREETLIGHT POLE LOCATION

WP STREETLIGHTS ON STREET CORNERS TO BE LOCATED EQUIDISTANT FROM TRUNC POINTS, 2.7m FROM LOT BOUNDARY, UNLESS NOTED OTHERWISE.

STREETLIGHT POLE LOCATION - CORNERS

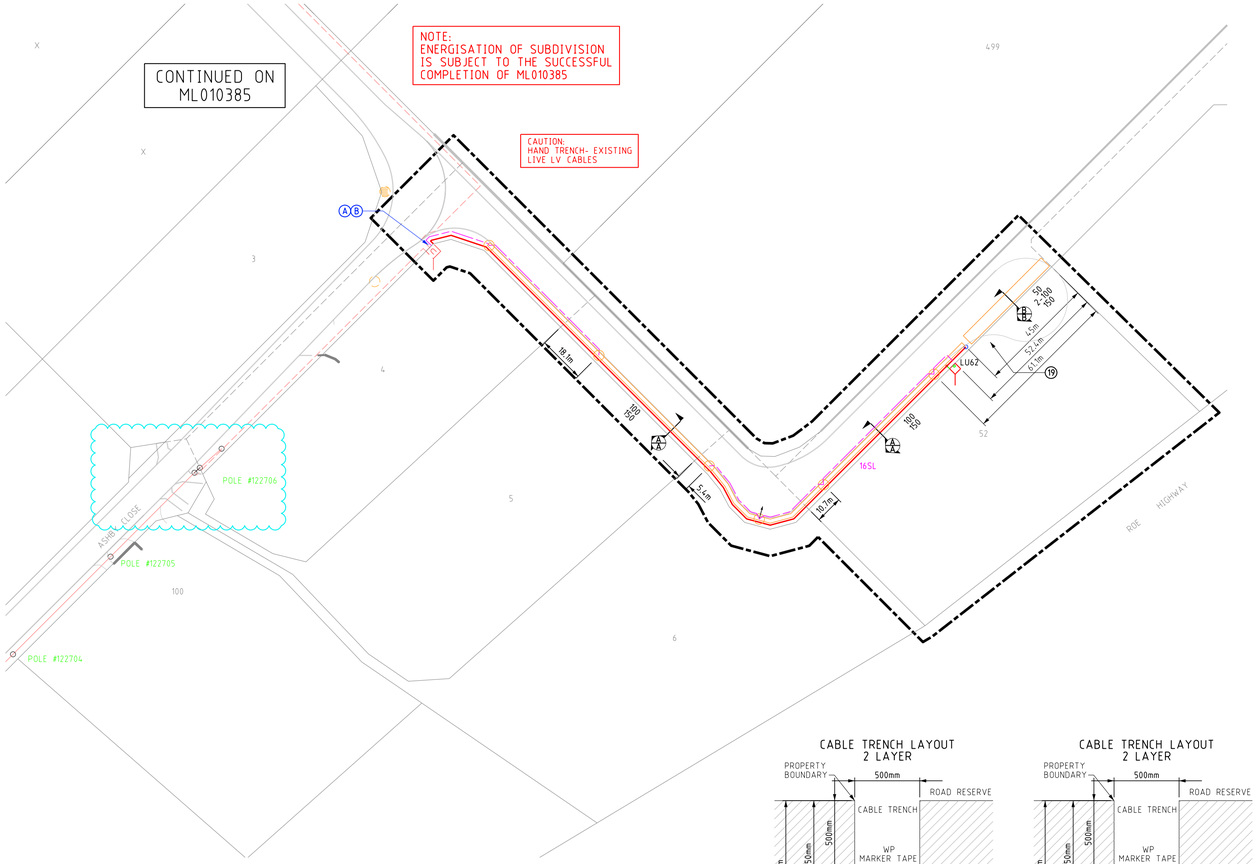
ARROW DENOTES DIRECTION TO PEG WITH WHICH DUCTS ARE TO BE ALIGNED

DUCTS TO BE LAID TO WP SPECIFICATION AS OUTLINED IN UNDERGROUND DISTRIBUTION SCHEMES MANUAL - POLICY AND INSTALLATION OPTIONS

DENOTES PREVIOUSLY REQUESTED DUCTS

Dimensions and scales to be checked prior to measuring cable lengths

1:1000 20 10 0 20 40 60 80



LEGEND

SCHEME BDY.
RETAINING WALL
RETAINING WALL EXTRA FOOTING

HV CABLES
- CN53 - 400mm2 (3X1c)
- CN49 - 240mm2 (3X1c)
- CN48 - 185mm2 (3X1c)
- CN50 - 95mm2 (3X1c)
- CN51 - 50mm2 (3X1c)
- CN51 - 50mm2 (1c)
- CN46 - 35mm2 (3X1c)
- CN47 - 35mm2 (1c)
- EXISTING HV CABLES (SIZE AND TYPE INDICATED)

LV-SL CABLES
- CN45 - 240mm2 (1x3c)
- CN44 - 185mm2 (1x3c)
- CN43 - 120mm2 (1x3c)
- CN42 - 25mm2 (1x3c)
- CN41 - 16mm2 SL (1c)
- 4Q C PILOT
- EXISTING LV CABLES (SIZE AND TYPE INDICATED)

STREET LIGHTS: 42w CFL; 70/75w MH; 70w HPS; 18w LED
EXISTING: 80w MV; 150w MH; 150w HPS; 125w MV; 250w MH; 250w HPS
LEGEND DEFINES TYPE & WATTAGE - NOT COLOUR

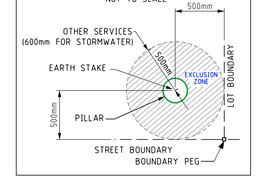
PILLARS / PITS / ETC
- MINI (WORKING END)
- UNIVERSAL
- MINI
- LINK
- CABLE MARKER U/G
- UMS PIT
- UTILITIES PIT
- 100/200AMP CUTOUT
- CONDUIT / POLY PIPE

TRANSFORMERS (T) SWITCHGEAR (S)

AERIAL CONDUCTORS AND POLES
- NEW POLE (ANY TYPE AS INDICATED)
- EXISTING POLE (ANY TYPE AS INDICATED)
- HV LV EXISTING AERIAL CONDUCTORS (SIZE AND TYPE INDICATED)

TYPICAL PILLAR EXCLUSION ZONE

NOT TO SCALE

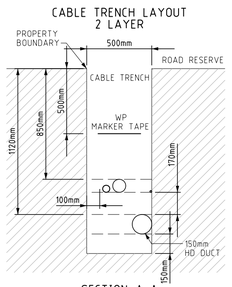


×ASTERISK DENOTES CHANGE IN LOAD ON AN EXISTING CIRCUIT

TRANSFORMER SPECIFICATIONS AND LOCATION	FUSEWAY NO.	CIRCUIT NO.	FUSE AMPS	CABLE mm²	CIRCUIT NAME	VOLT DROP	AMPS	TOTAL AMPS
EXISTING 630kVA Tx LOT 100 22kV (827A) ADMD=200kVA/HECTARE	1	1	-	630	CONTIGUOUS SUPPLY	47.27V	403A	438A
	2							
	3	2×	315	240	UNI LOT 52	5.76V	31A	
	4	3	-	-	-	-	-	
	5	4	-	-	-	-	-	
	6	5	-	-	-	-	-	
	7	6	-	-	-	-	-	
	8	7	315	240	-	0.41V	6A	

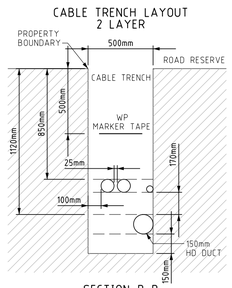
NOTE: ALL UNMETERED SUPPLIES (Including CUSTOMER AND WESTERN POWER STREETLIGHTING ASSETS)					
TYPE OF EQUIPMENT	NO of UNITS	UNIT WATTAGE	TOTAL WATTAGE	DAILY HRS OPERATION	WP Asset Yes / No
6.5m WP STANDARD POLE + 42W CF SUBURBAN LUMINAIRE	6	42W	252W	DUSK/DAWN	YES
NOTE: ALL UNMETERED SUPPLIES and STREETLIGHTS MUST BE INCLUDED IN DESIGN DRAWING					

CABLE TRENCH LAYOUT 2 LAYER



SECTION A-A
NOT TO SCALE

CABLE TRENCH LAYOUT 2 LAYER



SECTION B-B
NOT TO SCALE

FOR CONSTRUCTION

IF WORKING IN THE VICINITY OF EXISTING OVERHEAD DISTRIBUTION OR TRANSMISSION LINES.

REFER TO "WORKSAFE" REGULATION 3.64

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REFER TO 'WORKSAFE' REGULATION 3.21

REV	DESCRIPTION	DATE	DRAWN	CHKD
	ISSUED TO CLIENT FOR CONSTRUCTION	11-10-17	BR	VH
B	UNDERGROUND SUPPLY TO LOTS 5 & 6 REMOVED. TRANSFORMER TABLE UPDATED. LOT BOUNDARIES UPDATED	27-09-17	BR	VH

REV	DESCRIPTION	DATE	DRAWN	CHKD
A	ISSUED TO WP FOR CONFORMANCE	15-08-17	BR	VH
4	DUCT ADDED FOR FUTURE 16SL CABLE	16-03-17	BR	VH
3	STREETLIGHT DESIGN REVISED TO CONTINUE ADJACENT DESIGN METHODOLOGY	10-03-17	BR	VH
2	DESIGN REVISED TO SUIT STAGE 1 BOUNDARIES	09-03-17	BR	VH
1	ISSUED TO CLIENT FOR COMMENT	20-12-16	BR	VH

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LAT. 31° 57' 58" S
LONG 116° 00' 14" E

Scale	1:1000	@ A1 Original Paper Size	
Base File Date	09-03-2017	Design Date	07-12-2016
Designed	BR	Drawn	BR
Checked	VH	Approved	DLJ
Western Power Reference No.	ML010386	WAPC No.	155145
Local Authority	SHIRE OF KALAMUNDA		
Civil Consultant	PORTER CONSULTING ENGINEERS		

ASHBY CL & SULTANA RD HIGH WYCOMBE STAGE 1

ROADWAY EXTENSION
ELECTRICAL RETICULATION LAYOUT

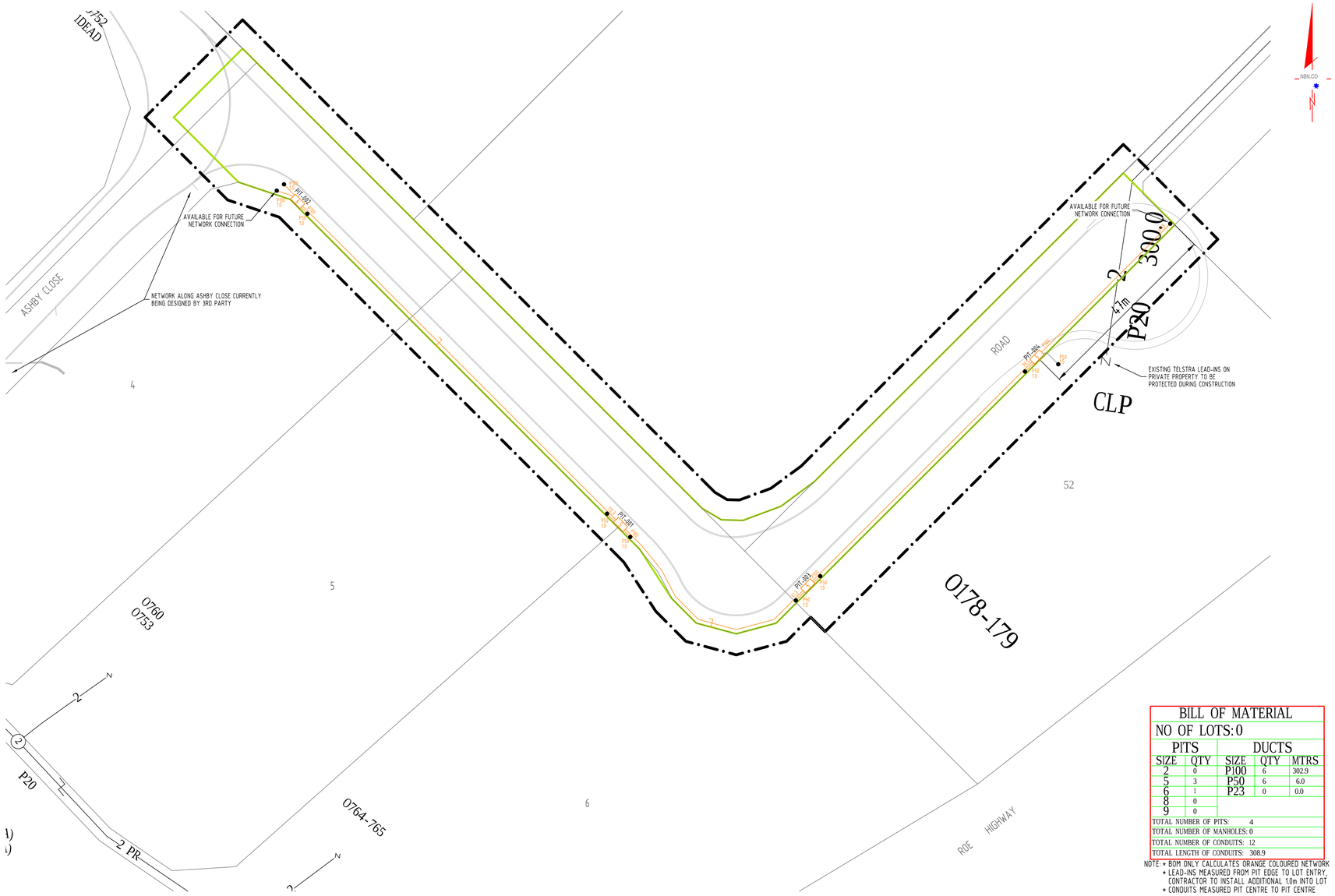
Sheet	Of	3E Drawing Number	Revision
1	1	3E16144-01	B

SPECIFIC NOTES

20. REFER TO DETAIL & DIAGRAM SHEET FOR NBN PIT AND PIPE DESIGN GENERAL NOTES AND DETAIL DIAGRAMS
21. BOTH THE FIBRE REQUEST AND THE PIT AND PIPE DESIGN PROVIDE FOR 0 SINGLE RESIDENTIAL LOTS

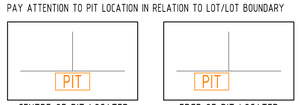
LEGEND

- STAGE BOUNDARY
- CONSTRUCTION BOUNDARY
- PROPOSED RETAINING WALL
- EXISTING TELSTRA CONDUIT
- NBN CONDUIT/LEAD-IN CONSTRUCTED IN A PREVIOUS STAGE
- NBN CONDUIT/LEAD-IN CONSTRUCTED IN CURRENT STAGE EXCEPT WHERE LOTS DENOTED BY ⊛ SYMBOL
- NBN LEAD-IN CONSTRUCTED IN CURRENT STAGE TO A LOT TO BE RELEASED IN A FUTURE STAGE
- PIT-ID X — NBN PIT CONSTRUCTED IN A PREVIOUS STAGE, PIT TYPE "X" AS INDICATED BELOW
- PIT-ID 2 — SERVICE DROP ACCESS PIT (650mm × 280mm × 565mm)
- PIT-ID 5 — SERVICE DROP ACCESS/BOUNDARY/FJL PIT (SINGLE LID) (700mm × 450mm × 650mm)
- PIT-ID 6 — SERVICE DROP ACCESS/LOCAL NETWORK/FJL PIT (DUAL LID) (1360mm × 555mm × 650mm)
- PIT-ID 8 — DISTRIBUTION/LOCAL NETWORK CONNECTION PIT (DUAL LID) (1360mm × 555mm × 860mm)
- PIT-ID 9 — FIBRE DISTRIBUTION HUB (FDH) PIT (2000mm × 555mm × 900mm)
- (5) — EXISTING TELSTRA PIT ("M" INDICATES MANHOLE)
- FDH-ID — FIBRE DISTRIBUTION HUB (FDH) FDH CABINET WITH CABINET ID SHOWN
- PIT AND PIPE (INCLUDING LEAD-INS) BEING CONSTRUCTED WITH THIS STAGE BUT LOTS TO BE RELEASED IN A FUTURE STAGE.
- PIT AND PIPE (INCLUDING LEAD-INS) WERE CONSTRUCTED WITH A PREVIOUS STAGE BUT LOTS TO BE RELEASED IN THIS STAGE.
- 15m EARTH POTENTIAL RISE (EPR) ZONE REFER TO GENERAL NOTE 13
- SHARED TRENCH SYMBOL



CAUTION: PIT LOCATIONS VARY

PAY ATTENTION TO PIT LOCATION IN RELATION TO LOT/LOT BOUNDARY



CENTRE OF PIT LOCATED AT LOT/LOT BOUNDARY

EDGE OF PIT LOCATED AT LOT/LOT BOUNDARY

BILL OF MATERIAL

NO OF LOTS: 0

PITS		DUCTS		
SIZE	QTY	SIZE	QTY	MTRS
2	0	P100	6	302.9
5	3	P50	6	6.0
6	1	P23	0	0.0
8	0			
9	0			

TOTAL NUMBER OF PITS: 4
TOTAL NUMBER OF MANHOLES: 0
TOTAL NUMBER OF CONDUITS: 12
TOTAL LENGTH OF CONDUITS: 308.9

NOTE: * BOM ONLY CALCULATES ORANGE COLOURED NETWORK
* LEAD-INS MEASURED FROM PIT EDGE TO LOT ENTRY, CONTRACTOR TO INSTALL ADDITIONAL 10m INTO LOT
* CONDUITS MEASURED PIT CENTRE TO PIT CENTRE

SHEET DESCRIPTIONS
SHEET 1 - NBN PIT & PIPE DESIGN
SHEET 2 - NBN PIT & PIPE GENERAL NOTES, DETAILS AND DIAGRAMS
SHEET 3 - NBN CO GENERAL LEGEND SHEET, NOT REQUIRED FOR PIT & PIPE CONSTRUCTION

Preliminary
Not For Construction

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REFER TO 'WORKSAFE' REGULATION 3.21

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REV	DATE	DRAFTER	DESCRIPTION	APPROVED
B	05-04-17	BR	P50 STARTER PIPES ADDED TO PITS FOR FUTURE CONNECTIONS	CHKD: BB | APPR: DLJ
A	17-03-17	BR	SUBMITTED TO CLIENT FOR COMMENT	CHKD: BB | APPR: DLJ

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Email: admin@3ece.com.au

Australia's broadband network

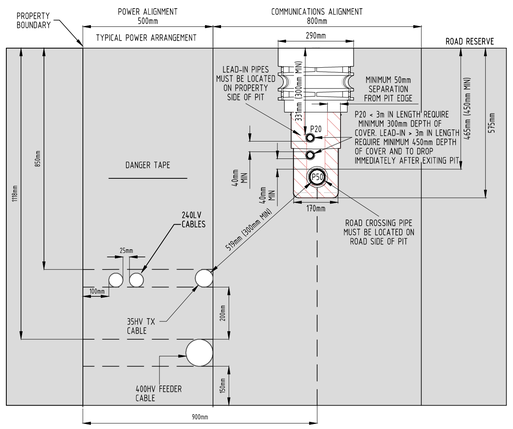
Dimensions and scales to be checked prior to measuring cable lengths
10 5 0 10 20 30 40
1:500 @ A1 Original Paper Size

DRAWING TITLE:
ASHBY CLOSE & SULTANA ROAD
HIGH WYCOMBE, STAGE 1
NBN PIT AND PIPE LAYOUT
ROAD WAY EXTENSION

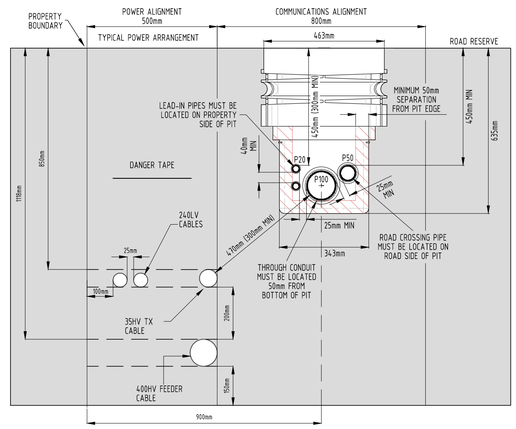
DESIGN DATE: 07-12-2016	STATE: WA	REGION: PCG94	
BASE FILE DATE: 09-03-2017	FSA: N/A	SAM: N/A	ADA: N/A
WAPC No(s): "vvvvvv"	PROJECT No: AYCA-4A7VBV		
LOCAL AUTHORITY: SHIRE OF KALAMUNDA	CADREF No: 3E16144-11		
CIVIL CONSULTANT: PORTER CONSULTING ENGINEERS	SCALE 1:500	SHEET No. 1 OF 3	REV. B

GENERAL NOTES

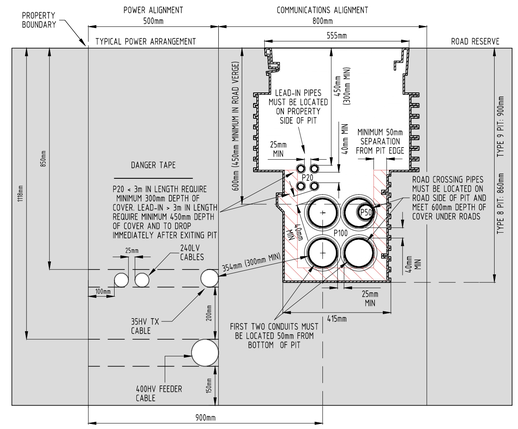
1. REFER TO CIVIL ENGINEERS DRAWINGS FOR SERVICES TRENCH ALIGNMENT DETAILS
2. ALL COMMUNICATION WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH NBN CO. DOCUMENT NBN-TE-CTO-194 "NEW DEVELOPMENTS: DEPLOYMENT OF THE NBN CO. CONDUIT AND PIT NETWORK – GUIDELINES FOR DEVELOPERS". NBN CO. GUIDELINES ARE AVAILABLE AT http://www.nbnco.com.au » Industry » Property Developers » Technical Guidelines
3. ON GAZETTED ROAD RESERVES NBN NETWORK CONDUIT TO BE INSTALLED ON THE 900mm ALIGNMENT WITH ALL NBN PLANT WITHIN THE 500-1300mm ALIGNMENT. IN SITUATIONS WHERE THERE ARE DUAL NETWORKS (NEW OR EXISTING, e.g. TELSTRA) THE NBN CONDUIT IS TO BE INSTALLED ON THE 1100mm ALIGNMENT. WHERE THE PRESCRIBED ALIGNMENT IS UNAVAILABLE, LIAISE WITH CIVIL CONSULTANT
4. ALL CONDUITS PIPES & LEAD-INS TO BE SEALED AND FITTED WITH DRAW ROPE
5. INSTALLATION OF AN IDENTIFICATION TAPE IS NOT REQUIRED
6. MINIMUM DEPTH OF COVER FOR CONDUITS SHOULD BE IN ACCORDANCE WITH NBN-TE-CTO-194, AS FOLLOWS
   - 450mm MINIMUM COVER IN ROAD VERGE
   - 600mm MINIMUM COVER FOR LATERAL ROAD CROSSINGS
   - 650mm MINIMUM COVER ON PRIVATE PROPERTY FOR LEAD-IN/SERVICE DROP PIPE
7. CONDUIT AND PIPE SIZES ARE TO CONFORM TO AS1477 TABLE 4.2(A):
   - P20 NOMINAL = 23.7mm MEAN ID, 26.8mm MEAN OD
   - P50 NOMINAL = 53.7mm MEAN ID, 60.4mm MEAN OD
   - P100 NOMINAL = 104.6mm MEAN ID, 114.3mm MEAN OD
8. LEAD IN/SERVICE DROP P23 NOMINAL FOR SINGLE RESIDENTIAL PROPERTIES, P50 NOMINAL FOR SMALL MDUs OR COMMERCIAL AND P100 NOMINAL FOR LARGE MDUs AND MEDIUM RISE BUILDINGS
9. CONDUIT BENDS SHOULD COMPLY WITH NBN-TE-CTO-194 BUT RADII SHOULD NOT BE LESS THAN
   - P20 (P23) LEAD-IN 300mm
   - P50 LEAD-IN 300mm
   - P50 ROAD CROSSING 500mm
   - P100 TRUNCATION/ROAD CROSSING 800mm (NO 90° BENDS PERMITTED ON P100 CONDUITS)
10. MINIMUM RADIAL CLEARANCES SHOULD BE MAINTAINED BETWEEN CONDUIT & OTHER PUBLIC UTILITIES, IN ACCORDANCE WITH NBN-TE-CTO-194 - SEE TRENCH CROSS SECTION DETAIL
11. FDH STARTER CONDUIT TO BE LOCATED SUCH THAT FDH IS SET BACK 5m FROM ANY INTERSECTION AND 1.2m FROM ANY BACK OF KERB. TYPE 9 PIT & STARTER PIPE TO BE INSTALLED BY CONTRACTOR. FDH & CONCRETE PLINTH TO BE INSTALLED BY OTHERS
12. PITS TO BE SET BACK
    - 5m FROM ANY INTERSECTION BACK OF KERB (BOK)
    - 1m FROM BOK ON ROAD VERGE WHERE PRACTICAL
    - 1m FROM STREETLIGHTS AND POWER POLES
    - 200mm FROM DRIVEWAYS MINIMUM, WITH 500mm OR GREATER SETBACK PREFERRED
    - 500mm FROM PARKING BAY BOK
    - BARRIER KERBS REQUIRED WHERE LESS THAN 1m SET BACKS FROM BOK UTILISED
13. ALL READILY ACCESSIBLE PLANT, SUCH AS PITS AND FDH'S, TO BE INSTALLED OUTSIDE EPR ZONES, TO COMPLY WITH NBN-TE-CTO-194, COMMUNICATIONS ALLIANCE GUIDELINES G645:2011, C524-2013 AND AS 3835.1
14. NBN CO DO NOT REQUIRE SERVICE EASEMENTS OVER ABOVE OR BELOW GROUND EQUIPMENT ON POS. SOME SHIRES OR TOWN COUNCILS MAY REQUIRE SERVICE EASEMENTS
15. PIT TO PIT DISTANCES SHOWN ARE APPROXIMATE ONLY
16. PITS ARE NOT TO BE INSTALLED ON DRIVEWAYS OR IN ROADWAYS
17. NO RISERS/COLLARS TO BE UTILISED ON PITS (e.g. A RISER CAN NOT BE USED IN CONJUCTION WITH A TYPE 6 PIT TO CREATE A TYPE 8 PIT)
18. PIT LIDS ARE TO BE LABELLED "NBN" WITH INDIVIDUAL LIDS WEIGHING NO MORE THAN 38kg AND WITH THE WEIGHT SHOWN ON THE LID IN ACCORDANCE WITH AS3996-2006 6.1.
19. THE INTEGRITY OF ALL CONDUIT/PIPE TO BE TESTED WITH AN 80% MANDREL



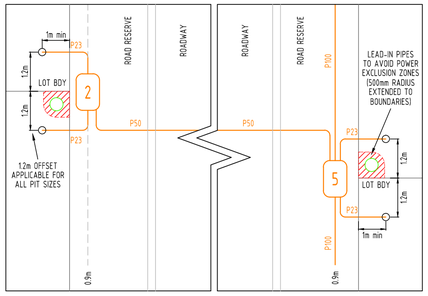
SHARED TRENCH CROSS SECTION DETAIL
TYPE 2 PITS
1:10



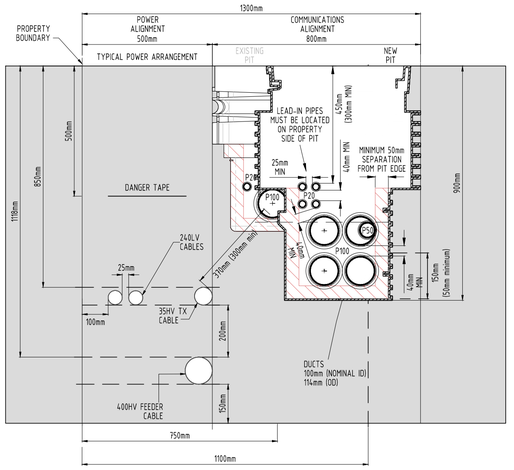
SHARED TRENCH CROSS SECTION DETAIL
TYPE 5 PITS
1:10



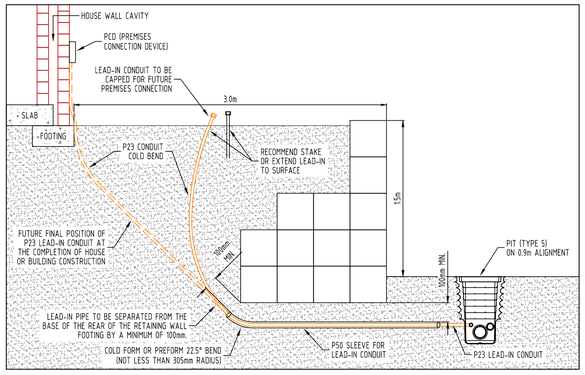
SHARED TRENCH CROSS SECTION DETAIL
APPLICABLE TO TYPE 8 & TYPE 9 PITS
1:10



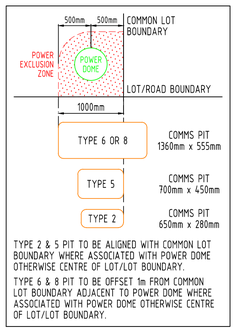
CONDUIT AND PIT ALIGNMENT WITHIN ROAD RESERVE
NTS



SHARED TRENCH CROSS SECTION DETAIL
DUAL PIT & PIPE
1:10



TYPICAL SECTION THROUGH RETAINING WALL FOR LEAD-IN CONDUIT
1:25



TYPICAL PIT LOCATION DETAIL
(ADJACENT TO POWER DOME)
NTS

SHEET DESCRIPTIONS
SHEET 1 - NBN PIT & PIPE DESIGN
SHEET 2 - NBN PIT & PIPE GENERAL NOTES, DETAILS AND DIAGRAMS
SHEET 3 - NBN CO GENERAL LEGEND SHEET, NOT REQUIRED FOR PIT & PIPE CONSTRUCTION

EXISTING OVERHEAD SERVICES
WORKSAFE - REGULATION 3.64

IF WORKING IN THE VICINITY OF EXISTING OVERHEAD DISTRIBUTION OR TRANSMISSION LINES.

REFER TO "WORKSAFE" REGULATION 3.64

Preliminary
Not For Construction

DIAL BEFORE YOU DIG 1100 OR WWW.1100.COM.AU

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Australia's broadband network

Dimensions and scales to be checked prior to measuring cable lengths
10 5 0 10 20 30 40
1:500 @ A1 Original Paper Size

DRAWING TITLE:
ASHBY CLOSE & SULTANA ROAD
HIGH WYCOMBE, STAGE 1
NBN PIT AND PIPE LAYOUT
ROAD WAY EXTENSION

DESIGN DATE: 07-12-2016	STATE: WA	REGION: PCC94	
BASE FILE DATE: 09-03-2017	FSA: N/A	SAM: N/A	ADA: N/A
WAPC No(s): "vvvvvv"	PROJECT No: AYCA-4A7VBV		
LOCAL AUTHORITY: SHIRE OF KALAMUNDA	CADREF No: 3E16144-11		
CIVIL CONSULTANT: PORTER CONSULTING ENGINEERS	SCALE 1:500	SHEET No. 2 OF 3	REV. B

POP — PRIVATELY OPERATED PAYPHONES

APS — ASSISTANCE TELEPHONES (EG ELEVATOR AND ROADSIDE PHONES)

MET — APPLY TO OTHER TYPE OF METERING POINT (any service)

ATM — ATM

PRK — BANDSTAND / ROTUNDA / SPORTS FIELD STANDS / OTHER PARK BUILDING

PSD — POINT OF SALE DEVICE (vending machine, ticket machine)

TRF — Traffic Lights / Traffic Light Controller / Variable Speed Sign / Traffic Signal

PBT — Public Transport (bus stop, tram stop, railway station, taxi rank, ferry wharf)

SWT — Links / Link Pole / MV / HV Links / ABC Links / Dynamic Switch / Airbrake Switch / Isolator

WAT — Water Infrastructure (storage, pumps, valves water supply, waste water, sewerage stations)

GAS — Natural Gas Infrastructure

CAM — Camera (security / traffic)

CTL — Bridge control, swing bridge, traffic control gates, railway boom gates)

MOB — Mobile Phone Tower / radio antenna

LIT — Street Lighting Pole / street light controller

CAR — Unmanned (council) car park

PWR — Transformer / Kiosk / Pad Mount Sub-station / Pole Mount Transformer

NAP-ID N — Network Access Point (NAP)

MPT-ID N — Multiport (MPT)
n is the number of ports (eg 4,6,8,12)

TJL-ID — Splice Joint on a Transit Cable (TJL)

DJL-ID — Splice Joint on a Distribution Cable (DJL)

LJL-ID — Splice Joint on a Local Cable (LJL)

MJL-ID — Splice Joint on a Tether Cable (MJL)

AJL-ID — Zone Terminal / Splice Joint (AJL)

FDH-ID — Fibre Distribution Hub-FDH Cabinet with Cabinet ID shown

PIT-ID 2 — Service Drop Access Pit (650mmX280mmX565mm)

PIT-ID 5 — Network Boundary/Local Network Pit (Single Lid) (700mmX450mmX650mm)

PIT-ID 6 — Distribution/Local Network Connection Pit (Dual Lid) (1360mmX555mmX650mm)

PIT-ID 8 — Distribution/Local Network Connection Pit (1360mmX555mmX860mm)

PIT-ID 9 — Fibre Distribution Hub (FDH) Pit (2000mmX555mmX900mm)

Existing Telstra manhole

5 — Existing Telstra Pit (2,3,4,5,6,7,8,9)

Telstra exchange

Example of Telstra Major Conduit Layout with Proposed duct marked to be used by NBN

M < _ > — NBN MARKER POST
MARKER POST TO BE NUMBERED

DES / QTY — Example of descriptor box that will show the type of work and the quantity involved

PCD — Premise Connection Device (PCD)

POLE-ID — Pole (showing pole identity)

FAN AAAA — Fan Access Node site (FAN)

138A RX CX — Multi Dwelling Unit (MDU)

DEPTH —
ALIGN — DEPTH OVER ALIGNMENT SYMBOL TO BE USED WITH EVERY MARKER POST

Symbol to be used when replacing/removing existing network

CABLE TRAY:

CONDUIT CONFIGURATION

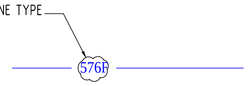
CONDUITS AND DUCTS ARE IN LAYER :
< L460 NBN Support - Underground >
AND TERMINOLOGY CATEGORIZED INTO TWO GROUPS IN THE DRAWING AS PER BELOW:
1- DUCT — USED WITH LOCAL NETWORK
2-CONDUIT — USED WITH LEAD-IN DROPS
ATTRIBUTES ATTACHED ARE AS SHOWN

CABLE CONFIGURATION

CABLE TYPE:
CABLES DIVIDE INTO FOLLOWING CATEGORIES AND ARE COLOUR CODED:

TRANSIT CABLES	COLOUR NO: 1	312F
DISTRIBUTION CABLES	COLOUR NO: 190	288F
LOCAL CABLES	COLOUR NO: 4	144F
TETHER CABLES	COLOUR NO: 3	12F
LEAD IN (DROP) CABLES	COLOUR NO: 5	1F

CABLE SIZE:
CABLE SIZE IS THE TOTAL NUMBER OF OPTIC FIBRES IN THE CABLE AND IS DETERMINED BY A NUMBER FOLLOWED BY F (FIBRE) OR R (RIBBON) IN THE MIDDLE OF THE LINE TYPE



CABLE LOCATION:
CABLE LOCATIONS DETERMINES WHERE THE CABLE IS USED AS PER BELOW:

IN-CONDUIT	288F
AERIAL	144F
BURIED	96F

LINE TYPES ARE CATEGORIZED INTO 3 TYPES:
1- IN-CONDUIT: DXXXF1 312F _ ...
2- AERIAL: DXXXF_A1 144_A _ ...
3- BURIED: DXXXF_B1 12_B _ ...

EXAMPLE:

144 FIBRE AERIAL LOCAL CABLE	144F
1 FIBRE BURIED DROP CABLE	1F 1F
432 FIBRE IN-CONDUIT TRANSIT CABLE	48F

FSA Boundary

FSAM Boundary

FDA Boundary

STAFF WORKING ON THIS ESTIMATE PLEASE NOTE:
The location of other authorities services which may affect this work have not been obtained by the estimator. Constructor to obtain service information before commencing.

DANGER
LASER BEAM
EYE PROTECTION MUST BE WORN

SAFETY FIRST
SAFETY STARTS WITH YOU

DIAL BEFORE YOU DIG
www.1100.com.au

REV	DATE	DRAFTER	DESCRIPTION	APPROVED
B	05-04-17	BR	P50 STARTER PIPES ADDED TO PITS FOR FUTURE CONNECTIONS	CHKD: BB | APPR: DLJ
A	17-03-17	BR	SUBMITTED TO CLIENT FOR COMMENT	CHKD: BB | APPR: DLJ

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Electrical Engineering Excellence
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Tel: 08 6314 9000 Fax: 08 9325 3351
Email: admin@3ece.com.au

Australia's broadband network

Dimensions and scales to be checked prior to measuring cable lengths
10 5 0 10 20 30 40
1:500 @ A1 Original Paper Size

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ASHBY CLOSE & SULTANA ROAD
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CIVIL CONSULTANT: PORTER CONSULTING ENGINEERS	SCALE: 1:500	SHEET No.: 3 OF 3	REV: B

Attachment 6:
Nardine Close Extension (Road 2A) – Stage 2 Drawings

NADINE CLOSE

FORRESTFIELD

STAGE 2

TABLE OF CONTENTS

SHIRE OF KALAMUNDA

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TUSNO Pty Ltd ACN 070 097 148 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

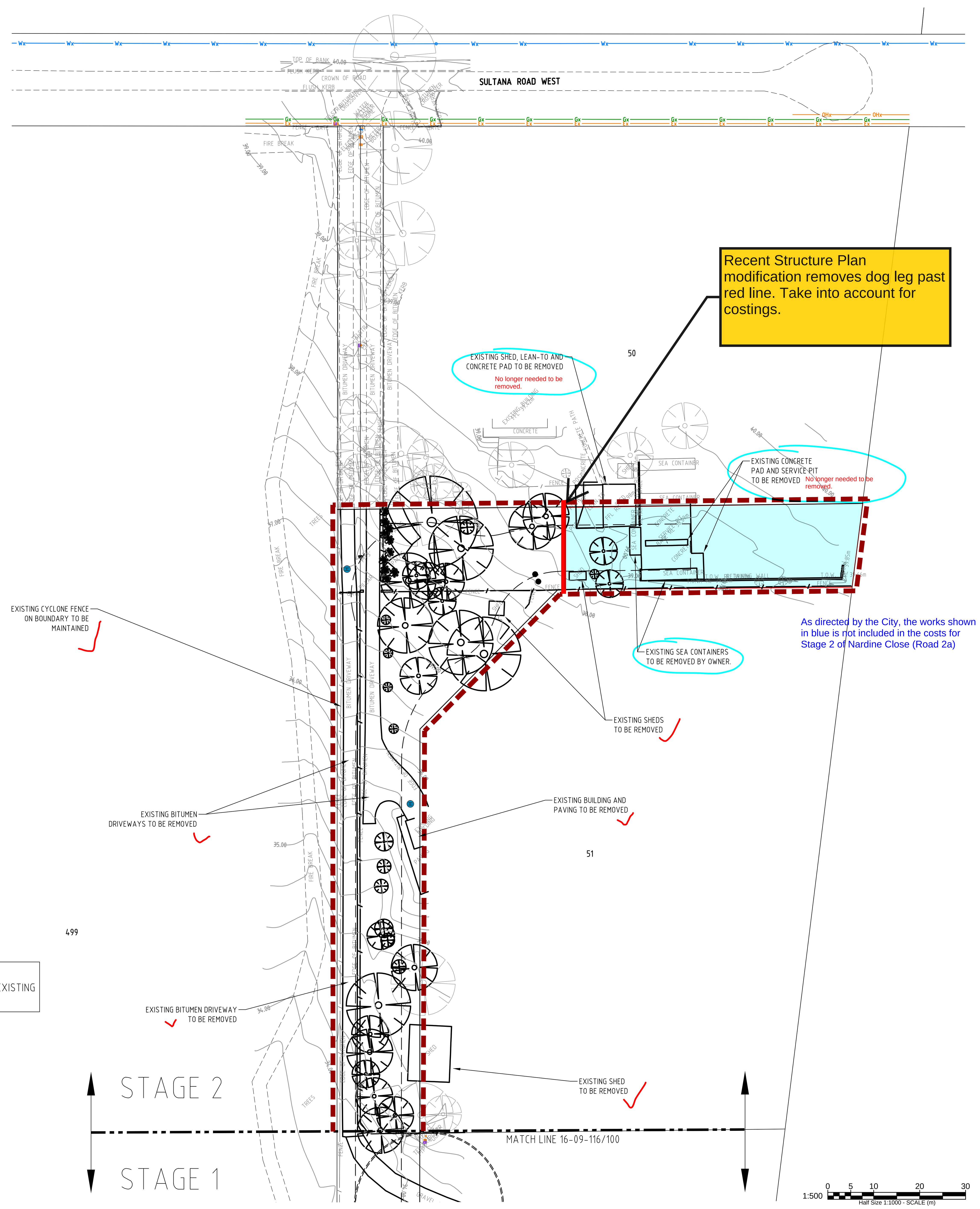
JOB No. 16-9-116

SITEWORKS NOTES

1. VERTICAL DATUM : AUSTRALIAN HEIGHT DATUM.
   HORIZONTAL DATUM : PERTH COASTAL GRID 1994 PCG94
2. EXISTING SURVEY/CONTOURS FROM SITE SURVEY BY BROOK AND MARSH
3. **SERVICES, SUCH AS SEWER, WATER, GAS, TELEPHONE, ELECTRICITY, AND DRAINAGE MAY BE ENCOUNTERED DURING CONSTRUCTION OF THE WORKS. SERVICES INFORMATION SHOWN ON DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. BEFORE EXCAVATION COMMENCES THE LOCATION OF ALL SUCH SERVICES SHALL BE OBTAINED FROM THE RELEVANT AUTHORITIES BY THE CONTRACTOR.**
4. **THE CONTRACTOR SHALL CO-ORDINATE THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO COMMENCEMENT OF WORK. ANY CONFLICTS ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.**
5. THE CONTRACTOR SHALL PROVIDE A SAFE WORKING ENVIRONMENT FOR THE DURATION OF THE WORKS. CONTRACTOR SHALL HAVE IN PLACE A PROJECT SAFETY AND RISK MANAGEMENT SYSTEM WHICH COMPLIES WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT AND WORK SAFE WA REQUIREMENTS
6. THE CONTRACTOR SHALL LIMIT ACCESS TO THE WORKS TO THE SITEWORKS BOUNDARY. EXISTING VEGETATION OUTSIDE OF BOUNDARY TO BE PROTECTED.
7. THE CONTRACTOR SHALL PREPARE AND IMPLEMENT A DUST MANAGEMENT PLAN IN ACCORDANCE WITH THE DEPARTMENT OF ENVIRONMENT AND CONSERVATIONS GUIDELINES. THE CONTRACTOR SHALL PAY ALL FEES AND OBTAIN ALL APPROVALS FROM THE LOCAL AUTHORITY FOR THIS DUST MANAGEMENT PLAN PRIOR TO ANY WORKS STARTING ON SITE.
8. THE CONTRACTOR SHALL INSTALL TEMPORARY SITE FENCING WITH DUST CONTROL FABRIC AND MAINTAIN FOR DURATION OF WORKS.
9. DUST SUPPRESSION METHODS SHALL BE APPLIED BY THE CONTRACTOR IN ACCORDANCE WITH THE SPECIFICATION.
10. ALL TREES SHALL REMAIN UNDISTURBED SPECIFICALLY NOTED ON THE PLANS OR ADVISED BY THE ENGINEER
11. THE CONTRACTOR SHALL REMOVE FROM SITE ALL RUBBISH (ie: CAR BODIES, DRUMS, ETC.) WITHIN SITEWORKS BOUNDARY TO AN APPROVED DISPOSAL SITE.
12. ALL SHEDS, INTERNAL FENCES, HARDSTAND AREAS, IRRIGATION PIPES AND SIMILAR STRUCTURES ON-SITE SHALL BE REMOVED BY THE CONTRACTOR AND DISPOSED OFFSITE UNLESS OTHERWISE NOTED.
13. THE CONTRACTOR SHALL COMPLETE ALL WORKS AS REQUIRED IN THE GEOTECHNICAL REPORT IN ACCORDANCE WITH THE REQUIREMENTS OF THE GEOTECHNICAL REPORT.
14. THE CONTRACTOR SHALL REMOVE REDUNDANT CROSSOVERS AND CONSTRUCT KERB TO MATCH EXISTING, VERGE TO BE MADE GOOD.

LEGEND

- EXISTING GROUND CONTOUR
- EXISTING GROUND SPOT LEVEL
- SITEWORKS BOUNDARY
- EXISTING RETAINING WALL
- EXISTING FENCE
- EXISTING FENCE - TO BE REMOVED
- EXISTING SEWER
- EXISTING WATER
- EXISTING POWER
- EXISTING TELECOMMUNICATIONS
- EXISTING GAS
- EXISTING DRAINAGE
- EXISTING TREES
- EXISTING TREES - TO BE REMOVED



NOTE
CONTRACTOR TO LOCATE AND PROTECT EXISTING DOMESTIC SERVICES TO LOTS 51 AND 52

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PROJECT: **NADINE CLOSE FORRESTFIELD**

No.	DATE	REVISION	BY
D	19-01-2017	SPLIT INTO 2 STAGES, NOTES ADDED	MEG
C	13-12-2016	PROJECT TITLE CHANGE	MEG
B	6-12-2016	ROAD RESERVE WIDTHS AMENDED	DLC
A	24-10-2016	ISSUED FOR APPROVAL	MEG

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TUSKO Pty Ltd ACN 070 097 148 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT: **SHIRE OF KALAMUNDA**

DRAWING: **SITEWORKS PLAN STAGE 2**

STATUS: **FOR TENDER**

SCALE 1:500 | DATE OCT 2016 | DESIGN BIH | DRAWN MJV | CHECK | APP'D

DRAWING No. **16-9-116/101** | REV No. **D** | ORIGINAL DRAWING SIZE **A1**

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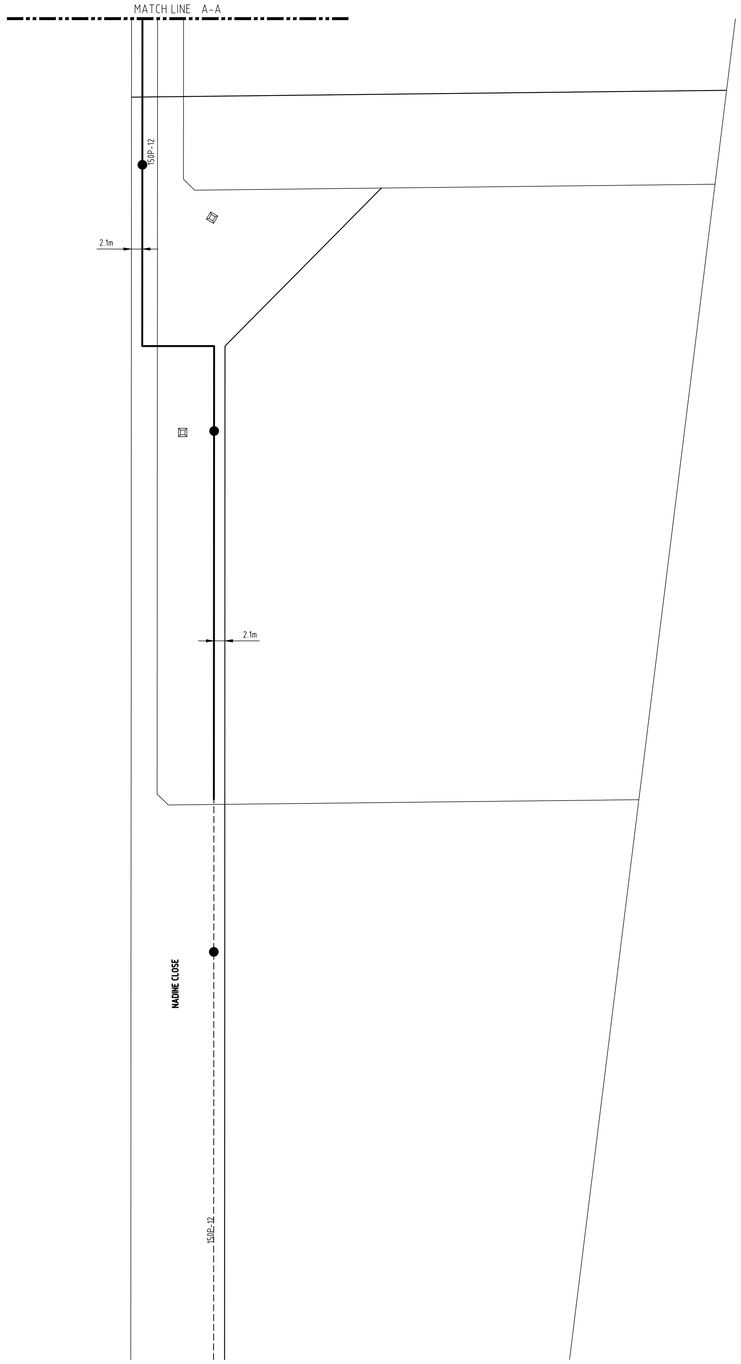
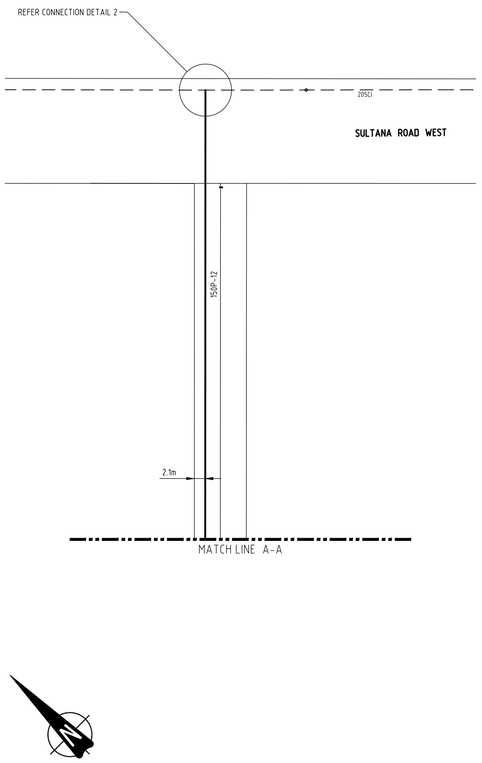




LEGEND

- WATER RETICULATION BOUNDARY
- RETAINING WALL
- 150P-12 — PROPOSED WATER MAIN, PIPE SIZE AND MATERIAL DESIGNATION
- PROPOSED HYDRANT & SLUICE VALVE
- EXISTING WATER MAIN, HYDRANT & SLUICE VALVE
- FUTURE WATER MAIN, HYDRANT & SLUICE VALVE
- CHANGE IN PIPE DIAMETER
- "FL" OR "FR" — DENOTES SIDE OF LOT TO BE SERVICED (VIEWED FROM THE ROAD)
- "D" — DEFERRED CONNECTION
- FP — FLUSHING POINT (X)
- HYDRANT RRPM (BLUE) 120mm OFFSET FROM CENTRELINE
- SERVICE LAID IN THIS STAGE FOR RELEASE IN FUTURE STAGE
- SERVICE LAID IN PREVIOUS STAGE TO BE RELEASED IN THIS STAGE

NUMBER OF SERVICES

PRELAID SHORT SINGLE	- 0
PRELAID SHORT DUAL	- 0
PRELAID LONG SINGLE	- 0
PRELAID LONG DUAL	- 0
DEFERRED SERVICES	- 0
TOTAL CONNECTION	- 0
TOTAL LOTS SERVED	- 0

EXTENSION

CONTRACTOR TO LAY 250m OF 150P-12

CONNECTION

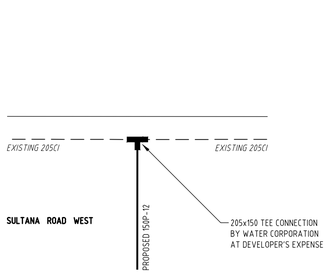
CONNECTIONS (1) TO BE MADE BY WATER CORPORATION

GENERAL NOTES

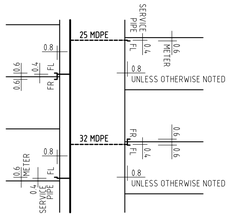
1. ALL WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH WATER CORPORATION MANUALS AND STANDARDS.
2. **SERVICES, SUCH AS SEWER, WATER, GAS, TELEPHONE, ELECTRICITY, AND DRAINAGE MAY BE ENCOUNTERED DURING CONSTRUCTION OF THE WORKS. SERVICES INFORMATION SHOWN ON DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. BEFORE EXCAVATION COMMENCES THE LOCATION OF ALL SUCH SERVICES SHALL BE OBTAINED FROM THE RELEVANT AUTHORITIES.**
3. **CO-ORDINATE THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO COMMENCEMENT OF WORK. ANY CONFLICTS ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.**
4. UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN METRES.
5. ALL PIPES SHALL BE INSTALLED TO WITHIN 3.5m OF EXISTING MAIN. CONNECTION TO EXISTING BY WATER CORPORATION TO BE ORGANISED BY CONTRACTOR.
6. UNLESS OTHERWISE DIRECTED BY THE ENGINEER, COVER REQUIREMENTS SHALL COMPLY WITH THE WATER CORPORATION STANDARDS.
7. MINIMUM CLEARANCE TO GAS = 300mm, MINIMUM CLEARANCE TO OTHER SERVICES = 150mm.
8. ALL WORKS SHALL BE IN DRY GROUND. GROUND WATER SHALL NOT BE PERMITTED TO ENTER PIPES.
9. UNLESS OTHERWISE SHOWN ON THIS DRAWING OR VARIED BY THE ENGINEER ALL PIPES AND FITTINGS SHALL BE LAID ON AN ALIGNMENT OF 2.1m FROM THE CENTRE OF THE PIPE TO THE ROAD RESERVE BOUNDARY.
10. FLUSHING POINTS SHALL BE INSTALLED ON ALL MAINS AT CONNECTION POINTS TO EXISTING MAINS OR WHERE SPECIFIED.
11. CONTRACTOR SHALL INSTALL FLUSHING POINTS AT ALL DEAD ENDS.
12. UNLESS DIMENSIONED OTHERWISE, MAINS SHALL EXTEND AT LEAST 8m ALONG THE FRONT OF LAST LOT SERVED.
13. ALL VALVES SHALL BE OPPOSITE BOUNDARY PEGS UNLESS DIMENSIONED OTHERWISE, ALL HYDRANTS SHALL BE POSITIONED IN THE MIDDLE OF LOTS OR OPPOSITE BOUNDARY PEGS AS SHOWN.
14. SERVICE CROSSINGS SHALL BE LOCATED AT RIGHT ANGLES TO BOUNDARY AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE WATER CORPORATION.
15. THE CONTRACTOR SHALL ALLOW FOR ALL AS CONSTRUCTED INFORMATION (INCLUDING SURVEY) TO BE PLOTTED IN ACCORDANCE WITH THE WATER CORPORATIONS CURRENT PRACTICE AND DELIVERED TO THE ENGINEER FOR SIGNING AND PRESENTATION TO THE WATER CORPORATION.
16. IT IS DEEMED THAT THE AS CONSTRUCTED DOCUMENTS FORM PART OF THE WORKS. PRACTICAL COMPLETION CAN NOT BE AWARDED IF ACCEPTABLE AS CONSTRUCTED DOCUMENTS HAVE NOT BEEN PROVIDED TO THE ENGINEER.

P.E. NOTES

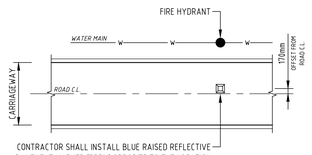
1. IN CUL-DE-SACS WHERE P.E. MAINS ARE DEFLECTED TO SUIT CADASTRAL BOUNDARY CHANGES IN DIRECTION, THE ALIGNMENT OF MAINS SHALL BE 2.1m +/- 0.3m THIS TOLERANCE SHALL ONLY APPLY IN THE VICINITY OF TRUNCATION POINTS AT ALL OTHER LOCATIONS THE MAINS SHALL BE LAID ON THE 2.1m ALIGNMENT.
2. POLYETHYLENE PIPE SHALL BE M.D.P.E.
3. WHERE A P.E. MAIN IS CONNECTED TO A PVC MAIN THE TAPPING BAND SHALL BE MANUFACTURED FROM GUN METAL AND BE OF THE SPLIT BAND TYPE AND HAVE AN INTERNAL DIAMETER CORRESPONDING TO THE PIPE OUTSIDE DIAMETER.
4. P.E. PIPES SHALL WHERE NECESSARY BE DEFLECTED DOWN FROM MAIN TAPPING TO ACHIEVE CORRECT DEPTH.
5. TAPPING BAND NOT TO BE CLOSER THAN 150mm TO JOINT ON LARGE PIPE.
6. ALL SLUICE VALVES ON P.E. MAIN SHALL BE 50mm DIAMETER GATE VALVES WITH CAST IRON HANDLES.
7. FLUSHING POINTS SHALL BE PROVIDED AT THE END OF ALL P.E. PIPES.



CONNECTION DETAIL 2
NTS



TYPICAL LONG AND SHORT PRELAID SERVICE DETAIL
NOT TO SCALE



CONTRACTOR SHALL INSTALL BLUE RAISED REFLECTIVE PAVEMENT MARKER (RRPM) OPPOSITE TO THE LOCATION OF THE FIRE HYDRANT. RRPM TO BE OFFSET 170mm FROM THE ROAD C.L. ON THE SAME SIDE AS THE HYDRANT

FIRE HYDRANT MARKER DETAIL
DIAGRAMMATIC

WATER RETICULATION DETAILS
MAINS EXTENSION:
SUB FILE :
MAIN EXT FILE :
PLAN :

THIS PLAN IS ACCEPTED AS COMPLYING WITH OVERALL SCHEME PLANNING

COMPLIANCE WITH RELEVANT MANUALS REMAINS THE RESPONSIBILITY OF THE CONSULTING ENGINEERS.

NO WORKS ARE TO COMMENCE ON SITE UNTIL STARTUP ARRANGEMENTS HAVE BEEN MADE WITH THE RELEVANT WORKS INSPECTOR. SEE DEVELOPER'S MANUAL FOR CONTACT DETAILS

..... FOR MANAGER LAND SERVICING

1:500 0 5 10 20 30
Half Size 1:1000 - SCALE (m)

DIAL BEFORE YOU DIG www.1100.com.au

PROJECT: **NADINE CLOSE FORRESTFIELD**

No	DATE	REVISION	BY
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CLIENT: **SHIRE OF KALAMUNDA**

DRAWING: **WATER RETICULATION PLAN STAGE 2**

STATUS: **FOR TENDER**

SCALE	1:500
DATE	OCT 2016
DESIGN	BIH
DRAWN	MJV
CHECK	
DRAWING No.	16-9-116/301
REV No.	D
ORIGINAL DRAWING SIZE	A1
FILE NAME	S:\ACTIVE PROJECTS\16-09-116\ACAD\16916-300-301.dwg
APP'D	

PATH NOTES

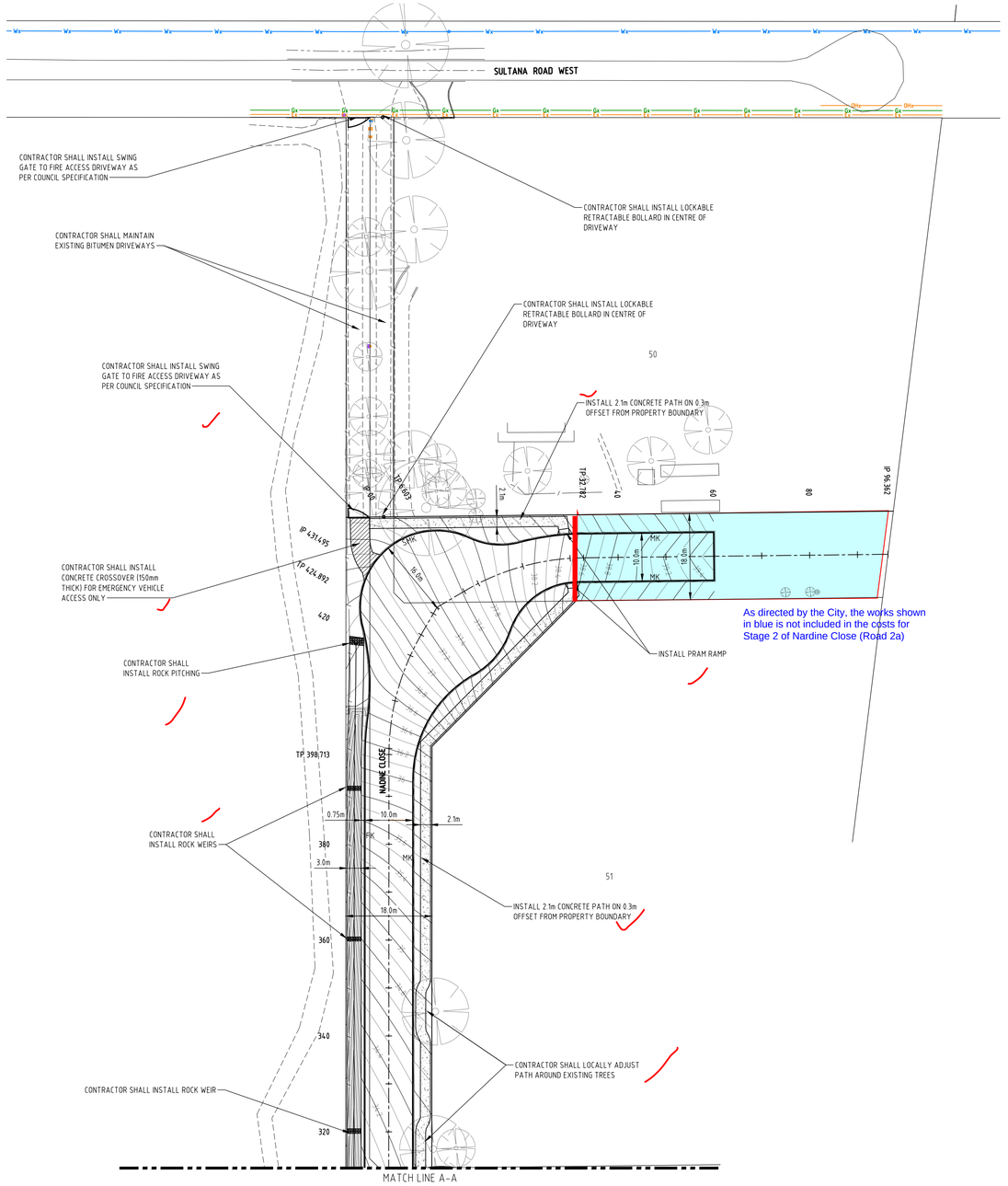
1. ALL FOOTPATHS AND PEDESTRIAN RAMPS SHALL BE CONSTRUCTED TO LOCAL AUTHORITY STANDARD. ALL MATERIAL USED SHALL BE IN ACCORDANCE WITH LOCAL AUTHORITY STANDARD SPECIFICATION
2. THE CONTRACTOR SHALL PROTECT ALL EXISTING WORKS, AND SUPPLY AND MAINTAIN ALL SAFETY DEVICES TO PROTECT VEHICLES, PEDESTRIANS AND THE WORKS
3. UNLESS OTHERWISE SHOWN, ALL FOOTPATHS SHALL BE 1.5m WIDE WITH A 0.3m OFFSET FROM THE ROAD RESERVE BOUNDARY. FOOTPATHS ADJACENT TO RETAINING WALLS TO BE 1.8m WIDE AND LOCATED ON THE ROAD RESERVE BOUNDARY.
4. UNLESS OTHERWISE SHOWN, ALL DUAL USE PATHS TO BE 2.1m WIDE WITH A 0.3m OFFSET FROM THE ROAD RESERVE BOUNDARY. DUAL USE PATHS ADJACENT TO RETAINING WALLS TO BE 2.4m WIDE AND LOCATED ON THE ROAD RESERVE BOUNDARY.
5. UNLESS OTHERWISE SHOWN, ALL JOINTS SHALL BE SPACED IN ACCORDANCE WITH THE LOCAL AUTHORITY REQUIREMENTS. IF NOT AVAILABLE , THEY SHALL BE AS PER THE IPWEA REQUIREMENTS. JOINTS TO TIE IN WITH KERB JOINTS.
6. PRIOR TO PLACING CONCRETE THE BASE SHALL BE FREE FROM DELTERIOUS MATERIAL, UNIFORMLY COMPACTED TO 95% MAXIMUM DRY DENSITY AND LIGHTLY DAMPENED.
7. ALL CONCRETE WORK SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 32 MPa AT 28 DAYS.
8. THE FINAL SURFACE SHALL BE BROOM FINISHED AND ALL EDGES AND JOINTS TOOL FINISHED.
9. CONTRACTOR SHALL PROTECT THE FINISHED WORK FOR 24 HOURS AFTER THE CONCRETE HAS BEEN LAID, ANY DAMAGE SHALL BE MADE GOOD AT THE CONTRACTORS EXPENSE.

LEGEND

- PROPOSED ROAD/KERB
- EXISTING ROAD/KERB
- PROPOSED 'W' BEAM BARRIER
- SEP 2-05 — PROPOSED DRAINAGE STRUCTURE NUMBER
- (SEP 3-05) — EXISTING DRAINAGE STRUCTURE NUMBER
- PROPOSED DRAINAGE PIPE
- EXISTING DRAINAGE PIPE
- Sx — EXISTING SEWER PIPE
- Wx — EXISTING WATER MAIN
- Ex — EXISTING POWER LINE
- Tx — EXISTING TELECOMMUNICATIONS
- Ox — EXISTING OPTIC FIBRE
- Gx — EXISTING GAS LINE
- JUNCTION PIT (JP) 1050 U.N.O.
- SIDE ENTRY PIT (SEP)
- DOUBLE SIDE ENTRY PIT (DSEP)
- DOUBLE GULLY PIT (DGP)
- GULLY PIT (GP)
- U/S 42.95 / 450/140.0 / 14 / D/S 42.96 — INVERT LEVEL UP STREAM / PIPE DIAMETER / GRADE / LENGTH / INVERT LEVEL DOWN STREAM
- PROPOSED DUAL USE/FOOT PATH WITH KERB RAMP
- PROPOSED STREET SIGN
- PROPOSED HAZARD BOARD
- PROPOSED PAVEMENT/KERBING WITH 2m TRANSITION
- MK — MOUNTABLE KERBING
- FK — FLUSH KERBING
- SMK — SEMI-MOUNTABLE KERBING
- RFK — REINFORCED FLUSH KERBING
- LOCKABLE RETRACTABLE BOLLARD
- SWING GATE

ROAD NOTES

1. VERTICAL DATUM : AUSTRALIAN HEIGHT DATUM (AHD)
   HORIZONTAL DATUM : PERTH COASTAL GRID 1994 (PCG94)
2. **SERVICES, SUCH AS SEWER, WATER, GAS, TELEPHONE, ELECTRICITY, AND DRAINAGE MAY BE ENCOUNTERED DURING CONSTRUCTION OF THE WORKS. SERVICES INFORMATION SHOWN ON DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. BEFORE EXCAVATION COMMENCES THE LOCATION OF ALL SUCH SERVICES SHALL BE OBTAINED FROM THE RELEVANT AUTHORITIES.**
3. **THE CONTRACTOR SHALL CO-ORDINATE THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO COMMENCEMENT OF WORK. ANY CONFLICTS ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.**
4. ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH THE PROJECT SPECIFICATION, BUT WHERE NO DETAIL PROVIDED, TO THE REQUIREMENTS OF THE LOCAL AUTHORITY.
5. CONTRACTOR SHALL PROVIDE ALL SIGNING, LIGHTING AND FLAGMEN NECESSARY TO ENSURE SAFETY OF THE PUBLIC AND OF THE WORKS.
6. LOCATE ALL LEVELS FROM EXISTING SURVEY MARKS. ALL SURVEY MARKS ARE TO BE PROTECTED.
7. EXISTING VERGES SHALL NOT BE DISTURBED BEYOND THE EXTENT OF WORK.
8. ALL FILL SHALL BE CLEAN NON PLASTIC MATERIAL FREE FROM VEGETATION AND OTHER DELETERIOUS MATERIAL AND CERTIFIED AS SUITABLE FOR RESIDENTIAL LANDUSE.
9. ALL FILL SHALL BE PLACED IN UNIFORM LAYERS NOT EXCEEDING 300mm THICKNESS AND COMPACTED TO A DENSITY NOT LESS THAN 95% MAXIMUM DRY DENSITY.
10. CONTRACTOR SHALL TIE IN OF NEW SURFACE TO FINISH FLUSH WITH EXISTING SURFACE.
11. ALL EDGE KERBING SHALL BE MOUNTABLE UNLESS OTHERWISE NOTED.
12. SIGN POSTS AND STREET NAME PLATES TO BE SUPPLIED AND INSTALLED TO LOCAL AUTHORITY REQUIREMENTS. CONTRACTOR SHALL FIT STREET NAME PLATES TO ADJACENT LIGHT POLES WHERE APPROPRIATE.
13. THE CONTRACTOR SHALL SPOT OUT THE LINE MARKING. THE CONTRACTOR SHALL ADVISE MAIN ROADS WHEN THE SITE IS READY FOR LINEMARKING AND SIGNAGE. INSTALLATION, LINE MARKING AND SIGNING TO BE UNDERTAKEN BY MAIN ROADS.
14. THE CONTRACTOR SHALL PREPARE AS-CONSTRUCTED ROADS AND PATH DRAWINGS (INCLUDING SURVEY) TO THE SATISFACTION OF THE LOCAL AUTHORITY. AS CONSTRUCTED PLANS TO BE ISSUED TO THE ENGINEER FOR SIGNING AND PRESENTATION TO THE LOCAL AUTHORITY.
15. THE CONTRACTOR SHALL PREPARE AND PROVIDE ROAD AND PATH AS CONSTRUCTED DOCUMENTS IN 'R' SPEC FORMAT AS PER LOCAL AUTHORITY REQUIREMENTS
16. IT IS DEEMED THAT THE AS CONSTRUCTED DOCUMENTS FORM PART OF THE WORKS. PRACTICAL COMPLETION CAN NOT BE AWARDED IF ACCEPTABLE AS CONSTRUCTED DOCUMENTS HAVE NOT BEEN PROVIDED TO THE ENGINEER.



DIAL BEFORE YOU DIG www.1100.com.au

1:500 0 5 10 20 30 — Half Size 1:1000 - SCALE (m)

PROJECT: **NADINE CLOSE FORRESTFIELD**

No.	DATE	REVISION	BY
G	19-01-2017	SPLIT INTO 2 STAGES, NOTES ADDED	MEG
F	16-1-2016	PATH SHIFTED TO PROPERTY BOUNDARY	MEG
E	19-12-2016	SWING GATES ADDED TO FIRE ACCESS DRIVEWAY	MEG
D	13-12-2016	ROAD NAMES ADDED, PROJECT TITLE CHANGE, ROCK PITCHING ADDED	MEG
C	8-12-2016	DESIGN CONTOURS ADDED	DLC
B	6-12-2016	ROAD RESERVE WIDTHS AMENDED, ROAD LAYOUT AMENDED TO SUIT	DLC
A	24-10-2016	ISSUED FOR APPROVAL	MEG

Porter Consulting Engineers

TOTARO Pty Ltd ACN 070 097 148 as Trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

Level 2 Kishorn Court
58 Kishorn Road
Mt Pleasant 6153 WA

PO Box 1036
Canning Bridge 6153 WA

Tel (08) 9315 9955
Fax (08) 9315 9959
Email office@porterseng.com.au
www.porterseng.com.au

CLIENT: **SHIRE OF KALAMUNDA**

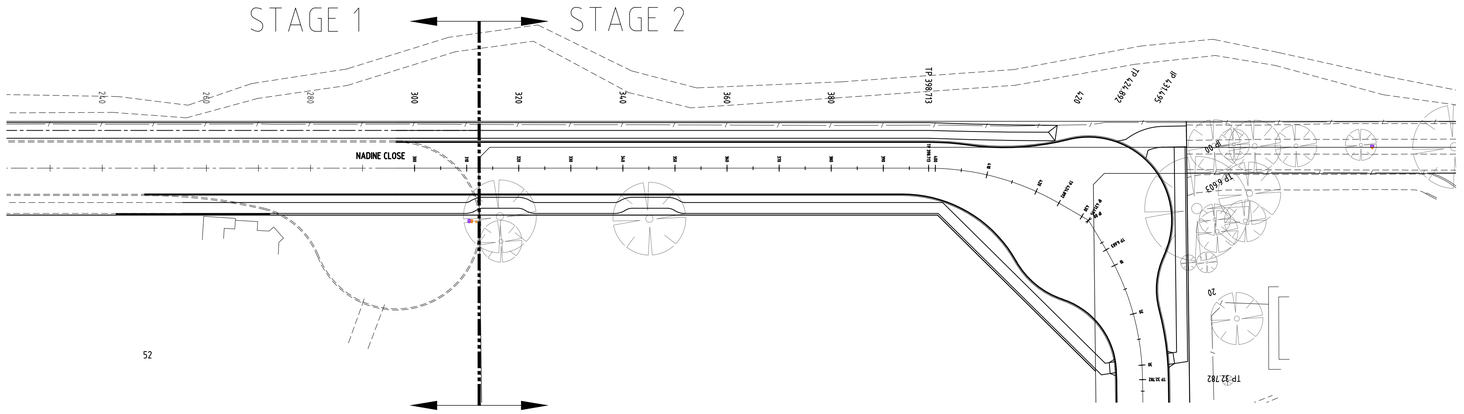
DRAWING: **ROADWORKS AND DRAINAGE LAYOUT PLAN STAGE 2**

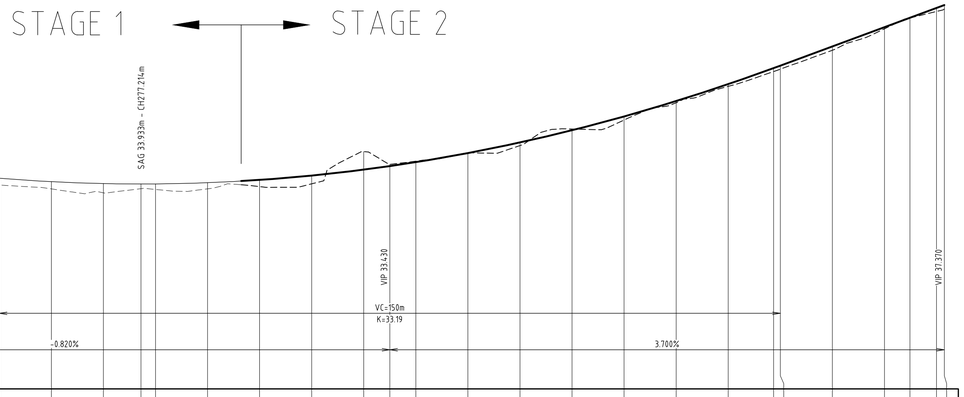
STATUS: **FOR TENDER**

SCALE	1:500
DATE	OCT 2016
DESIGN	BJH
DRAWN	MJV
CHECK	
APP'D	

DRAWING No. **16-9-116/401** REV No. **G** ORIGINAL DRAWING SIZE **A1**

FILE NAME S:\ACTIVE PROJECTS\16-09-116\ACAD\169116-400-401.dwg





Vertical Curve
K value: VC=150m K=33.19

Grade: -0.820% 3.700%

DATUM 30.0

LEFT GUTTER DESIGN LEVEL		34.223	34.141	34.059	33.977	33.895	33.828	33.791	33.783	33.785	33.808	33.862	33.945	34.059
RIGHT GUTTER DESIGN LEVEL	34.605	34.523	34.441	34.359	34.277	34.195	34.128	34.091	34.083	34.085	34.108	34.162	34.245	34.359
DESIGN SURFACE PEGGED CL LEVEL	34.455	34.373	34.291	34.209	34.127	34.045	33.978	33.941	33.933	33.935	33.958	34.012	34.095	34.209
NATURAL SURFACE PEGGED CL LEVEL	34.349	34.289	34.247	34.111	33.969	33.913	33.839	33.764	33.843	33.829	33.840	33.883	33.937	34.556
PEGGED CL CHAINAGE	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	277.214	280.000	290.000	300.000	310.000	320.000

LEFT GUTTER DESIGN LEVEL	34.127	34.203	34.377	34.582	34.816	35.080	35.425	35.800	36.107	36.155					
RIGHT GUTTER DESIGN LEVEL	34.427	34.503	34.677	34.882	35.116	35.380	35.625	35.900							
DESIGN SURFACE PEGGED CL LEVEL	34.277	34.353	34.527	34.732	34.966	35.230	35.525	35.850	36.157	36.205	36.575	36.945	37.126	37.315	37.370
NATURAL SURFACE PEGGED CL LEVEL	34.310	34.372	34.525	34.671	34.989	35.162	35.493	35.808	36.092	36.138	36.502	36.913	37.122	37.246	37.290
PEGGED CL CHAINAGE	325.000	330.000	340.000	350.000	360.000	370.000	380.000	390.000	398.713	400.000	410.000	420.000	424.892	430.000	431.495

HORIZ. ALIGNMENT: R50m

CROSSFALL: TRANSITION — 3% L R ONE WAY CROSSFALL — TRANSITION

NARDINE CLOSE LONGITUDINAL SECTION

SCALE : HORIZONTAL - 1:500
: VERTICAL - 1:50

1:500 0 5 10 20 30
Half Size 1:1000 - SCALE (m)

1:50 0 0.5 1 2 3
Half Size 1:100 - SCALE (m)

PROJECT:
**NADINE CLOSE
FORRESTFIELD**

No.	DATE	REVISION	BY
E	19-01-2017	SPLIT INTO 2 STAGES, NOTES ADDED	MEG
D	13-12-2016	ROAD NAMES ADDED, PROJECT TITLE CHANGE	MEG
C	8-12-2016	LONGITUDINAL SECTION AMENDED	DLC
B	6-12-2016	ROAD RESERVE WIDTHS AMENDED, ROAD LAYOUT AMENDED TO SUIT	DLC
A	24-10-2016	ISSUED FOR APPROVAL	MEG

ONLY PLANS WITH NUMERICAL REVISION (REV '0' OR HIGHER) AND SIGNED AS APPROVED SHALL BE USED FOR CONSTRUCTION.

Porter
Consulting Engineers
Level 2 Kishorn Court
58 Kishorn Road
Mt Pleasant 6153 WA
PO Box 1036
Canning Bridge 6153 WA
Tel (08) 9315 9955
Fax (08) 9315 9959
Email office@portereng.com.au
www.portereng.com.au
TUSNO Pty Ltd ACN 070 097 148 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:
SHIRE OF KALAMUNDA

DRAWING:
**ROAD LAYOUT AND
LONGITUDINAL SECTION PLAN
STAGE 2**

STATUS: **FOR TENDER**

SCALE 1:500
DATE OCT 2016
DESIGN BIH
DRAWN MJV
CHECK
DRAWING No. 16-9-116/411
REV No. E
ORIGINAL DRAWING SIZE A1
FILE NAME S:\ACTIVE PROJECTS\16-09-116\ACAD\169116-410-411.dwg
APP'D

LEGEND

	PROPOSED ROAD/KERB
MK	MOUNTABLE KERBING
FK	FLUSH KERBING
SMK	SEMI-MOUNTABLE KERBING
RFK	REINFORCED FLUSH KERBING
	PROPOSED PAVEMENT/KERBING WITH 2m TRANSITION

1:250 0 2.5 5 10 15
Half Size 1:500 - SCALE (m)

DIAL BEFORE YOU DIG www.1100.com.au

PROJECT: **NADINE CLOSE FORRESTFIELD**

No.	DATE	REVISION	BY
A	19-1-2017	ISSUED FOR APPROVAL, SPLIT INTO 2 STAGES	MEG

Porter Consulting Engineers

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58 Kishorn Road
Mt Pleasant 6153 WA

PO Box 1036
Canning Bridge 6153 WA

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Email office@portereng.com.au
www.portereng.com.au

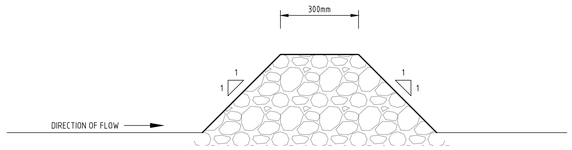
TUOAD Pty Ltd ACN 070 097 748 as Trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 614 296 385

CLIENT: **SHIRE OF KALAMUNDA**

DRAWING: **INTERSECTION DETAILS PLAN STAGE 2**

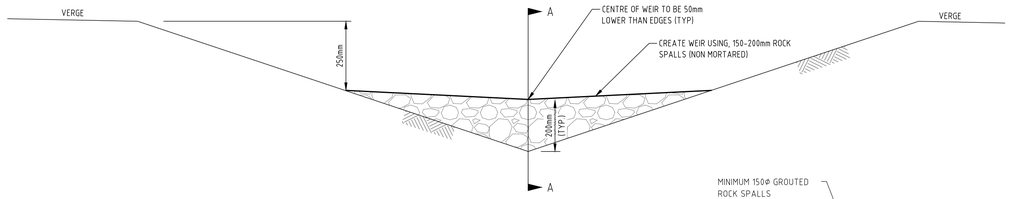
STATUS: **FOR TENDER**

SCALE	1:250
DATE	DEC 2016
DESIGN	DLC
DRAWN	DLC
CHECK	
APP'D	
DRAWING No.	16-9-116/421
REV No.	A
ORIGINAL DRAWING SIZE	A1
FILE NAME	S:\ACTIVE PROJECTS\16-09-116\ACAD\16916-420-425.dwg



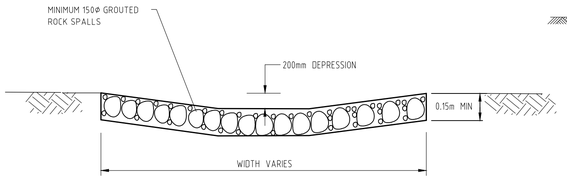
SECTION A-A

SCALE N.T.S.



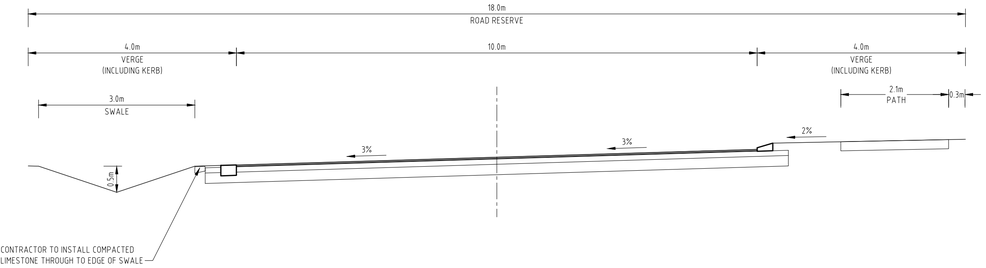
ROCK WEIR DETAIL

SCALE N.T.S.



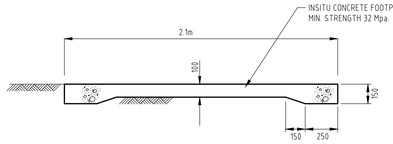
MORTARED STONE PITCHING DETAIL

NOT TO SCALE



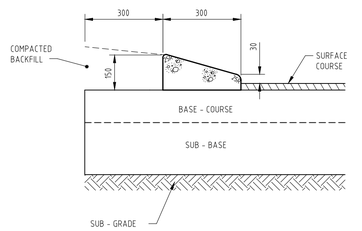
TYPICAL ROAD CROSS-SECTION

SCALE 1:10



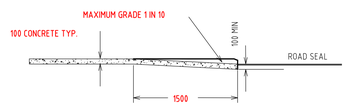
PATH CROSS SECTION

NOT TO SCALE

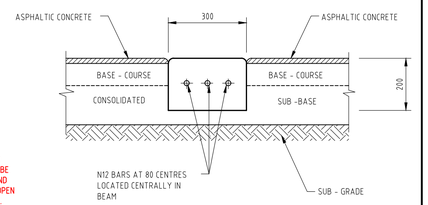


MOUNTABLE KERB

SCALE 1:10

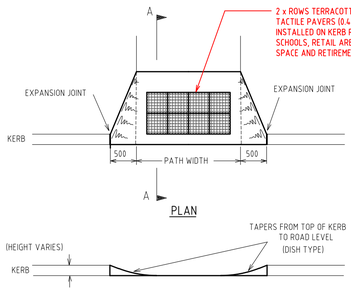


SECTION A-A



FLUSH KERB

SCALE 1:10

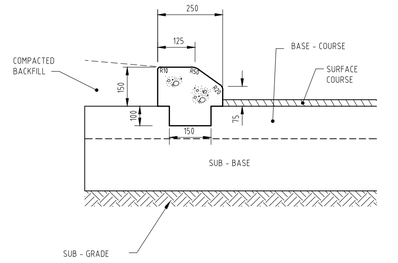


ELEVATION

NOTE - 1. EDGE OF RAMP SHALL BE FLUSH WITH ROAD PAVEMENT (ASPHALT OR SEAL).
2. ALL CONCRETE SHALL BE BROOM FINISHED TO PROVIDE A NON SLIP SURFACE.
3. HOLDING RAIL TREATMENT SHALL BE IN ACCORDANCE WITH THE LOCAL AUTHORITY
4. ALL EDGES OF DUAL USE PATHWAYS, INCLUDING TRANSVERSE JOINTS ARE TO BE FINISHED USING A BULLNOSED TROWEL.

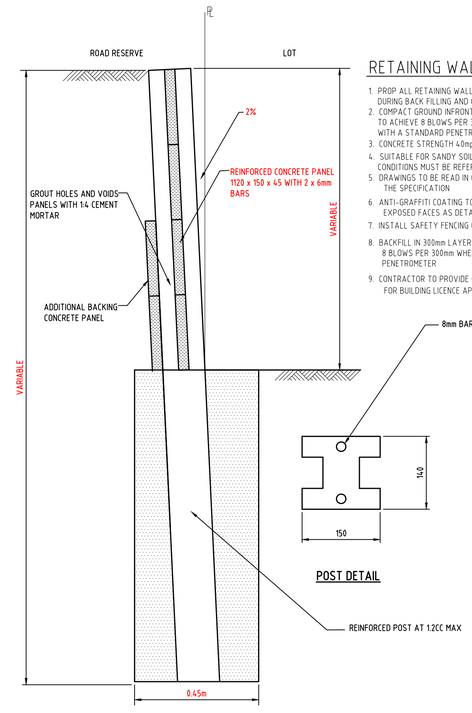
CONCRETE PATH RAMP DETAILS

N.T.S.



SEMI - MOUNTABLE - KEYED

SCALE 1:10



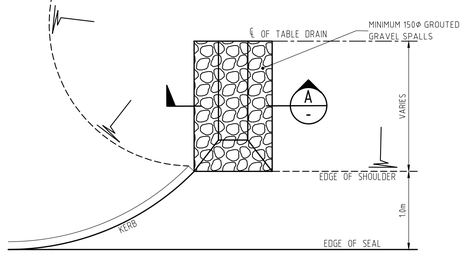
STRONGLOCK SMOOTH POST AND PANEL RETAINING WALL OR SIMILAR

NTS

RETAINING WALL NOTES

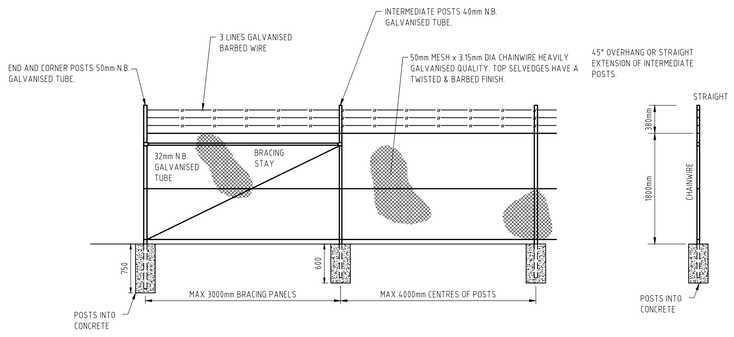
1. PROP ALL RETAINING WALLS AT 1800 CRS. DURING BACK FILLING AND COMPACTION.
2. COMPACT GROUND INFRONT OF AND UNDERWALL TO ACHIEVE 8 BLOWS PER 300mm WHEN TESTED WITH A STANDARD PENETROMETER.
3. CONCRETE STRENGTH 40mpa
4. SUITABLE FOR SANDY SOIL ONLY ALL OTHER CONDITIONS MUST BE REFERRED TO THE ENGINEER
5. DRAWINGS TO BE READ IN CONJUNCTION WITH THE SPECIFICATION
6. ANTI-GRAFFITI COATING TO BE APPLIED TO ALL EXPOSED FACES AS DETAILED IN THE SPECIFICATION
7. INSTALL SAFETY FENCING ON ALL WALLS HIGH THAN 1.0m
8. BACKFILL IN 300mm LAYERS AND COMPACT TO ACHIEVE 8 BLOWS PER 300mm WHEN TESTED WITH A STANDARD PENETROMETER
9. CONTRACTOR TO PROVIDE CERTIFIED PLAN AND DETAIL FOR BUILDING LICENCE APPLICATION

POST DETAIL



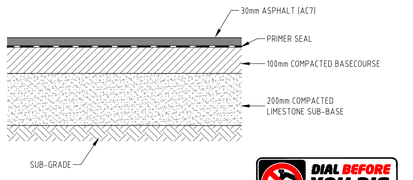
KERB RETURN ROCK PITCHING DETAIL

NTS



CHAINWIRE SECURITY FENCE - 1.8m BARBED

NOT TO SCALE



PAVEMENT ON SAND SUB GRADE

SCALE 1:10

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PROJECT:

NADINE CLOSE FORRESTFIELD

No.	DATE	REVISION	BY
C	13-12-2016	PROJECT TITLE CHANGE, ROCK WEIRS, ROCK PITCHING, SMK (KEYED) FENCE, WALL AND PATH ADDED	MEG
B	8-12-2016	TYPICAL ROAD CROSS-SECTION AND PAVEMENT DETAIL ADDED	DLC
A	24-10-2016	ISSUED FOR APPROVAL	MEG

Porter Consulting Engineers

T/ATF Porter Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

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Tel (08) 9315 9955
Fax (08) 9315 9959
Email office@porterseng.com.au
www.porterseng.com.au

CLIENT:

SHIRE OF KALAMUNDA

DRAWING:

STANDARD DETAILS PLAN

STATUS: **FOR TENDER**

SCALE	AS ABOVE
DATE	OCT 2016
DESIGN	BJH
DRAWN	MJV
CHECK	
DRAWING No.	16-9-116/600
REV No.	C
ORIGINAL DRAWING SIZE	A1
FILE NAME	S:\ACTIVE PROJECTS\16-09-116\ACAD\169116-600.dwg
APP'D	

Attachment 7:
Nardine Close extension (Road 2A) – Adjusted Construction Contract amount

- Progress Certificate 4 (L153.19)

Porter
Consulting Engineers

Level 2 Kishorn Court
58 Kishorn Road
Mount Pleasant WA 6153

PO Box 1036
Canning Bridge WA 6153

Tel: (08) 9315 9955
Fax: (08) 9315 9959
Email: office@portereng.com.au
www.portereng.com.au

Our Ref: BH/JK/L153.19
Job No: 16-09-116

16 August 2019

City of Kalamunda
PO Box 42
KALAMUNDA, WA 6926

Attention: Graeme Budge

Dear Graeme

FORRESTFIELD INDUSTRIAL AREA – ROAD 2A – STAGE 1
PAYMENT CERTIFICATE 4

We enclose Valuation of Works Certificate No. 4 in favour of RJ Vincent for work completed to 13 August 2019, for the above project.

We have assessed the claim for the work completed and recommend payment of $62,415.23 inclusive of GST, direct to RJ Vincent in accordance with the requirements of the contract.

We also enclose Variation Order No.3 for your records.

RJ Vincent has provided a bank guarantee in lieu of cash retention. The original copy of the guarantee is held at the offices of the City of Kalamunda, and can be released at the expiry of the 12 month defect liability period, once a Final Certificate is issued.

RJ Vincent has also provided a Statutory Declaration. A copy of the declaration is enclosed for your records.

RJ Vincent has been requested to forward an invoice to you direct for payment.

Yours faithfully

BRAD HARRIS
MANAGING DIRECTOR

Enc.

cc: Chris Mania – RJ Vincent

PAYMENT CERTIFICATE

Project:	Forrestfield Industrial Area - Road 2A - Stage 1	**Date Issued:**	16 August 2019
		Job Number:	16-09-116
Principal:	City of Kalamunda	**Valuation Number:**	4
Contractor:	RJ Vincent	**Prev. Valuation No:**	3

To: (Contractor): RJ Vincent
4 & 5 Kirke Street,
Balcatta, WA 6021

(Principal): City of Kalamunda
PO Box 42
Kalamunda, WA 6926

The Superintendent hereby certifies payment of the sum of $62,415.23 is to be made by the Principal to the Contractor for the value of work effected to 13 August 2019 calculated as follows:

..... (signature)
(Superintendent)

Original Contract Sum:			$538,494.92
Less Provisional Sums:		$74,800.00	
Contingency Sum:		$0.00	$74,800.00
Adjusted Contract Amount:			**$463,694.92**
Authorised Variations to Date: VO1, VO2			$17,895.08
Variations Recommended for This Month: VO3			$14,588.18
Total Variations:			**$32,483.26**
Adjusted Contract Amount to Date:			**$496,178.18**

Estimated Value of Work Completed to Date:	$496,178.18
Less 0% Retention - Bank Guarantee Provided.	$0.00
Less Amount Previously Valued:	$439,437.06
SUB TOTAL:	**$56,741.12**
GST Amount:	$5,674.11
THIS VALUATION:	**$62,415.23**

Distribution:	**Principal**	**Contractor**	**File**
			P086.19

To be used in conjunction with AS 2124 .

CONTRACT VARIATION ORDER

Project:	Forrestfield Industrial Area - Road 2A	**Date Issued:**	16 August 2019
Principal:	City of Kalamunda	**Job Number:**	16-09-116
Contractor:	RJ Vincent	**Number:**	3

DESCRIPTION OF VARIATION	CONTRACT SUM ADJUSTMENT	
	ADDITION ($)	DEDUCTION ($)
1 Installation of 1.8m Cyclone Fencing along property boundary.	9,882.40	
2 Water service change-over and meter relocation - Provisional Sum included in Contract.	4,705.78	
TOTAL	14,588.18	0.00
NET TOTAL ADJUSTMENTS	14,588.18	

..... (signature)
(Superintendent)

Distribution: **Principal** **Contractor** **File**
P085.19

To be used in conjunction with AS 2124.

Government of **Western Australia**
Department of **Finance**
Building Management and Works

Statutory Declaration Form 1

STATUTORY DECLARATION

PAYMENT TO SUBCONTRACTORS

I, Christopher Mania

of 6 Yabera Rd, Forrestfield, WA 6058.

Project Engineer for RJ Vincent & Co

sincerely declare as follows-

1. I hold the position of Project Engineer

   and am duly authorised by the Contractor to make this declaration in accordance with the provisions of clause 43 of the General Conditions of Contract.

2. In respect of Civil Construction Nardine Close Forrestfield Contract

   and Progress Claim Number 4 of 31/07/2019

   all Subcontractors have been paid all moneys due and payable to them at the date of this Progress Claim in respect of work under this Contract.

This declaration is true and I know that it is an offence to make a declaration knowing that it is false in a material particular.

This declaration is made under the *Oaths, Affidavits and Statutory Declarations Act* 2005 at:

...5 Kirke Street, Balcatta, 6021.....	on	02	08	2019
(Location)		(Day Number)	(Month)	(Year)

by:

.....

[*Signature of person making the declaration*]

in the presence of

.....

[*Signature of authorised witness*]

Blake William Burton JAENKE
Chartered Accountant (241683)

.....

[*Name of authorised witness and qualification as such a witness*]

Sample_Statutory_Declaration_Subcontractors_01Dec2015

100% claim

Date	31/07/2019
Project:	Forrestfield Industrial Area - Nardine Close
Client:	**City of Kalamunda**
C/-:	Porter Consultants
Attn:	Brad Harris
Address:	58 Kishorn Rd, Mt Pleasant, WA 6153
Job No:	2638
Contract No:	RFT 1901
Ref. No:	CPC11384

PROGRESS CLAIM ONLY

CLAIM FOR PAYMENT NUMBER 4 - JULY 2019

ORIGINAL TENDERED SUM	**$538,494.92**
PLUS / MINUS PROVISIONAL & CONTINGENT VARIATIONS	**-$42,316.74**
AMENDED CONTRACT SUM	**$496,178.18**
GROSS VALUE OF WORKS NOW COMPLETED	**$496,178.18**
Retention provided in the form of 1 x 2.5% BG	
	$496,178.18

LESS PREVIOUS CERTIFICATES

Date	Number	Value
3/05/19	Payment Certificate #1	$29,199.35
7/06/19	Payment Certificate #2	$201,721.89
5/07/19	Payment Certificate #3	$208,515.82

Value Previously Certified	**$439,437.06**	**$439,437.06**
VALUE NOW FOR PAYMENT		**$56,741.12**
GST		**$5,674.11**
TOTAL VALUE NOW FOR PAYMENT		**$62,415.23**

PROJECT: Forrestfield Industrial Area - Nardine Close
CLIENT: City of Kalamunda
CONSULTANT: Porter Consultants

SCHEDULE REVISION STATUS

REV	DESCRIPTION	DATE
A	Issued for Pricing	12th February 2019

SUMMARY OF TENDER PRICE

ITEM	DESCRIPTION	AMOUNT	CLAIM TO DATE
1	Site Establishment including Access and Traffic Control	$84,757.40	$84,757.40
2	Physical Location of Services (prior to works)	$4,140.00	$4,140.00
3	Site Security and Wind Fencing	$3,533.95	$3,533.95
4	Clearing and Disposal	$25,461.87	$25,461.87
5	Earthworks	$29,047.50	$29,047.50
6	Stormwater Drainage System (complete)	$3,246.29	$3,246.29
7	a) Water Reticulation (complete)	$43,502.88	$43,502.88
8	b) Reconnection of existing house (Provisional Sum)	$1,800.00	$1,800.00
9	Roadworks (Complete including kerbs, bollards and signs)	$175,102.52	$175,102.52
10	Footpaths and Ramps	$18,761.84	$18,761.84
11	Fencing	$7,071.35	$7,071.35
12	Retaining Walls	$14,679.23	$14,679.23
13	Dilapidation Surveys	$720.00	$720.00
14	'As Constructed' documents (including as cons and third-party certification)	$2,990.00	$2,990.00
15	a) Underground Power and Street Lighting (complete)	$41,777.20	$41,777.20
16	b) Reconnection of existing house (Provisional Sum)	$3,000.00	$3,000.00
17	Communications	$7,718.21	$7,718.21
18	Provisional Sum for Septic Tank Adjustments	$15,000.00	$15,000.00
19	Provisional Sum for Water Corporation connections	$5,000.00	$5,000.00
20	Provisional Sum for path works on Ashby Close as directed by the Super intendent	$50,000.00	$50,000.00
21	BCITF Levy	$1,184.68	$1,184.68
	SUB-TOTAL TENDER excl GST	**$538,494.92**	**$538,494.92**

VARIATIONS

VARIATION NUMBER	AMOUNT	CLAIM TO DATE
Variation Number 1 - Delete Provisionals	-$74,800.00	-$74,800.00
Variation Number 2 - 3E Power Certification	V02.2 $3,800.00	$3,800.00
Variation Number 3 - Relocate Leach Drain	V01.1 $7,541.00	$7,541.00
Variation Number 4 - Reduction in Comms Scope	V01.2 -$843.79	-$843.79
Variation Number 5 - Change in water crossing design	V01.3 -$1,541.00	-$1,541.00
Variation Number 6 - House power reconnection	V01.4 $23,618.10	$23,618.10
Variation Number 7 - Delete post & panel wall	V02.1 -$14,679.23	-$14,679.23
Variation Number 8 - Black 1.80m cyclone fencing	V03.1 $9,882.40	$9,882.40
Variation Number 7 - Water changeover costs	V03.2 $4,705.78	$4,705.78
SUB-TOTAL VARIATIONS excl GST	**-$42,316.74**	**-$42,316.74**

TOTAL TENDER + VARIATIONS excl GST	**$496,178.18**	**$496,178.18**
GST	**$49,617.82**	**$49,617.82**
TOTAL INCL GST	**$545,796.00**	**$545,796.00**

Page 2 of 10

PROJECT: Forrestfield Industrial Area - Nardine Close
CLIENT: City of Kalamunda
CONSULTANT: Porter Consultants

14/08/2019
3 of 10

CURRENT SCHEDULE REVISION: A

SCHEDULE OF PRICES						PROGRESS CLAIM	
ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT	% COMP	CLAIM AMOUNT
1	**Site Establishment including Access and Traffic Control**						
1.1	Site Establishment						
	a) Site Compound and facilities	1	item	$10,032.43	$10,032.43	100%	$10,032.43
	b) Mobilisation to Site	1	item	$7,475.00	$7,475.00	100%	$7,475.00
1.2	Supervision	10	weeks	$2,775.00	$27,750.00	100%	$27,750.00
1.3	Survey for Construction	10	weeks	$1,495.00	$14,950.00	100%	$14,950.00
1.4	Insurances	1	item	$2,000.00	$2,000.00	100%	$2,000.00
1.5	Management Plans	1	item	$1,500.00	$1,500.00	100%	$1,500.00
1.6	QA Kit	1	item	$1,500.00	$1,500.00	100%	$1,500.00
1.7	Construction Water	1	item	$9,999.97	$9,999.97	100%	$9,999.97
1.8	Dust Control	10	Week	$955.00	$9,550.00	100%	$9,550.00
	Subtotal - Site Establishment				**$84,757.40**		**$84,757.40**
2	**Physical Location of Services (prior to works)**	1	item	$4,140.00	$4,140.00	100%	$4,140.00
	Subtotal - Location of Services				**$4,140.00**		**$4,140.00**
3	**Site Security and Wind Fencing**						
3.1	Site Fencing	187	m	$8.05	$1,505.35	100%	$1,505.35
3.2	Wind Fencing	147	m	$13.80	$2,028.60	100%	$2,028.60
	Subtotal - Site Fencing				**$3,533.95**		**$3,533.95**
4	**Clearing and Disposal**						
4.1	Clear and Mulch existing vegetation	1	item	$15,065.00	$15,065.00	100%	$15,065.00
4.2	Dispose of mulch	350	m3	$8.02	$2,807.00	100%	$2,807.00
4.3	Remove existing rural fencing	199	m	$13.80	$2,746.20	100%	$2,746.20
4.4	Remove existing shed	1	item	$1,624.50	$1,624.50	100%	$1,624.50
4.5	Remove existing retaining wall	73.5	m	$31.59	$2,321.87	100%	$2,321.87
4.6	Strip existing garden beds	45	m2	$19.94	$897.30	100%	$897.30
	Subtotal - Clearing and Disposal				**$25,461.87**		**$25,461.87**
5	**Earthworks**						
5.1	Strip and stockpile topsoil (100mm)	6,119	m2	$0.31	$1,896.89	100%	$1,896.89
5.2	Cut to Fill	527	m3	$5.98	$3,151.46	100%	$3,151.46
5.3	Respread topsoil (100mm thick)	2,152	m3	$0.55	$1,183.60	100%	$1,183.60
5.4	Remove excess sand from site	379	m3	$27.42	$10,392.18	100%	$10,392.18
5.5	Remove excess topsoil from site	397	m3	$27.72	$10,996.52	100%	$10,996.52
5.6	Earthworks testing	1	item	$500.00	$500.00	100%	$500.00
5.7	Hydromulch	2,505	m2	$0.37	$926.85	100%	$926.85
	Subtotal - Earthworks				**$29,047.50**		**$29,047.50**
6	**Stormwater Drainage System (complete)**						
6.1	Trim and shape Swales	807	m2	$2.22	$1,791.54	100%	$1,791.54
6.2	Stonepitching	11	m2	$132.25	$1,454.75	100%	$1,454.75
	Subtotal - Stormwater				**$3,246.29**		**$3,246.29**

PROJECT: Forrestfield Industrial Area - Nardine Close
CLIENT: City of Kalamunda
CONSULTANT: Porter Consultants

14/08/2019
4 of 10

CURRENT SCHEDULE REVISION: A

SCHEDULE OF PRICES						PROGRESS CLAIM	
ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT	% COMP	CLAIM AMOUNT
7	**a) Water Reticulation (complete)**						
1	Mobilisation	1	Item	$1,380.00	$1,380.00	100%	$1,380.00
2	Excavation for water main in sand	403	M	$11.96	$4,819.88	100%	$4,819.88
3	Supply and lay 100mm Dia uPVC Pipe	3	M	$24.15	$72.45	100%	$72.45
4	Supply and lay 150mm Dia uPVC Pipe	400	M	$33.58	$13,432.00	100%	$13,432.00
5	Supply and Install TBE on 100mm Main	1	No	$414.00	$414.00	100%	$414.00
6	Supply and Install FP on 150mm Main	1	No	$667.00	$667.00	100%	$667.00
7	Supply and Install Hydrant on 150mm main	4	No	$931.50	$3,726.00	100%	$3,726.00
8	Supply and Install Bend on 150mm main	13	No	$247.25	$3,214.25	100%	$3,214.25
9	Supply and Drill 180PE PN16 x 12M length	1	No	$2,242.50	$2,242.50	100%	$2,242.50
10	Attendance by butt welder	1	Item	$1,035.00	$1,035.00	100%	$1,035.00
11	Supply and Install 180/150 Puddle flange	2	No	$2,530.00	$5,060.00	100%	$5,060.00
12	Supply and Lay 150mm adaptors	2	No	$162.15	$324.30	100%	$324.30
13	Supply and Lay 150/100 taper	1	No	$287.50	$287.50	100%	$287.50
14	150mm same side water service- Single Prelay	1	No	$287.50	$287.50	100%	$287.50
15	Liaison with Water Corporation	1	Item	$517.50	$517.50	100%	$517.50
16	Supply and Install Tap Protectors	1	No	$57.50	$57.50	100%	$57.50
17	Testing of Watermain	1	Item	$1,092.50	$1,092.50	100%	$1,092.50
18	Remove and dispose of existing footpath	110	m2	$11.52	$1,267.20	100%	$1,267.20
19	Reinstate footpath	110	m2	$32.78	$3,605.80	100%	$3,605.80
	Subtotal - Water Reticulation				**$43,502.88**		**$43,502.88**
	b) Reconnection of existing house (Provisional Sum)						
	Provisional Sum	**1**	**item**	**$1,800.00**	**$1,800.00**	**100%**	**$1,800.00**
	Subtotal - Reconnection of existing house				**$1,800.00**		**$1,800.00**
8	**Roadworks (Complete including kerbs, bollards and signs)**						
8.1	Subgrade Preparation	3,967	m2	$2.99	$11,861.33	100%	$11,861.33
8.2	Supply, Lay, and trim 200mm Limestone	3,967	m2	$9.94	$39,431.98	100%	$39,431.98
8.3	Supply, Lay, and trim 100mm Roadbase	3,967	m2	$8.72	$34,592.24	100%	$34,592.24
8.4	Primer Seal	3,967	m2	$2.96	$11,742.32	100%	$11,742.32
8.5	Lay 30mm thickness asphalt	3,614	m2	$11.73	$42,392.22	100%	$42,392.22
8.6	Semimountable kerbing	359	m	$19.67	$7,061.53	100%	$7,061.53
8.7	Mountable Kerbing	11	m	$15.99	$175.89	100%	$175.89
8.8	Flush Kerbing	221	m	$60.84	$13,445.64	100%	$13,445.64
8.9	E/O to Key kerb	181	m	$8.97	$1,623.57	100%	$1,623.57
8.10	Road Tie-in	1	item	$500.00	$500.00	100%	$500.00
8.11	Final Trim	5,312	m2	$0.95	$5,046.40	100%	$5,046.40
8.12	Lift up existing pavers and relay as required	1	item	$3,300.00	$3,300.00	100%	$3,300.00

PROJECT: Forrestfield Industrial Area - Nardine Close
CLIENT: City of Kalamunda
CONSULTANT: Porter Consultants

14/08/2019
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CURRENT SCHEDULE REVISION: A

SCHEDULE OF PRICES						PROGRESS CLAIM	
ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT	% COMP	CLAIM AMOUNT
8.13	Supply and Install Chevron	1	No.	$300.00	$300.00	100%	$300.00
8.14	Testing	1	item	$3,629.40	$3,629.40	100%	$3,629.40
	Subtotal - Roadworks				**$175,102.52**		**$175,102.52**
9	**Footpaths and Ramps**						
9.1	Supply and Lay 2.1m wide footpath	248	m	$70.83	$17,565.84	100%	$17,565.84
9.2	Supply and Install Pram Ramps	2	no.	$598.00	$1,196.00	100%	$1,196.00
	Subtotal - Footpaths and Ramps				**$18,761.84**		**$18,761.84**
10	**Fencing**						
10.1	Install new rural fencing	91	m	$17.25	$1,569.75	100%	$1,569.75
10.2	Install new rural gate	1	no.	$1,380.00	$1,380.00	100%	$1,380.00
10.3	Reinstate Cyclone Fencing	112	m	$36.80	$4,121.60	100%	$4,121.60
	Subtotal - Fencing				**$7,071.35**		**$7,071.35**
11	**Retaining Walls**						
11.1	Concrete post and panel						
11.2	Mobilisation	1	item	$991.88	$991.88	100%	$991.88
11.3	Post hole coring	1	item	$1,157.19	$1,157.19	100%	$1,157.19
11.4	600mm retained height	30	m	$344.14	$10,324.20	100%	$10,324.20
11.5	Antigraffiti Coating	1	item	$303.60	$303.60	100%	$303.60
11.6	Certification by Structural Engineer	1	item	$1,287.33	$1,287.33	100%	$1,287.33
11.7	OHS	1	item	$230.03	$230.03	100%	$230.03
11.8	Building licence	1	item	$385.00	$385.00	100%	$385.00
	Subtotal - Retaining Walls				**$14,679.23**		**$14,679.23**
12	**Dilapidation Surveys**						
12.1	Pre-Commencement Surveys	2	No.	$360.00	$720.00	100%	$720.00
	Subtotal - Dilapidations				**$720.00**		**$720.00**
13	**'As Constructed' documents (including as cons and third-party certification)**						
13.1	R-Spec	1	item	$2,990.00	$2,990.00	100%	$2,990.00
	Subtotal - As-constructed documents				**$2,990.00**		**$2,990.00**
14	**a) Underground Power and Street Lighting (complete)**						
1	Excavation in sand for power & communications	243	M	$11.96	$2,906.28	100%	$2,906.28
2	Hand excavation in sand for power	33	M	$24.15	$796.95	100%	$796.95
3	Supply & Lay 100 HD conduit	259	M	$12.31	$3,188.29	100%	$3,188.29
4	Supply & Lay 150 HD conduit	243	No	$17.25	$4,191.75	100%	$4,191.75
5	Supply & Lay 16mm2 Streetlight cable	226	M	$10.47	$2,366.22	100%	$2,366.22
6	Supply & Lay 25 LV cable	3	M	$23.58	$70.74	100%	$70.74
7	Supply & Lay 240 LV cable	273	M	$49.11	$13,407.03	100%	$13,407.03
8	Transport of Power Materials	1	Item	$1,127.00	$1,127.00	100%	$1,127.00
9	LU2- 240 Straight Joint	1	No	$358.80	$358.80	100%	$358.80
10	LU5- 240 Tee Joint	1	No	$358.80	$358.80	100%	$358.80
11	LU10-Mini Pillar	1	No	$373.75	$373.75	100%	$373.75

Deleted V02.1

PROJECT: Forrestfield Industrial Area - Nardine Close
CLIENT: City of Kalamunda
CONSULTANT: Porter Consultants

14/08/2019
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CURRENT SCHEDULE REVISION: A

SCHEDULE OF PRICES						PROGRESS CLAIM	
ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT	% COMP	CLAIM AMOUNT
12	End caps, slabbing & warning tape	1	Item	$276.00	$276.00	100%	$276.00
13	LU62- Live End Seal	1	No	$392.15	$392.15	100%	$392.15
14	10.5M SOR GAL pole with 80W Road Flair LED luminaire	4	No	$2,450.36	$9,801.44	100%	$9,801.44
15	Testing/Commissioning	1	Item	$897.00	$897.00	100%	$897.00
16	Liaison with Western Power, other utilities & Electrical Consultant	1	Item	$437.00	$437.00	100%	$437.00
17	As constructed Information	1	Item	$828.00	$828.00	100%	$828.00
	Subtotal - Underground Power				**$41,777.20**		**$41,777.20**
	b) Reconnection of existing house (Provisional Sum)	**1**	**item**	**$3,000.00**	**$3,000.00**	**100%**	**$3,000.00**
	Subtotal - Reconnection of existing house				**$3,000.00**		**$3,000.00**
15	**Communications**						
1	Additional excavation in sand for Communications only	57	M	$9.78	$557.46	100%	$557.46
2	Supply & Lay 50Dia Communications conduit	6	M	$8.63	$51.78	100%	$51.78
3	Supply & Lay 100Dia Communications conduit	303	M	$12.31	$3,729.93	100%	$3,729.93
4	Supply & Lay 100Dia conduit bend	4	No	$28.75	$115.00	100%	$115.00
5	Supply & Install P5 Communications pit- C/W gasket & concrete Class B lid	3	No	$365.70	$1,097.10	100%	$1,097.10
6	Supply & Install P6 Communications pit- C/W gasket & concrete Class B lid	1	No	$657.80	$657.80	100%	$657.80
7	Supply & Install 50m ID lot lead in pipe	1	No	$41.40	$41.40	100%	$41.40
8	Capped end	9	No	$23.00	$207.00	100%	$207.00
9	Rod & Rope ducting	329	M	$1.56	$513.24	100%	$513.24
10	As constructed information	1	Item	$747.50	$747.50	100%	$747.50
	Subtotal - Communications				**$7,718.21**		**$7,718.21**
16	**Provisional Sum for Septic Tank Adjustments**	**1**	**item**	**$15,000.00**	**$15,000.00**	**100%**	**$15,000.00**
17	**Provisional Sum for Water Corporation connections**	**1**	**item**	**$5,000.00**	**$5,000.00**	**100%**	**$5,000.00**
18	**Provisional Sum for path works on Ashby Close as directed by the Super intendent**	**1**	**item**	**$50,000.00**	**$50,000.00**	**100%**	**$50,000.00**
19	BCITF Levy	1	item	$1,184.68	$1,184.68	100%	$1,184.68

VO3.1

DATE: 16/07/2019

PROJECT: Forrestfield Industrial Area - Nardine Close

JOB NO : 2638

CONSULTANT: Porter Consultants

RJV

VARIATION ORDER
VO (8)

Item	Description	Qty	Unit	Rate	Total	(%)	Claim Amount
	This variation refers to requested boundary fencing to 166 Sultana Rd. We hereby claim:						
1	Black 1800mm chainmesh fencing with 3 barbed wires	158	m	$52.80	$8,342.40	100%	$8,342.40
2	Matching black 2 x 4m gates across driveway	1	Item	$1,540.00	$1,540.00	100%	$1,540.00
Signed:	CMania			(Excl GST)	$9,882.40		$9,882.40

V03.1

Jamie King

From: Graeme Budge <Graeme.Budge@kalamunda.wa.gov.au>
Sent: Tuesday, 16 July 2019 3:51 PM
To: Christopher Mania; Jamie King
Cc: Joshua Hickey
Subject: RE: 16-09-116 : Forrestfield Industrial - Resident fencing quote

Accepted.

Regards

Graeme Budge | **Project Manager Delivery**
T 08 9257 9978 | E Graeme.Budge@kalamunda.wa.gov.au
P City of Kalamunda, PO Box 42, KALAMUNDA WA 6926
W www.kalamunda.wa.gov.au

Subscribe here to keep updated

From: Christopher Mania [mailto:christopher.mania@rjv.com.au]
Sent: Tuesday, July 16, 2019 3:23 PM
To: Jamie King <jamie@portereng.com.au>; Graeme Budge <Graeme.Budge@kalamunda.wa.gov.au>
Cc: Joshua Hickey <joshua.hickey@rjv.com.au>
Subject: RE: 16-09-116 : Forrestfield Industrial - Resident fencing quote

Jamie,

Updated variation attached based on provided fencing sketch & specification.

Kind regards,

Chris Mania
Project Engineer

CIVIL INFRASTRUCTURE

A. 4 and 5 Kirke Street, Balcatta. WA. 6021
T. 08 9345 3999
F. 08 9345 3121
M. 0419 931 042
E. christopher.mania@rjv.com.au
W. www.rjv.com.au

From: Jamie King <jamie@portereng.com.au>
Sent: Monday, 15 July 2019 10:54 AM
To: Christopher Mania <christopher.mania@rjv.com.au>; Graeme Budge <Graeme.Budge@kalamunda.wa.gov.au>

VO32

DATE: 24/07/2019

PROJECT: Forrestfield Industrial Area - Nardine Close

JOB NO : 2638

CONSULTANT: Porter Consultants

VARIATION ORDER
VO (9)

Item	Description	Qty	Unit	Rate	Total	(%)	Claim Amount
	This variation refers to the changeover of water supply to new main. We hereby claim:						
1	Clear decorative stones, pavers, excavate & hand trench new water pipe from meter to house, backfill & compact, reinstate stones to garden bed.						
1.1	5T Excavator	5	Hr	$105.00	$525.00	100%	$525.00
1.2	Pipelayer	8	Hr	$72.00	$576.00	100%	$576.00
1.3	Labourer	8	Hr	$55.00	$440.00	100%	$440.00
1.4	Pipe, fittings & consumables	1	Item	$134.20	$134.20	100%	$134.20
2	Licenced plumbers attendance for water meter relocation (by Water Corp)	1	Item	$605.00	$605.00	100%	$605.00
3	Licenced plumbers attendance for ticketing & notices for both water changeover & leach drain relocation.	1	Item	$907.50	$907.50	100%	$907.50
4	Water Corp quote for changeover and cut & cap redundant service + 10% P&A	1	Item	$1,518.08	$1,518.08	100%	$1,518.08

Hours + Rates reasonable.

Signed: Mania (Excl GST) $4,705.78 $4,705.78

U03.2

WATER CORPORATION
ABN 28 003 434 917

Application Account

Issue date 23 July 2019

INEARTH PTY LTD
P.O.BOX 1296
EAST VICTORIA PARK PO BOXES WA 6981

Account number **90 23450 96 1**

Please pay **$1 380.08**

Account For: 90 14045 54 2 - 166 SULTANA RD WEST HIGH WYCOMBE LOT 308

Applic Num	Application Type	Total Fee
MW2064492-*	RELOCATE SERVICE OVER 0.5M	1,380.08
Goods and Services Tax (GST)		0.00
Total Due:		1,380.08

On Jno 865.
NARDINE CLOSE.
23/07/19.

$1,380.08 + 10% PHA
= $1,518.08

See Back For Additional Information

Payment slip

Enquiries
13 13 95

Account number **90 23450 96 1**

Please pay **$1 380.08**

WATER CORPORATION

*690 9023450961

Website: watercorporation.com.au/contact
Faults and Emergencies: (24/7) 13 13 75

Attachment 8:
Nardine Close cul-de-sac assessment

Porter
Consulting Engineers

ENGINEERING REPORT

TEMPORARY CUL-DE-SAC OPTIONS AND COST REVIEW FOR NARDINE CLOSE, HIGH WYCOMBE

Porter

REPORT PREPARED FOR

CITY OF KALAMUNDA

Prepared by	**Porter Consulting Engineers**
Postal address	PO Box 1036 Canning Bridge WA 6153
Phone	(08) 9315 9955
Email	office@portereng.com.au

Date	19 June 2020
Our reference	R43.20
Job Number	20-06-081
Checked	

HISTORY AND STATUS OF THE DOCUMENT

Revision	Date issued	Author	Issued to	Revision type
Rev A	17/06/2020	Michael Cook	City of Kalamunda	Technical Note
Rev B	19/06/2020	Michael Cook	City of Kalamunda	Conversion to Formal Report, incorporate City review comments

CONTENTS

ATTACHMENTS:

1. Retain existing cul-de-sac layout
2. Existing services plan
3. City of Kalamunda Emergency Accessway concept plan
4. Indicative Costs for retention of the existing cul-de-sac (T092.20)
5. Indicative Costs for Emergency Accessway to tie into existing cul-de-sac (T095.20)
6. Relocating the cul-de-sac layout
7. Indicative Costs for relocating the cul-de-sac layout (T093.20)
8. Indicative Costs for Emergency Accessway to tie into relocated cul-de-sac (T096.20)

1.0 INTRODUCTION

The City of Kalamunda is seeking an assessment of the existing cul-de-sac on Nardine Close in High Wycombe that currently terminates at the boundary line of lot 308 and lot 51. The cul-de-sac was constructed in July 2019 as part of road upgrade works to Nardine Close (Road 2A-Stage 1) to service the Forrestfield industrial area. The cul-de-sac has been designed to accommodate a 27.5m long Restricted Access Vehicle (RAV) category 2 to 4 (inclusive).

The cul-de-sac was intended to be temporary and was to be removed as part of a future extension of Nardine Close (Stage 2) to the boundary of lot 50 and lot 51 as shown in **Figure 1**.

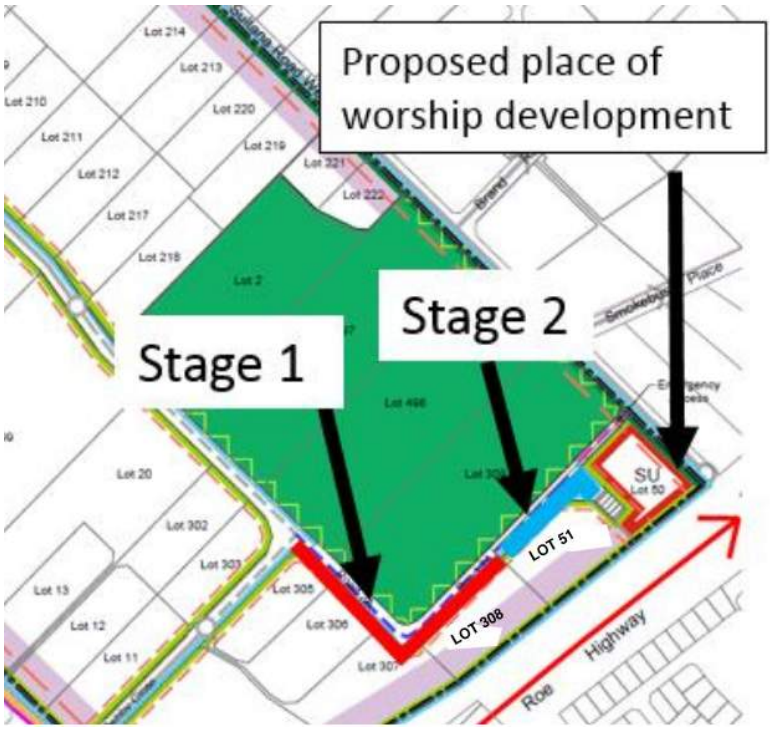


Figure 1: Stage 1 and 2 extents for Nardine Close (Road 2A)

The City has recently approved a Development Application for a place of worship to lot 50. The place of worship will be primarily serviced by light vehicles, with all access via Sultana Road West. Therefore, the Stage 2 extension works of Nardine Close to the boundary of lot 50/lot 51 may no longer be required if the place of worship development progresses as planned.

The City has requested the consideration of the existing cul-de-sac arrangement but also wishes to consider an alternative arrangement with the cul-de-sac being centrally located on the boundary dividing lots 308 and 51. The consideration of an alternative arrangement is due to concerns being raised that the exiting cul-de-sac arrangement will not provide adequate access to lot 51.

The City of Kalamunda has engaged Porter Consulting Engineers to provide an assessment, advice and costs towards:

- The cul-de-sac remaining in its current location.
- Relocate the cul-de-sac.

It is noted the original scheme had a cul-de-sac at the end of Nardine Close, with no access through to Sultana Road West except for the emergency accessway. In industrial areas it would be preferable not to create cul-de-sacs due to turning requirements for larger vehicles. However, industrial traffic was not seen as desirable to Sultana Road West and therefore both assessments have a cul-de-sac at the end of Nardine Close.

2.0 RETAIN THE CUL-DE-SAC IN ITS CURRENT LOCATION

2.1 27.5m long Restricted Access Vehicle access

The existing cul-de-sac will not detrimentally impact access for 27.5m long RAV vehicles entering and exiting lot 51 and lot 308. The current setout of the cul-de-sac allows for the installation of crossovers to lot 51 and lot 308 consistent with industrial sites in the area.

2.2 Road Reservation to the cul-de-sac

The existing cul-de-sac is partially located within the Nardine Close road reservation and partially within private land ownership of lot 308. The City has established an agreement with the owners of lot 308 that allows part of the cul-de-sac to be within lot 308 due to its temporary nature. Should the existing cul-de-sac be retained in its current location on a permanent basis, the City will acquire the necessary land from the owners of lot 308 as part of establishing a permanent cul-de-sac.

Towards establishing the existing cul-de-sac as permanent, consideration should be had to providing an adequate verge width from the face to kerb to reservation boundary around the cul-de-sac.

Although lot 308 is zoned industrial, it accommodates a residential home which immediately abuts Nardine Close. An interim reservation boundary may need to be established whilst this residential home remains. The interim reservation boundary would need to be setout such that the boundary retains the residential home within lot 308.

When lot 308 is developed into an industrial development, a permanent reservation boundary should be established to provide nominal 3m wide verges.

Attachment 1, illustrates the interim and permanent reservation setouts.

2.3 Works Required

As the cul-de-sac was intended to be temporary, the services installed finished before the cul-de-sac and did not extend to the lot 308/lot 51 boundary as per typical requirements of the relevant utility authorities.

Should the cul-de-sac become permanent, the utility authorities will require the services to be extended to the lot 308/lot 51 boundary.

Electrical

The existing electrical cables terminate immediately south of the existing cul-de-sac as shown in **Attachment 2**.

These electrical cables will need to be extended by following the interim reservation boundary to the lot 308/lot 51 boundary. A light pole is expected to be required by the cul-de-sac head towards establishing the cul-de-sac as permanent.

It is likely that the electrical cables will need to be relocated to suit the permanent reservation boundary when this is established.

Due to the proximity of the existing residential home to the boundary line, it is expected that trenchless technique installation will be required for electrical conduits.

Communications

The existing NBN conduits terminate immediately south of the existing cul-de-sac as shown in **Attachment 2**. NBN Co. will require new conduit/cabling to be installed that follows the interim road reservation boundary line to extend to lot 51.

It is likely that the NBN conduits/cables will need to be relocated to suit the permanent reservation boundary when this is established.

Due to the proximity of the existing residential home to the boundary line, it is expected that trenchless technique installation will be required for communication conduits.

Gas

Lot 308 is serviced with a gas supply via a private supply line within the emergency accessway. It is expected that ATCO Gas will require new mains to be installed from the emergency accessway that follows the interim reservation boundary.

It is unlikely that ATCO Gas will allow this gas supply to be retained for use when lot 308 is developed into an industrial development. However, this would need to be confirmed with ATCO at the time of development.

Water

The existing DN150 water main currently terminates immediately south of the existing cul-de-sac as in **Attachment 2**. The water main will need to be extended by following the interim reservation boundary to the lot 308/lot 51 boundary.

The Water Corporation has previously advised that the water main will need to be extended to Sultana Road West (via the emergency accessway) to reinforce the water supply network in this area.

It is likely that the water mains will need to be relocated to suit the permanent reservation boundary when this is established.

Fencing

Existing fencing and gates will need to be relocated to the new reservation boundary.

At present, there is an existing 1.8m high chain mesh fence between the existing cul-de-sac kerb line and the residential home (see **Figure 2**). This fencing is within the road reservation and will need to be relocated to the boundary line. By relocating the fence to the boundary line, access to the western side of the residential home will be severely limited due to the building to effect having an near nil setback.

Consideration should be had to defer relocating the fencing until the demolition of the residential home so not to impact the resident's access around the home. For the purpose of this advice, it has been assumed that the chain mesh fence will not relocated to the boundary line until the home is demolished as part of industrial development to lot 308.

A provisional allowance has been included for the possible relocation of the private internal service (i.e. drainage from downpipes) by the western side of the home to avoid clashes with proposed extension of services.

Figure 2: Existing mesh fencing by the existing residential property of lot 308

Footpath

The existing 2.1m wide footpath currently terminates immediately south of the existing cul-de-sac. Typically it would be expected that this footpath is extended to lot 51. However, with the existing chain mesh fence assumed to remain in its current position, it will not be possible to extend the footpath. Therefore, it has been assumed that the extension of the footpath will be deferred until the home is demolished.

Crash Barrier

Whilst the existing residential home is still in place within lot 308, consideration should be had to installing a crash safety barrier (i.e. W-Beam) due to the proximity of the home to the kerb line of the cul-de-sac. The home has to affect a nil setback offset to the south-west corner of the

building. The crash barrier would be installed immediately behind the kerb line and existing chain mesh fencing.

The barrier would be removed once the residential home is demolished and the permanent reservation boundary is established.

Emergency Accessway

Although there is currently an emergency accessway from the existing cul-de-sac to Sultana Road West, the City is seeking to formalise this accessway to 6m wide 'Right of Way' with a 6m wide gravel basecourse. Although the emergency accessway concept drawing shown in **Attachment 3** notes a 5m wide basecourse, allowance has been made for a 6m wide basecourse which is the minimum trafficable surface width in accordance with the 'Guidelines for Planning in Bushfire Prone Areas'[1].

The existing width of the access is currently 5m wide and the City would need to acquire a 1m width from lot 51 to establish a 6m wide Right of Way.

The existing 3m wide asphalt surfacing will be removed for the installation of the water main from Sultana Road West. Clearing of existing vegetation to establish a 6m width will be required. The 6m wide gravel basecourse will be constructed to achieve the noted design levels.

By Sultana Road West there is an existing distribution board and an electrical meter box that straddles the current boundary line for the existing 5m accessway boundary line which would need to be relocated (See **Figure 3**).

Figure 3: Existing distribution board and an electrical meter box by Sultana Road West will need relocating

[1] Department of Planning, Lands and Heritage, *Guidelines for Planning in Bushfire Prone Areas*, viewed 19 June 2020, </getmedia/0364136f-bf61-41ed-a68f-e77f165d6e3c/GD-BF-Bushfire_Guidelines_Version_1-3_Dec2017-Appendices>

2.4 Opinion of Probable Cost

The table below is a summary of the indicative costs to facilitate the interim reservation to accommodate the existing cul-de-sac. A more detailed breakdown is included in **Attachment 4**.

Item	Costs to Accommodate the Existing Cul-de-sac
Construction costs to accommodate the interim reservation boundary	$132,200
Extra over costs for works from the interim to permanent reservation boundary.	$28,000
Development Fees and Charges	$29,100
Subtotal	$189,300
GST	$18,930
Total including GST	$208,230

The table below is a summary of the indicative costs for the emergency access way to tie into the existing cul-de-sac. A more detailed breakdown is included in **Attachment 5**.

Item	Costs for Emergency Accessway works
Construction costs to accommodate the interim reservation boundary	$67,100
Development Fees and Charges	$8,000
Subtotal	$75,100
GST	$7,510
Total including GST	$82,610

The amounts noted exclude any costs associated with land acquisitions.

3.0 RELOCATE THE CUL-DE-SAC

By relocating the cul-de-sac as shown in **Attachment 6**, it provides lot 308 with increased road frontage allowing for greater flexibility to crossovers and access as part of future industrial development to the lot. Whilst this greater flexibility is desirable, it is not necessary to provide this additional frontage to facilitate industrial development to lot 308, as the existing cul-de-sac setout provides adequate access to lot 308 and 51

By relocating the cul-de-sac, it eliminates the issue of the existing residential home in lot 308 being too close to the kerb and the need for an interim reservation boundary. The City will acquire the necessary land from the owners of lot 308 and lot 51 as part of establishing a cul-de-sac.

A 3.5m wide verge should be established as part of establishing the relocated cul-de-sac.

3.1 27.5m long Restricted Access Vehicle access to lot 51

A relocated cul-de-sac will not detrimentally impact access for 27.5m long RAV vehicles entering and exiting lot 51 and lot 308.

3.2 Works Required

Demolition

A small shed and other ancillary structures at the south-west corner of lot 51 will need to be relocated or demolished to accommodate a relocated cul-de-sac.

Electrical

The existing electrical cables would need to be extended to follow the new reservation boundary as part of the works to construct a relocated cul-de-sac.

Due to the proximity of the existing residential home to the boundary line, it is expected that trenchless technique installation will be required for electrical conduits.

Communications

The existing NBN conduits/cables would need to be extended to follow the new reservation boundary as part of the works to construct a relocated cul-de-sac.

Due to the proximity of the existing residential home to the boundary line, it is expected that trenchless technique installation will be required for communication conduits.

Gas

The gas supply from the emergency accessway that serves lot 308 is expected to require adjustment to follow the new road reservation boundary whilst a residential home is still in place for lot 308.

It is unlikely that ATCO Gas will allow this gas supply to be retained for use when lot 308 is developed into an industrial development. However, this would need to be confirmed by ATCO Gas at the time of development.

Water

The existing DN150 water main would need to be extended to follow the new reservation boundary as part of the works to construct a relocated cul-de-sac.

The Water Corporation has previously advised that the water main will need to be extended to Sultana Road West (via the emergency accessway) to reinforce the water supply network in this area.

Roadworks

Redundant portions of the cul-de-sac will require demolition and a new cul-de-sac head constructed in the new location.

As the new cul-de-sac head will not be near any existing buildings, installation of crash barriers will not be required.

The new cul-de-sac head will need to tie into the existing emergency accessway.

Footpath

The 2.1m wide footpath would be extended around the new cul-de-sac head.

Emergency Accessway

Although there is currently an emergency accessway from the existing cul-de-sac to Sultana Road West, the City is seeking to formalise this accessway to 6m wide with a 6m wide gravel basecourse as shown in **Attachment 3**.

The existing width of the access is currently 5m wide and the City would need to acquire a 1m width from lot 51 to establish a 6m wide Right of Way.

The existing 3m wide asphalt surfacing will removed due to the installation of the water main from Sultana Road West. Clearing of existing vegetation to establish a 6m wide clear width will be required and the 6m gravel base course constructed to achieve the noted design levels.

By Sultana Road West there is an existing distribution board and an electrical meter box that straddles the current boundary line for the existing 5m accessway boundary line which would need to be relocated (See **Figure 3**).

Fencing

Existing fencing and gates will need to be relocated to the new reservation boundary.

At present, there is an existing 1.8m high chain mesh fence between the existing cul-de-sac kerbline and the residential home (see **Figure 3**). This fencing is within the road reservation and will need to be relocated to the boundary line. By relocating the fence to the boundary line, access to the western side of the residential home will be severely limited due to the building to effect having a near nil setback.

A provisional allowance should also be included for the possible relocation of the private internal service (i.e. drainage from downpipes).

3.3 Opinion of Probable Cost

The table below is a summary of the indicative costs to relocate the cul-de-sac. A more detailed breakdown is included in **Attachment 7**.

Item	Costs to Relocate the Cul-de-sac
Construction Costs	$223,200
Development Fees and Charges	$23,400
Subtotal	$246,600
GST	$24,660
Total including GST	$271,260

The table below is a summary of the indicative costs for the emergency access way to tie into the relocated cul-de-sac. A more detailed breakdown is included in **Attachment 8**.

Item	Costs for Emergency Accessway works
Construction Costs	$61,100
Development Fees and Charges	$7,500
Subtotal	$68,600
GST	$6,860
Total including GST	$75,460

The amounts noted exclude any costs associated with land acquisitions.

4.0 CONCLUSION

4.1 Retain the cul-de-sac

Retaining the existing cul-de-sac does not impact on access to lot 51 and lot 308 for 27.5m long Restricted Access Vehicles (RAV Category 2 and 4). Whilst the existing residential home is still present in lot 308, an interim reservation boundary would need to be established due to the proximity of the home to the kerb line.

The chain mesh fence between the existing cul-de-sac kerb line and residential home will need to be relocated to the boundary line. By relocating the fence to the boundary line, access to the western side of the residential home will be severely limited due to the building to effect having a near nil setback.

Adjustment and relocating of private internal services may be required (i.e. drainage from downpipes).

Once lot 308 is developed into an industrial lot and the home is demolished, a permanent reservation boundary would need to be established. The Opinion of Probable Cost to retain the cul-de-sac to accommodate the interim and permanent boundary works is $208,230 including GST.

The Opinion of Probable Cost for the emergency accessway works is an additional $82,610 including GST.

If this is the City's preferred option, then preliminary designs should be prepared to establish the full scope of works, land acquisition areas, updating designs to the emergency access and in particularly resolving particulars in relation to the existing residential home (ie, existing private services needing to be relocated).

The amounts noted exclude any costs associated with land acquisitions.

4.2 Relocate the cul-de-sac

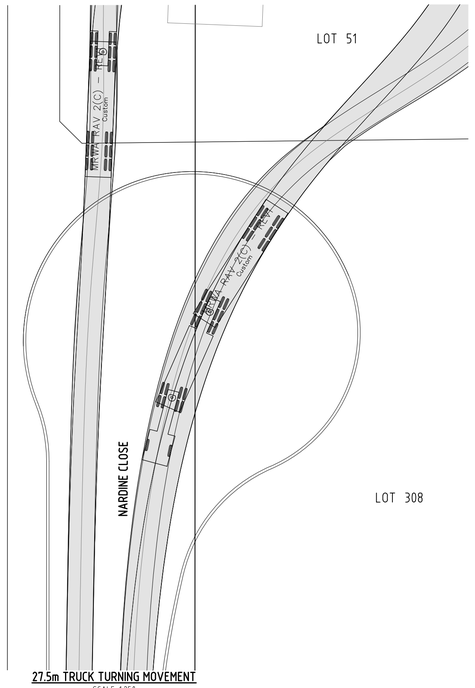
Should the cul-de-sac be relocated, access to lot 51 and lot 308 for 27.5m long Restricted Access Vehicles (RAV Category 2 and 4) is not impacted. A new reservation boundary would be established for the relocated cul-de-sac without a need for an interim reservation boundary due to the greater separation from the kerbline to the home on lot 308. The Opinion of Probable Cost to relocate the cul-de-sac is $271,260 including GST.

The Opinion of Probable Cost for the emergency accessway works is an additional $75,460 including GST.

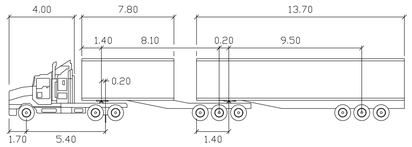
The amounts noted exclude any costs associated with land acquisitions.

If this is the City's preferred option, then preliminary designs should be prepared to establish the scope of works, land acquisition areas, and updating designs to the emergency access.

ATTACHMENT 1:
Retain existing cul-de-sac layout



27.5m TRUCK TURNING MOVEMENT
SCALE: 1:250

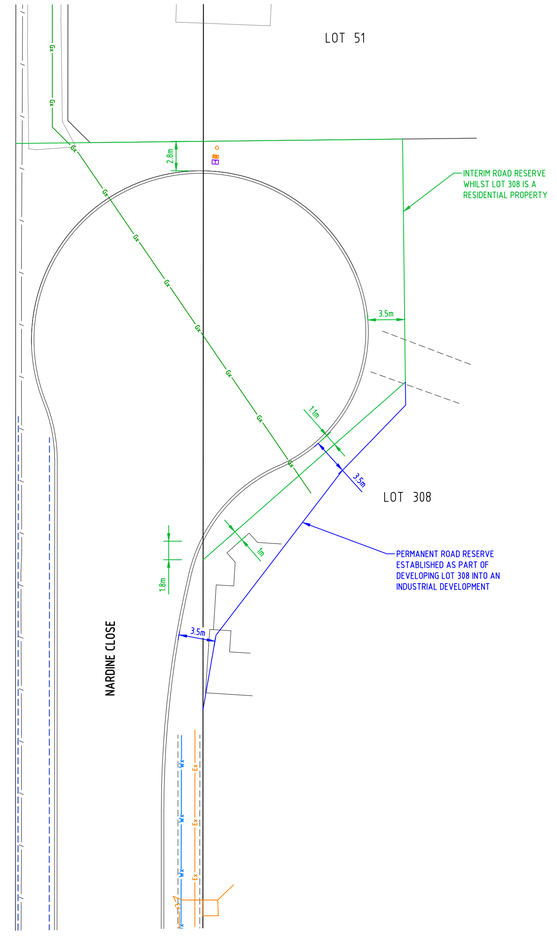


MRWA B-Double metric

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.5
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

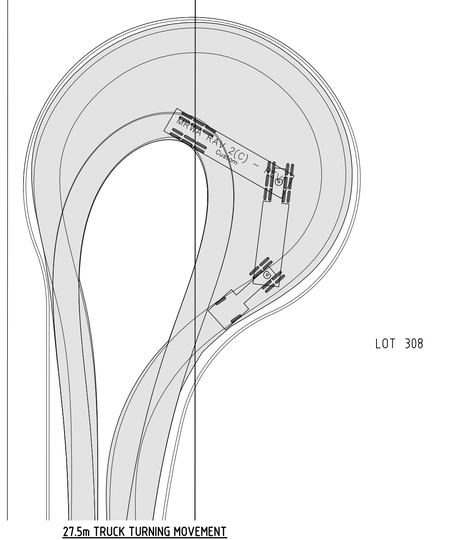
LEGEND

- EXISTING CONTOUR
- PROPOSED ROAD RESERVE BOUNDARY
- PROPOSED FUTURE ROAD RESERVE BOUNDARY
- EXISTING ROAD/KERB
- EXISTING RETAINING WALL
- EXISTING DRAINAGE OPEN DRAIN
- Wx EXISTING WATER MAIN
- Ex EXISTING POWER LINE
- Tx EXISTING TELECOMMUNICATIONS
- Gx EXISTING GAS



PROPOSED ROAD RESERVE BOUNDARY PLAN
SCALE: 1:250

NARDINE CLOSE ROAD LAYOUT
SCALE: 1:500



27.5m TRUCK TURNING MOVEMENT
SCALE: 1:250

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1:250 0 2.5 5 10 15 Half Size 1:500 - SCALE (m)

1:500 0 5 10 20 30 Half Size 1:1000 - SCALE (m)

PROJECT:
NADINE CLOSE FORRESTFIELD

No.	DATE	REVISION	BY
B	19-6-2020	CHANGES AS PER CLIENT	MEG
A	15-6-2020	ISSUED FOR APPROVAL	MEG

Porter Consulting Engineers
Level 2 Kishorn Court
58 Kishorn Road
Mt Pleasant 6153 WA
PO Box 1036
Canning Bridge 6153 WA
Tel (08) 9315 9955
Fax (08) 9315 9959
Email office@portereng.com.au
www.portereng.com.au
TIGMO Pty Ltd ACN 070 097 948 as Trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 616 396 385

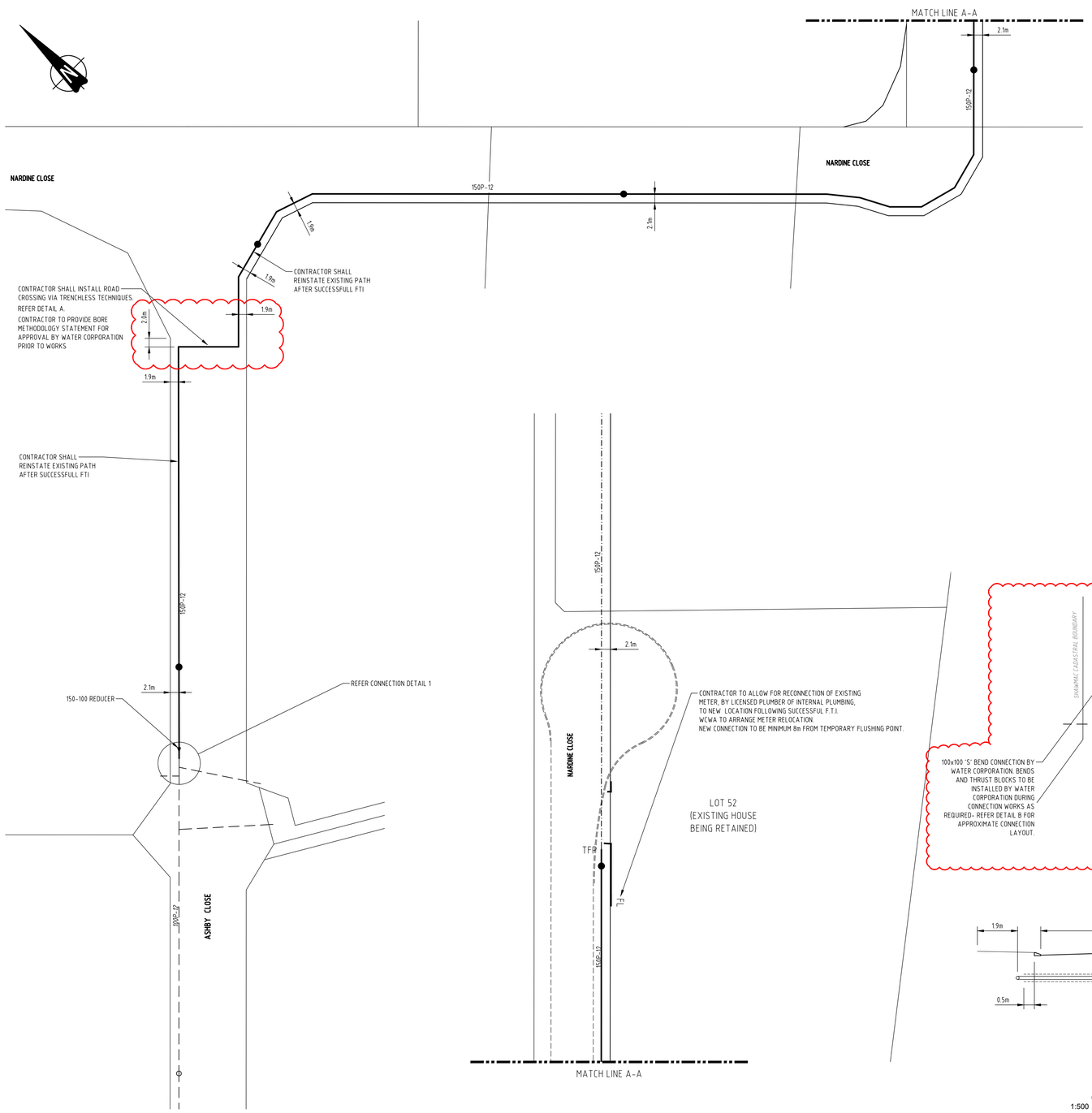
CLIENT:
CITY OF KALAMUNDA

DRAWING:
REVIEW OF EXISTING TURNAROUND

STATUS: **FOR APPROVAL**

SCALE	AS ABOVE
DATE	JUNE 2020
DESIGN	MC
DRAWN	MEG
CHECK	
DRAWING No.	20-6-81/800
REV No.	B
ORIGINAL DRAWING SIZE	A1
FILE NAME	S:\ACTIVE PROJECTS\20-06-081\ACAD\20681-800.dwg
APP'D	

ATTACHMENT 2:
Existing services plan



LEGEND

- WATER RETICULATION BOUNDARY
- EXISTING RETAINING WALL
- PROPOSED POST AND PANEL WALL
- 150P-12 — PROPOSED WATER MAIN, PIPE SIZE AND MATERIAL DESIGNATION
- PROPOSED HYDRANT & SLUICE VALVE
- EXISTING WATER MAIN, HYDRANT & SLUICE VALVE
- FUTURE WATER MAIN, HYDRANT & SLUICE VALVE
- CHANGE IN PIPE DIAMETER
- "FL" OR "FR" — DENOTES SIDE OF LOT TO BE SERVICED (VIEWED FROM THE ROAD)
- "D" — DEFERRED CONNECTION
- FP — FLUSHING POINT (X)
- HYDRANT RRPM (BLUE) 130mm OFFSET FROM CENTRELINE
- SERVICE LAID IN THIS STAGE FOR RELEASE IN FUTURE STAGE
- SERVICE LAID IN PREVIOUS STAGE TO BE RELEASED IN THIS STAGE

NUMBER OF SERVICES

PRELAID SHORT SINGLE	- 1
PRELAID SHORT DUAL	- 0
PRELAID LONG SINGLE	- 0
PRELAID LONG DUAL	- 0
DEFERRED SERVICES	- 0
TOTAL CONNECTION	- 1
TOTAL LOTS SERVED	- 1

EXTENSION

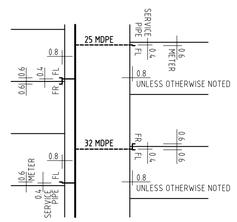
CONTRACTOR TO LAY 403m OF 150P-12

CONNECTION

CONNECTIONS (1) TO BE MADE BY WATER CORPORATION

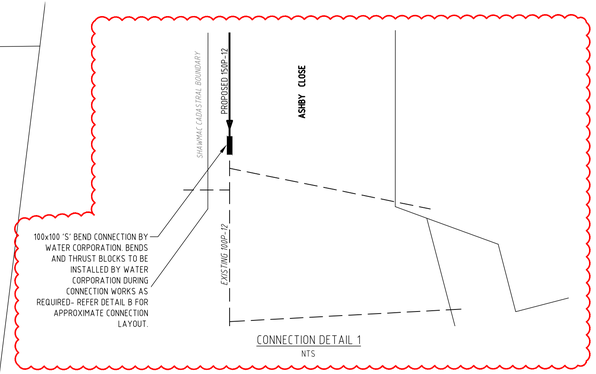
GENERAL NOTES

1. ALL WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH WATER CORPORATION MANUALS AND STANDARDS.
2. **SERVICES, SUCH AS SEWER, WATER, GAS, TELEPHONE, ELECTRICITY, AND DRAINAGE MAY BE ENCOUNTERED DURING CONSTRUCTION OF THE WORKS. SERVICES INFORMATION SHOWN ON DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. BEFORE EXCAVATION COMMENCES THE LOCATION OF ALL SUCH SERVICES SHALL BE OBTAINED FROM THE RELEVANT AUTHORITIES.**
3. **CO-ORDINATE THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO COMMENCEMENT OF WORK. ANY CONFLICTS ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.**
4. UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN METRES.
5. ALL PIPES SHALL BE INSTALLED TO WITHIN 3.5m OF EXISTING MAIN. CONNECTION TO EXISTING BY WATER CORPORATION TO BE ORGANISED BY CONTRACTOR.
6. UNLESS OTHERWISE DIRECTED BY THE ENGINEER, COVER REQUIREMENTS SHALL COMPLY WITH THE WATER CORPORATION STANDARDS.
7. MINIMUM CLEARANCE TO GAS = 300mm, MINIMUM CLEARANCE TO OTHER SERVICES = 150mm.
8. ALL WORKS SHALL BE IN DRY GROUND. GROUND WATER SHALL NOT BE PERMITTED TO ENTER PIPES.
9. UNLESS OTHERWISE SHOWN ON THIS DRAWING OR VARIED BY THE ENGINEER ALL PIPES AND FITTINGS SHALL BE LAID ON AN ALIGNMENT OF 2.1m FROM THE CENTRE OF THE PIPE TO THE ROAD RESERVE BOUNDARY.
10. FLUSHING POINTS SHALL BE INSTALLED ON ALL MAINS AT CONNECTION POINTS TO EXISTING MAINS OR WHERE SPECIFIED.
11. CONTRACTOR SHALL INSTALL FLUSHING POINTS AT ALL DEAD ENDS.
12. UNLESS DIMENSIONED OTHERWISE, MAINS SHALL EXTEND AT LEAST 8m ALONG THE FRONT OF LAST LOT SERVED.
13. ALL VALVES SHALL BE OPPOSITE BOUNDARY PEGS UNLESS DIMENSIONED OTHERWISE, ALL HYDRANTS SHALL BE POSITIONED IN THE MIDDLE OF LOTS OR OPPOSITE BOUNDARY PEGS AS SHOWN.
14. SERVICE CROSSINGS SHALL BE LOCATED AT RIGHT ANGLES TO BOUNDARY AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE WATER CORPORATION.
15. THE CONTRACTOR SHALL ALLOW FOR ALL AS CONSTRUCTED INFORMATION (INCLUDING SURVEY) TO BE PLOTTED IN ACCORDANCE WITH THE WATER CORPORATIONS CURRENT PRACTICE AND DELIVERED TO THE ENGINEER FOR SIGNING AND PRESENTATION TO THE WATER CORPORATION.
16. IT IS DEEMED THAT THE AS CONSTRUCTED DOCUMENTS FORM PART OF THE WORKS. PRACTICAL COMPLETION CAN NOT BE AWARDED IF ACCEPTABLE AS CONSTRUCTED DOCUMENTS HAVE NOT BEEN PROVIDED TO THE ENGINEER.



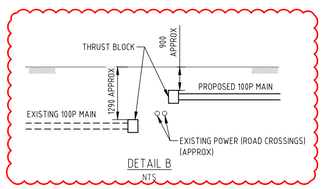
TYPICAL LONG AND SHORT PRELAID SERVICE DETAIL

NOT TO SCALE



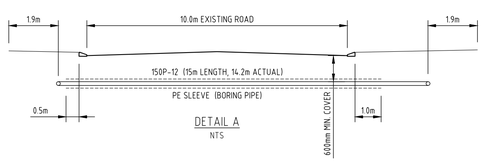
CONNECTION DETAIL 1

NTS



DETAIL B

NTS



DETAIL A

NTS

1:500 0 5 10 20 30 Half Size 1:1000 - SCALE (m)

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WATER RETICULATION DETAILS

WAPC No	:	155145
SUB FILE	:	
MAIN EXT FILE	:	JT1 2019 00613 V01
PLAN	:	NB19-103-001-01B

THIS PLAN IS ACCEPTED AS COMPLYING WITH OVERALL SCHEME PLANNING

COMPLIANCE WITH RELEVANT MANUALS REMAINS THE RESPONSIBILITY OF THE CONSULTING ENGINEERS.

NO WORKS ARE TO COMMENCE ON SITE UNTIL STARTUP ARRANGEMENTS HAVE BEEN MADE WITH THE RELEVANT WORKS INSPECTOR. SEE DEVELOPER'S MANUAL FOR CONTACT DETAILS

..... FOR MANAGER LAND SERVICING

PROJECT:
FORRESTFIELD INDUSTRIAL AREA ROAD 2A - STAGE 1

No	DATE	REVISION	BY
4	5-6-2019	CONNECTION DETAIL 1 ALTERED, DETAIL B ADDED	MEG
3	23-4-2019	WATER CROSSING RELOCATED, DETAIL A AMENDED	DLC
2	29-3-2019	ISSUED FOR CONSTRUCTION	MEG
1	6-3-2019	WATER CORPORATION DETAILS ADDED, EXISTING WATER DETAILS UPDATED	MEG
0	21-12-2018	ISSUED FOR TENDER	DLC
G	16-11-2019	ASHBY CLOSE WATER MAIN MOVE TO OPPOSITE SIDE OF ROAD, CONNECTION ALTERED	MEG
F	6-9-2017	WAPC, LOT DETAILS AND CONNECTION NOTES ADDED.	MJV
E	19-01-2017	SPLIT INTO 2 STAGES, NOTES ADDED	MEG

Porter Consulting Engineers

Level 2 Kishorn Court
58 Kishorn Road
Mt Pleasant 6153 WA

PO Box 1036
Canning Bridge 6153 WA

Tel (08) 9315 9955
Fax (08) 9315 9959
Email office@porterseng.com.au
www.porterseng.com.au

TUONO Pty Ltd ACN 010 091 168 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:
CITY OF KALAMUNDA

DRAWING:
WATER RETICULATION PLAN STAGE 1

STATUS: **FOR CONSTRUCTION**

SCALE	1:500
DATE	SEPT 2017
DESIGN	BJH
DRAWN	MJV
CHECK	
APP'D	
DRAWING No.	16-9-116/300
REV No.	4
ORIGINAL DRAWING SIZE	A1
FILE NAME	S:\ACTIVE PROJECTS\16-09-116\ACAD\169116-300-301.dwg

CONTRACTOR NOTES:

1. DRAWING TO BE READ IN CONJUNCTION WITH CONTRACT DRAWINGS AND SPECIFICATIONS.
2. ALL WORKS TO BE COMPLETED IN LINE WITH WESTERN POWER POLICIES INCLUDING THE UDS, WADCM, DDC, DSM, DCSH, UCIM AND EARTHING FAQ. ALL MATERIALS USED MUST BE APPROVED WESTERN POWER MATERIALS.
3. VERIFY ALL MATERIAL QUANTITIES AGAINST SITE CONDITIONS PRIOR TO QUOTATION AND ADVISE ELECTRICAL CONSULTANTS OF ANY VARIATIONS.
4. SHOW CAUTION IN PROXIMITY TO EXISTING ASSETS. ALWAYS REFER TO CURRENT DBYD DRAWINGS. POTHOLE TO LOCATE IF NECESSARY. PROTECT SERVICES AS REQUIRED. DO NOT ENCROACH MINIMUM APPROACH DISTANCES FOR UNDERGROUND OR OVERHEAD ASSETS.
5. LIAISE WITH WESTERN POWER AS REQUIRED. ORGANISE PRE-HANDOVER INSPECTION AND ENERGISATION SCHEDULE WITH WESTERN POWER PRIOR TO COMPLETION OF WORKS.
6. ARRANGE WITH 3E FOR ELECTRONIC AS CONSTRUCTED DRAWING COMPLETION AND SUBMISSION TO WESTERN POWER.
7. MAKE ALLOWANCE FOR TERRACING OF CABLES WHERE REQUIRED, INCLUDING FOR ROAD CROSSINGS.
8. CLEAN BEDDING SAND TO BE IMPORTED FOR CABLE TRENCHES WHERE EXISTING MATERIALS DO NOT MEET WP REQUIREMENTS.
9. PLAN CABLE RUNS TO LIMIT THE NUMBER OF STRAIGHT JOINTS.
10. COMMENCE LAYING CABLES FROM THE TRANSFORMER, SWITCHGEAR OR UNIVERSAL PILLAR.
11. ALL CABLES LAID NEXT TO RETAINING WALLS TO BE IN CONDUIT. EXTEND CONDUIT 2m PAST WALL ON STRAIGHT SECTIONS
12. INSTALL HEATSHRINK "END CAP" AT ALL CABLE ENDS.
13. INSTALL HEATSHRINK GLOVES ON ALL LV CABLE TERMINATION ENDS.
14. STREETLIGHT POLES MUST NOT BE INSTALLED IN FOOTPATHS. PEG POLES LOCATIONS PRIOR TO INSTALL AND NOTIFY 3E OF CLASHES IN ADVANCE.
15. ERECT LIGHT POLES ONLY AFTER NEARBY EXISTING OVERHEAD POWERLINES ARE REMOVED, WHERE NOTED.
16. BORE UNDER EXISTING ROADS.
17. CONTRACTOR TO LEAVE SUFFICIENT CABLE COILED AT ALL INTERFACE POINTS (INCLUDING JOINTS, PILLAR TERMINATIONS & POLE TERMINATIONS) TO ALLOW WP TO COMPLETE INTERFACE WORKS. INSTALL END CAPS TO PROTECT CABLE.
18. HV FEEDER CABLES TO BE INSTALLED AT DEPTHS SHOWN IN TRENCH CROSS SECTIONS TO ALLOW FOR CLEARANCES TO OTHER AND FUTURE CABLES.
19. ELECTRICAL CONTRACTOR TO INSPECT EXISTING METER BOARD AND CONSUMER SUPPLY, TO DETERMINE APPROPRIATE NEW CONSUMER MAINS ARRANGEMENT, SUPPLY, INSTALL & TERMINATE NEW UNDERGROUND CONSUMER MAINS TO NEW PILLAR, RELOCATE AND MAKE APPROPRIATE ALTERATIONS TO EXISTING METER BOARD.

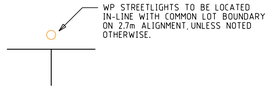
WESTERN POWER SCOPE OF WORKS

Ⓐ WP TO COST TO CARRY OUT TERMINATION OF NEW 240LV CABLE TO UNI PILLAR LOT 4. WP TO SUPPLY ALL MATERIALS AND CARRY OUT ALL ASSOCIATED WORKS.

WP STANDARD 10.5m POLE
WITH STANDARD
3m SINGLE OUTREACH
NOT TO SCALE

NOTE:
10.5m STANDARD SINGLE OUTREACH POLE WITH ROAD FLAIR 80W LED 4L LAMP TO BE GALVANISED

ALL STREETLIGHT CABLE TO BE IN CONDUIT IF OUTSIDE WP ALIGNMENT.



STREETLIGHT POLE LOCATION

NOTE: ALL UNMETERED SUPPLIES (Including CUSTOMER AND WESTERN POWER STREETLIGHTING ASSETS)					
TYPE OF EQUIPMENT	NO of UNITS	UNIT WATTAGE	TOTAL WATTAGE	DAILY HRS OPERATION	WP Asset Yes / No
10.5m WP STANDARD POLE + STANDARD SOR + ROAD FLAIR 80W LED 4L LUMINAIRE	4	80W	320W	DUSK/DAWN	YES
NOTE: ALL UNMETERED SUPPLIES and STREETLIGHTS MUST BE INCLUDED IN DESIGN DRAWING					

*ASTERISK DENOTES CHANGE IN LOAD ON AN EXISTING CIRCUIT

TRANSFORMER SPECIFICATIONS AND LOCATION	FUSEWAY NO.	CIRCUIT NO.	FUSE AMPS	CABLE mm²	CIRCUIT NAME	VOLT DROP	AMPS	TOTAL AMPS
EXISTING 630kVA Tx LOT 100 22kV (827A) ADMD=200kVA/ HECTARE	1	1	-	630	CONTIGUOUS SUPPLY	47.27V	403A	438A
	2							
	3	2*	315	240	L.E.S LOT 308	5.76V	31A	
	4	3	-	-	-	-	-	
	5	4	-	-	-	-	-	
	6	5	-	-	-	-	-	
	7	6	-	-	-	-	-	
	8	7	315	240	-	0.41V	6A	

Dimensions and scales to be checked prior to measuring cable lengths

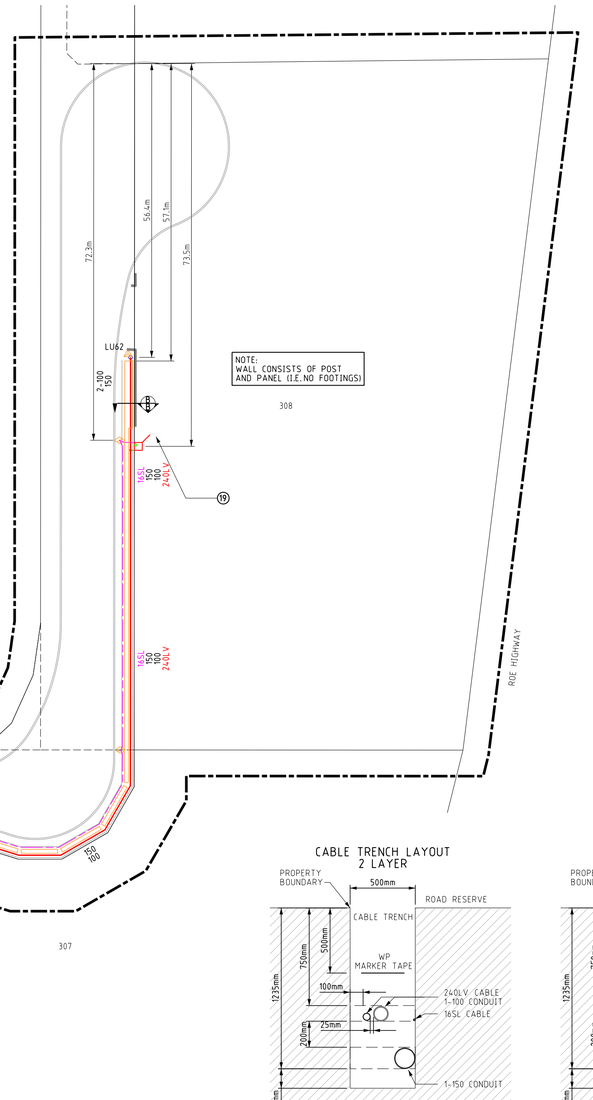
10 5 0 10 20 30 40

1:500

ARROW DENOTES DIRECTION TO PEG WITH WHICH DUCTS ARE TO BE ALIGNED

DUCTS TO BE LAID TO WP SPECIFICATION AS OUTLINED IN UNDERGROUND DISTRIBUTION SCHEMES MANUAL - POLICY AND INSTALLATION OPTIONS

DENOTES PREVIOUSLY REQUESTED DUCTS



LEGEND

SCHEME BDY.
RETAINING WALL
RETAINING WALL EXTRA FOOTING
RESTRICTED ZONE
EASEMENT

HV CABLES
CN53 - 400mm2 (3X1c)
CN49 - 240mm2 (3X1c)
CN48 - 185mm2 (3X1c)
CN50 - 95mm2 (3X1c)
CN51 - 50mm2 (3X1c)
CN51 - 50mm2 (1c)
CN46 - 35mm2 (3X1c)
CN47 - 35mm2 (1c)
EXISTING HV CABLES (SIZE AND TYPE INDICATED)

LV-SL CABLES
CN45 - 240mm2 (1x3c)
CN44 - 185mm2 (1x3c)
CN43 - 120mm2 (1x3c)
CN42 - 25mm2 (1x3c)
CN41 - 16mm2 SL (1c)
40 C PILOT
EXISTING LV CABLES (SIZE AND TYPE INDICATED)

STREET LIGHTS — EXISTING
42W CFL
80W MV
125W MV
70W HPS
150W HPS
250W HPS
250W HPS AERODROME
70W MH
150W MH
250W MH
4L LED
2L LED
3L LED
4L LED
5L LED
4L LED
LEGEND DEFINES TYPE & WATTAGE - NOT COLOUR

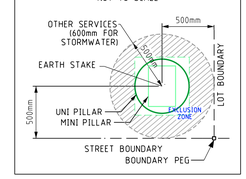
PILLARS / PITS / ETC
MINI (WORKING END)
UNIVERSAL
MINI
LINK
CABLE MARKER U/G
UMS PIT
UTILITIES PIT
100/200AMP CUTOUT
Serviced Uncleared De-energised Lot
CONDUIT / POLY PIPE

TRANSFORMER EXISTING SWITCHGEAR

AERIAL CONDUCTORS AND POLES
NEW POLE (ANY TYPE AS INDICATED)
EXISTING POLE (ANY TYPE AS INDICATED)
HV LV EXISTING AERIAL CONDUCTORS (SIZE AND TYPE INDICATED)

TYPICAL PILLAR EXCLUSION ZONE

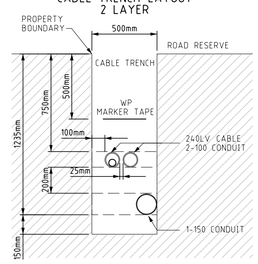
NOT TO SCALE



CABLE TRENCH LAYOUT 2 LAYER

SECTION A-A
NOT TO SCALE

CABLE TRENCH LAYOUT 2 LAYER



SECTION B-B
NOT TO SCALE

REV	DESCRIPTION	DATE	DRAWN	CHKD
B	AS CONSTRUCTED	28-06-19	DA	VH
	ISSUED TO CLIENT FOR CONSTRUCTION	12-03-19	DA	VH
A	ISSUED TO WESTERN POWER FOR CONFORMANCE	23-01-19	DA	VH
2	WP PROJECT NUMBER ADDED, DESIGN UPDATED TO SUIT EXISTING ASSET LOCATIONS SHOWN IN WP DIP.	21-01-19	DA	VH
1	ISSUED TO CLIENT FOR COMMENT	12-12-18	DA	VH

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e_mail: garywarne@optusnet.com.au

IF WORKING IN THE VICINITY OF EXISTING OVERHEAD DISTRIBUTION OR TRANSMISSION LINES.
REFER TO "WORKSAFE" REGULATION 364

THE LOCATION OF EXISTING SERVICES ARE APPROXIMATE ONLY. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN. ALWAYS REFER TO CURRENT DBYD DRAWINGS. CONFIRM ASSET LOCATIONS ON SITE BEFORE COMMENCEMENT OF WORK.
REFER TO "WORKSAFE" REGULATION 321

LAT 31° 57' 58" S
LONG 116° 00' 14" E

Scale	1:500 @ A1	Original Paper Size	
Base File Date	09-03-2017	H.Datum	PCG94
Designed	DA	Drawn	DA
Checked	VH	Approved	DLJ
Western Power Reference No.	MS017351	WAPC No.	155145
Local Authority	CITY OF KALAMUNDA		
Civil Consultant	PORTER CONSULTING ENGINEERS		

NARDINE CL & ASHBY CL FORRESTFIELD STAGE 1

ROADWAY EXTENSION ELECTRICAL RETICULATION LAYOUT

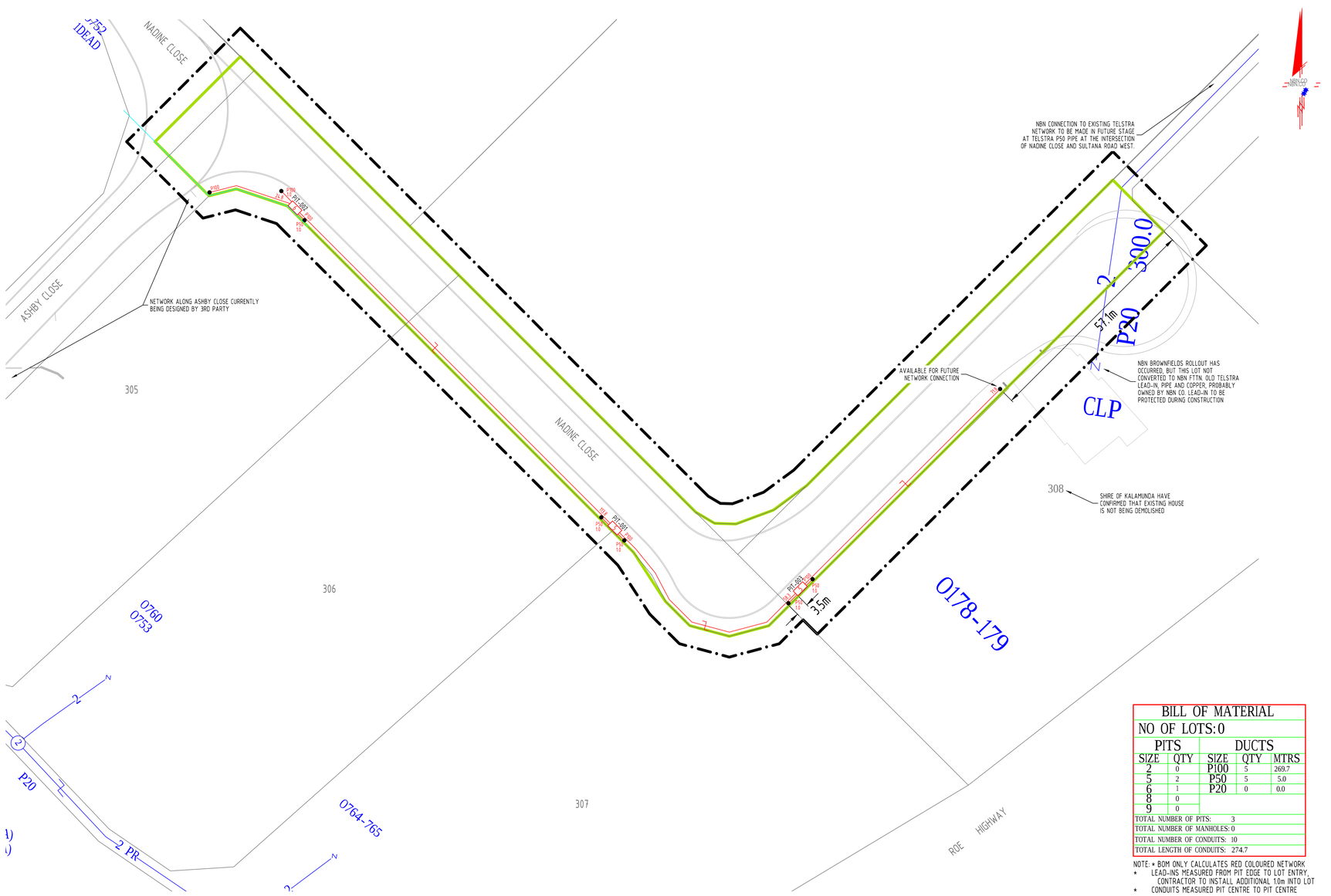
Sheet	OF	3E Drawing Number	Revision
1	1	3E18121-01	B

SPECIFIC NOTES

19. REFER TO DETAIL & DIAGRAM SHEET FOR NBN PIT AND PIPE DESIGN GENERAL NOTES AND DETAIL DIAGRAMS
20. BOTH THE FIBRE REQUEST AND THE PIT AND PIPE DESIGN PROVIDE FOR 0 SINGLE RESIDENTIAL GREENTITLE LOTS

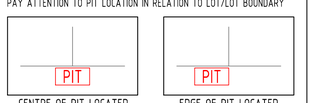
LEGEND

- STAGE BOUNDARY
- CONSTRUCTION BOUNDARY
- PROPOSED RETAINING WALL
- EXISTING TELSTRA PIT & PIPE. IN RURAL AREAS OWNERSHIP OF TELSTRA DISTRIBUTION CABLE PASSES TO NBN CO UNDER THE BROWNFIELDS ROLLOUT. OWNERSHIP OF DISTRIBUTION PIT & PIPE RETAINED BY TELSTRA
- NBN CONDUIT/LEAD-IN CONSTRUCTED UNDER OTHER STAGE
- NBN CONDUIT/LEAD-IN CONSTRUCTED IN CURRENT STAGE EXCEPT WHERE LOTS DENOTED BY (*) SYMBOL
- NBN LEAD-IN CONSTRUCTED IN CURRENT STAGE TO A LOT TO BE RELEASED IN A FUTURE STAGE
- PIT-ID X — NBN PIT CONSTRUCTED UNDER OTHER STAGE, PIT TYPE "X" AS INDICATED BELOW
- PIT-ID 2 — SERVICE DROP ACCESS PIT (650mm × 280mm × 565mm)
- PIT-ID 5 — SERVICE DROP ACCESS/BOUNDARY/FJL PIT (SINGLE LID) (700mm × 450mm × 650mm)
- PIT-ID 6 — SERVICE DROP ACCESS/LOCAL NETWORK/FJL PIT (DUAL LID) (1360mm × 555mm × 650mm)
- PIT-ID 8 — DISTRIBUTION/LOCAL NETWORK CONNECTION PIT (DUAL LID) (1360mm × 555mm × 860mm)
- NBN MANHOLE
- (5) EXISTING TELSTRA PIT ("M" INDICATES MANHOLE)
- PIT AND PIPE (INCLUDING LEAD-INS) BEING CONSTRUCTED WITH THIS STAGE BUT LOTS TO BE RELEASED IN A FUTURE STAGE.
- PIT AND PIPE (INCLUDING LEAD-INS) WERE CONSTRUCTED WITH A PREVIOUS STAGE BUT LOTS TO BE RELEASED IN THIS STAGE.
- 15m EARTH POTENTIAL RISE (EPR) ZONE REFER TO GENERAL NOTE 13
- SHARED TRENCH SYMBOL



CAUTION: PIT LOCATIONS VARY

PAY ATTENTION TO PIT LOCATION IN RELATION TO LOT/LOT BOUNDARY



CENTRE OF PIT LOCATED AT LOT/LOT BOUNDARY

EDGE OF PIT LOCATED AT LOT/LOT BOUNDARY

BILL OF MATERIAL

NO OF LOTS: 0

PITS SIZE	PITS QTY	DUCTS SIZE	DUCTS QTY	DUCTS MTRS
2	0	P100	5	269.7
5	2	P50	5	5.0
6	1	P20	0	0.0
8	0			
9	0			

TOTAL NUMBER OF PITS: 3
TOTAL NUMBER OF MANHOLES: 0
TOTAL NUMBER OF CONDUITS: 10
TOTAL LENGTH OF CONDUITS: 274.7

NOTE: * BOM ONLY CALCULATES RED COLOURED NETWORK
* LEAD-INS MEASURED FROM PIT EDGE TO LOT ENTRY, CONTRACTOR TO INSTALL ADDITIONAL 1.0m INTO LOT
* CONDUITS MEASURED PIT CENTRE TO PIT CENTRE

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REFER TO "WORKSAFE" REGULATION 3.64

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REFER TO 'WORKSAFE' REGULATION 3.21

SHEET DESCRIPTIONS
SHEET 1 - NBN PIT & PIPE DESIGN
SHEET 2 - NBN PIT & PIPE GENERAL NOTES, DETAILS AND DIAGRAMS
SHEET 3 - NBN CO GENERAL LEGEND SHEET, NOT REQUIRED FOR PIT & PIPE CONSTRUCTION

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REV	DATE	DRAFTER	DESCRIPTION	APPROVED
2	25-06-19	DA	AS CONSTRUCTED, NOTE ADDED INDICATING FUTURE CONNECTION TO TELSTRA NETWORK	CHKD: BB | APPR: DLJ
1	02-05-19	KW	P100 EXTENDED AROUND TRUNCATION FROM PIT-002. ISSUED FOR CONSTRUCTION	CHKD: BB | APPR: DLJ
0	04-04-19	DA	EXTENT OF NETWORK REDUCED, PIT REMOVED, SUBMITTED TO NBN CO FOR REVIEW	CHKD: BB | APPR: DLJ
A	13-12-18	DA	SUBMITTED TO CLIENT FOR COMMENT	CHKD: BB | APPR: DLJ

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Australia's broadband network

Dimensions and scales to be checked prior to measuring cable lengths
10 5 0 10 20 30 40
1:500 @ A1 Original Paper Size

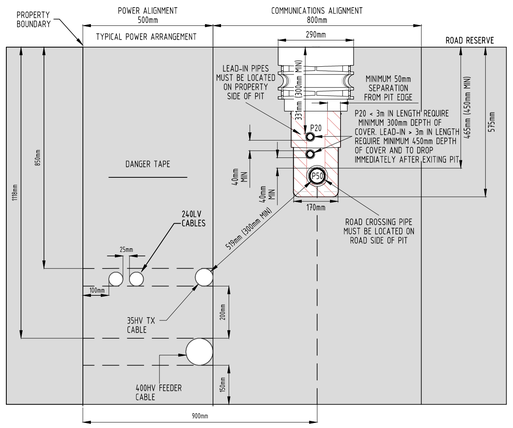
DESIGN DATE:	22-11-2018
BASE FILE DATE:	09-03-2017
WAPC No(s):	155145
LOCAL AUTHORITY:	SHIRE OF KALAMUNDA
CIVIL CONSULTANT:	PORTER CONSULTING ENGINEERS

DRAWING TITLE:
ASHBY CLOSE & SULTANA ROAD
HIGH WYCOMBE, STAGE 1
NBN PIT AND PIPE LAYOUT
ROAD WAY EXTENSION

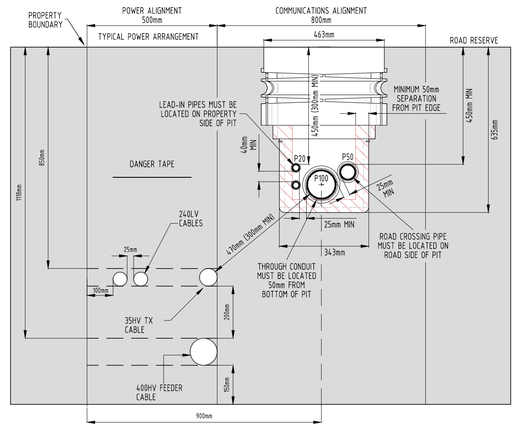
ENABLE#:	N/A		
STATE:	WA	REGION:	PCG94
FSA:	N/A	SAM:	N/A ADA: N/A
PROJECT No:	AYCA-4A7VBV		
CADREF No:	3E18121-11		
SCALE	1:500	SHEET No.	1 OF 3
REV.	2		

GENERAL NOTES

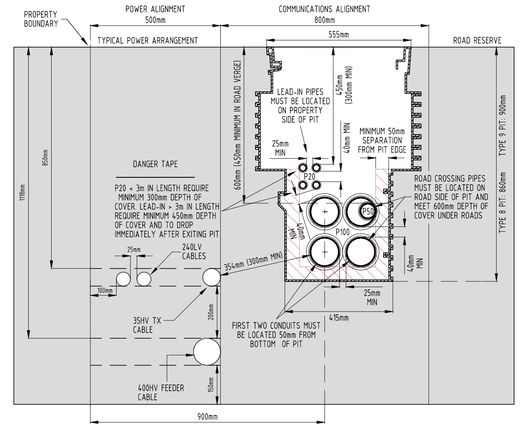
1. REFER TO CIVIL ENGINEERS DRAWINGS FOR SERVICES TRENCH ALIGNMENT DETAILS
2. ALL COMMUNICATION WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH NBN CO. DOCUMENT NBN-TE-CTO-194 "NEW DEVELOPMENTS: DEPLOYMENT OF THE NBN CO. CONDUIT AND PIT NETWORK - GUIDELINES FOR DEVELOPERS". NBN CO. GUIDELINES ARE AVAILABLE AT http://www.nbnco.com.au » Industry » Property Developers » Technical Guidelines
3. ON GAZETTED ROAD RESERVES NBN NETWORK CONDUIT TO BE INSTALLED ON THE 900mm ALIGNMENT WITH ALL NBN PLANT WITHIN THE 500-1300mm ALIGNMENT. IN SITUATIONS WHERE THERE ARE DUAL NETWORKS (NEW OR EXISTING, e.g. TELSTRA) THE NBN CONDUIT IS TO BE INSTALLED ON THE 1100mm ALIGNMENT. WHERE THE PRESCRIBED ALIGNMENT IS UNAVAILABLE, LIAISE WITH CIVIL CONSULTANT
4. ALL CONDUITS PIPES & LEAD-INS TO BE SEALED AND FITTED WITH DRAW ROPE
5. INSTALLATION OF AN IDENTIFICATION TAPE IS NOT REQUIRED
6. MINIMUM DEPTH OF COVER FOR CONDUITS SHOULD BE IN ACCORDANCE WITH NBN-TE-CTO-194, AS FOLLOWS
   - 450mm MINIMUM COVER IN ROAD VERGE
   - 600mm MINIMUM COVER FOR LATERAL ROAD CROSSINGS
   - 650mm MINIMUM COVER ON PRIVATE PROPERTY FOR LEAD-IN/SERVICE DROP PIPE
7. CONDUIT AND PIPE SIZES ARE TO CONFORM TO AS1477 TABLE 4.2(A):
   - P20 NOMINAL = 23.7mm MEAN ID, 26.8mm MEAN OD
   - P50 NOMINAL = 53.7mm MEAN ID, 60.4mm MEAN OD
   - P100 NOMINAL = 104.6mm MEAN ID, 114.3mm MEAN OD
8. LEAD IN/SERVICE DROP P23 NOMINAL FOR SINGLE RESIDENTIAL PROPERTIES, P50 NOMINAL FOR SMALL MDUs OR COMMERCIAL AND P100 NOMINAL FOR LARGE MDUs AND MEDIUM RISE BUILDINGS
9. CONDUIT BENDS SHOULD COMPLY WITH NBN-TE-CTO-194 BUT RADII SHOULD NOT BE LESS THAN
   - P20 (P23) LEAD-IN 300mm
   - P50 LEAD-IN 300mm
   - P50 ROAD CROSSING 500mm
   - P100 TRUNCATION/ROAD CROSSING 800mm (NO 90° BENDS PERMITTED ON P100 CONDUITS)
10. MINIMUM RADIAL CLEARANCES SHOULD BE MAINTAINED BETWEEN CONDUIT & OTHER PUBLIC UTILITIES, IN ACCORDANCE WITH NBN-TE-CTO-194 - SEE TRENCH CROSS SECTION DETAIL
11. PITS TO BE SET BACK
    - 5m FROM ANY INTERSECTION BACK OF KERB (BOK)
    - 1m FROM BOK ON ROAD VERGE WHERE PRACTICAL
    - 1m FROM STREETLIGHTS AND POWER POLES
    - 200mm FROM DRIVEWAYS MINIMUM, WITH 500mm OR GREATER SETBACK PREFERRED
    - 500mm FROM PARKING BAY BOK
    - BARRIER KERBS REQUIRED WHERE LESS THAN 1m SET BACKS FROM BOK UTILISED
12. ALL READILY ACCESSIBLE PLANT SUCH AS PITS TO BE INSTALLED OUTSIDE EPR ZONES, TO COMPLY WITH NBN-TE-CTO-194, COMMUNICATIONS ALLIANCE GUIDELINES G645:2011, C524:2013 AND AS3835.1
13. NBN CO DO NOT REQUIRE SERVICE EASEMENTS OVER ABOVE OR BELOW GROUND EQUIPMENT ON POS. SOME SHIRES OR TOWN COUNCILS MAY REQUIRE SERVICE EASEMENTS
14. PIT TO PIT DISTANCES SHOWN ARE APPROXIMATE ONLY
15. PITS ARE NOT TO BE INSTALLED ON DRIVEWAYS OR IN ROADWAYS
16. NO RISERS/COLLARS TO BE UTILISED ON PITS (e.g. A RISER CAN NOT BE USED IN CONJUCTION WITH A TYPE 6 PIT TO CREATE A TYPE 8 PIT)
17. PIT LIDS ARE TO BE LABELLED "NBN" WITH INDIVIDUAL LIDS WEIGHING NO MORE THAN 38kg AND WITH THE WEIGHT SHOWN ON THE LID IN ACCORDANCE WITH AS3996-2006 6.1.
18. THE INTEGRITY OF ALL CONDUIT/PIPE TO BE TESTED WITH AN 80% MANDREL



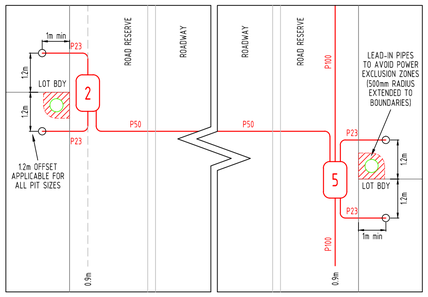
SHARED TRENCH CROSS SECTION DETAIL
TYPE 2 PITS
1:10



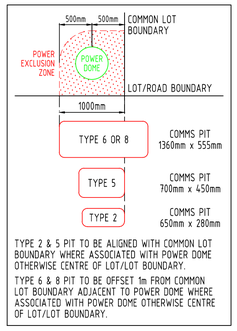
SHARED TRENCH CROSS SECTION DETAIL
TYPE 5 PITS
1:10



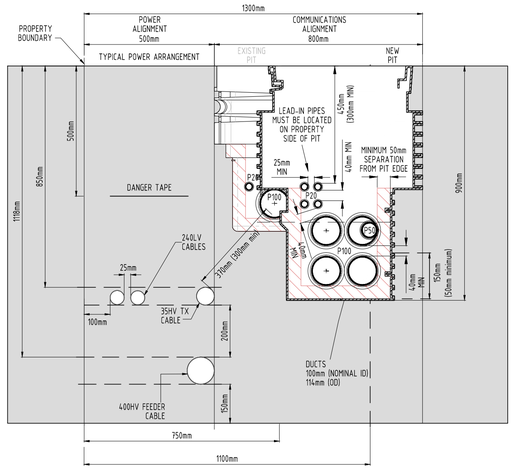
SHARED TRENCH CROSS SECTION DETAIL
TYPE 8 PITS
1:10



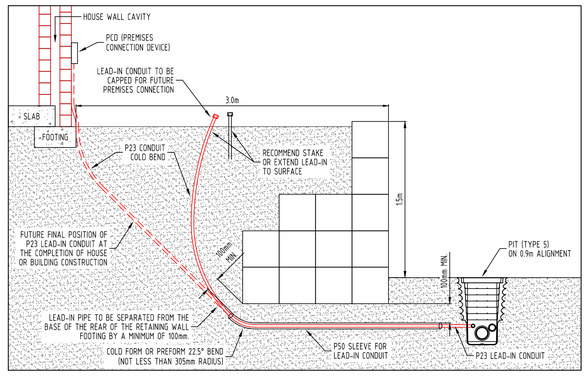
CONDUIT AND PIT ALIGNMENT WITHIN ROAD RESERVE
NTS



TYPICAL PIT LOCATION DETAIL
(ADJACENT TO POWER DOME)
NTS



SHARED TRENCH CROSS SECTION DETAIL
DUAL PIT & PIPE
1:10



TYPICAL SECTION THROUGH RETAINING WALL FOR LEAD-IN CONDUIT
1:25

SHEET DESCRIPTIONS
SHEET 1 - NBN PIT & PIPE DESIGN
SHEET 2 - NBN PIT & PIPE GENERAL NOTES, DETAILS AND DIAGRAMS
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Australia's broadband network

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Dimensions and scales to be checked prior to measuring cable lengths
10 5 0 10 20 30 40
1:500 @ A1 Original Paper Size

DESIGN DATE:	22-11-2018
BASE FILE DATE:	09-03-2017
WAPC No(s):	155145
LOCAL AUTHORITY:	SHIRE OF KALAMUNDA
CIVIL CONSULTANT:	PORTER CONSULTING ENGINEERS

DRAWING TITLE:
ASHBY CLOSE & SULTANA ROAD
HIGH WYCOMBE, STAGE 1
NBN PIT AND PIPE LAYOUT
ROAD WAY EXTENSION

ENABLE#:	N/A		
STATE:	WA	REGION:	PCG94
FSA:	N/A	SAM:	N/A
ADA:	N/A		
PROJECT No:	AYCA-4A7VBV		
CADREF No:	3E18121-11		
SCALE	1:500	SHEET No.	2 OF 3
REV.	2		

POP — PRIVATELY OPERATED PAYPHONES

APS — ASSISTANCE TELEPHONES (EG ELEVATOR AND ROADSIDE PHONES)

MET — APPLY TO OTHER TYPE OF METERING POINT (any service)

ATM — ATM

PRK — BANDSTAND / ROTUNDA / SPORTS FIELD STANDS / OTHER PARK BUILDING

PSD — POINT OF SALE DEVICE (vending machine, ticket machine)

TRF — Traffic Lights / Traffic Light Controller / Variable Speed Sign / Traffic Signal

PBT — Public Transport (bus stop, tram stop, railway station, taxi rank, ferry wharf)

SWT — Links / Link Pole / MV / HV Links / ABC Links / Dynamic Switch / Airbrake Switch / Isolator

WAT — Water Infrastructure (storage, pumps, valves water supply, waste water, sewerage stations)

GAS — Natural Gas Infrastructure

CAM — Camera (security / traffic)

CTL — Bridge control, swing bridge, traffic control gates, railway boom gates)

MOB — Mobile Phone Tower / radio antenna

LIT — Street Lighting Pole / street light controller

CAR — Unmanned (council) car park

PWR — Transformer / Kiosk / Pad Mount Sub-station / Pole Mount Transformer

NAP-ID (N) — Network Access Point (NAP)

MPT-ID (N) — Multiport (MPT)
n is the number of ports (eg 4,6,8,12)

Penetration

CABLE TRAY:

TJL-ID — Splice Joint on a Transit Cable (TJL)

DJL-ID — Splice Joint on a Distribution Cable (DJL)

LJL-ID — Splice Joint on a Local Cable (LJL)

MJL-ID — Splice Joint on a Tether Cable (MJL)

AJL-ID — Zone Terminal / Splice Joint (AJL)

FDH-ID — Fibre Distribution Hub-FDH Cabinet with Cabinet ID shown

PIT-ID 2 — Service Drop Access Pit (650mmX280mmX565mm)

PIT-ID 5 — Network Boundary/Local Network Pit (Single Lid) (700mmX450mmX650mm)

PIT-ID 6 — Distribution/Local Network Connection Pit (Dual Lid) (1360mmX555mmX650mm)

PIT-ID 8 — Distribution/Local Network Connection Pit (1360mmX555mmX860mm)

PIT-ID 9 — Fibre Distribution Hub (FDH) Pit (2000mmX555mmX900mm)

Shared Trench

NTD — nbn NTD

OBBU — NBN Optional Battery Backup Unit

PDH — nbn Premises Distribution Hub

CTL — nbn Cable Transition Location

FDT — nbn Fibre Distribution Terminal

FIP — nbn NTD Fire Indicator Panel

Riser — Riser

LIFT — nbn NTD LIFT

AP — Access Panel

SEC — nbn NTD Security

CET — nbn Communications Earth Terminal

DES / QTY — Example of descriptor box that will show the type of work and the quantity involved

nbn manhole

Existing Telstra manhole

FAN AAAA — Fan Access Node site (FAN)

138A RX CX — Multi Dwelling Unit (MDU)

NBN.CO

DEPTH —
ALIGN — DEPTH OVER ALIGNMENT SYMBOL TO BE USED WITH EVERY MARKER POST

Symbol to be used when replacing/removing existing network

PCD — Premise Connection Device (PCD)

POLE-ID — Pole (showing pole identity)

5 — Existing Telstra Pit (2,3,4,5,6,7,8,9)
Telstra exchange

T — Example of Telstra Major Conduit Layout with Proposed duct marked to be used by NBN

M < _ > — NBN MARKER POST
MARKER POST TO BE NUMBERED

CONDUIT CONFIGURATION

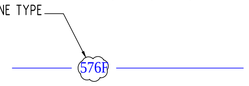
CONDUITS AND DUCTS ARE IN LAYER :
< L460 NBN Support - Underground >
AND TERMINOLOGY CATEGORIZED INTO TWO GROUPS IN THE DRAWING AS PER BELOW:
1- DUCT USED WITH LOCAL NETWORK
2-CONDUIT USED WITH LEAD-IN DROPS
ATTRIBUTES ATTACHED ARE AS SHOWN

CABLE CONFIGURATION

CABLE TYPE:
CABLES DIVIDE INTO FOLLOWING CATEGORIES AND ARE COLOUR CODED:

TRANSIT CABLES	COLOUR NO: 1	312F
DISTRIBUTION CABLES	COLOUR NO: 190	288F
LOCAL CABLES	COLOUR NO: 4	144F
TETHER CABLES	COLOUR NO: 3	12F
LEAD IN (DROP) CABLES	COLOUR NO: 5	1F

CABLE SIZE:
CABLE SIZE IS THE TOTAL NUMBER OF OPTIC FIBRES IN THE CABLE AND IS DETERMINED BY A NUMBER FOLLOWED BY F (FIBRE) OR R (RIBBON) IN THE MIDDLE OF THE LINE TYPE



CABLE LOCATION:
CABLE LOCATIONS DETERMINES WHERE THE CABLE IS USED AS PER BELOW:

IN-CONDUIT	288F
AERIAL	144F
BURIED	96F

LINE TYPES ARE CATEGORIZED INTO 3 TYPES:
1- IN-CONDUIT: (XXXF) 312F , ...
2- AERIAL: (XXXF_A) 144_A , ...
3- BURIED: (XXXF_B) 12_B , ...

EXAMPLE:

144 FIBRE AERIAL LOCAL CABLE	144F
1 FIBRE BURIED DROP CABLE	1F 1F
432 FIBRE IN-CONDUIT TRANSIT CABLE	48F

FSA Boundary
FSAM Boundary
FDA Boundary

STAFF WORKING ON THIS ESTIMATE PLEASE NOTE:
The location of other authorities services which may affect this work have not been obtained by the estimator, Constructor to obtain service information before commencing.

DANGER
LASER BEAM
EYE PROTECTION MUST BE WORN

SAFETY FIRST
SAFETY STARTS WITH YOU

DIAL BEFORE YOU DIG
www.1100.com.au

REV	DATE	DRAFTER	DESCRIPTION	APPROVED
2	25-06-19	DA	AS CONSTRUCTED, NOTE ADDED INDICATING FUTURE CONNECTION TO TELSTRA NETWORK	CHKD: BB | APPR: DLJ
1	02-05-19	KW	P100 EXTENDED AROUND TRUNCATION FROM PIT-002. ISSUED FOR CONSTRUCTION	CHKD: BB | APPR: DLJ
0	04-04-19	DA	EXTENT OF NETWORK REDUCED, PIT REMOVED, SUBMITTED TO NBN CO FOR REVIEW	CHKD: BB | APPR: DLJ
A	13-12-18	DA	SUBMITTED TO CLIENT FOR COMMENT	CHKD: BB | APPR: DLJ

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Australia's broadband network

Dimensions and scales to be checked prior to measuring cable lengths
10 5 0 10 20 30 40
1:500 @ A1 Original Paper Size

DESIGN DATE:	22-11-2018
BASE FILE DATE:	09-03-2017
WAPC No(s):	155145
LOCAL AUTHORITY:	SHIRE OF KALAMUNDA
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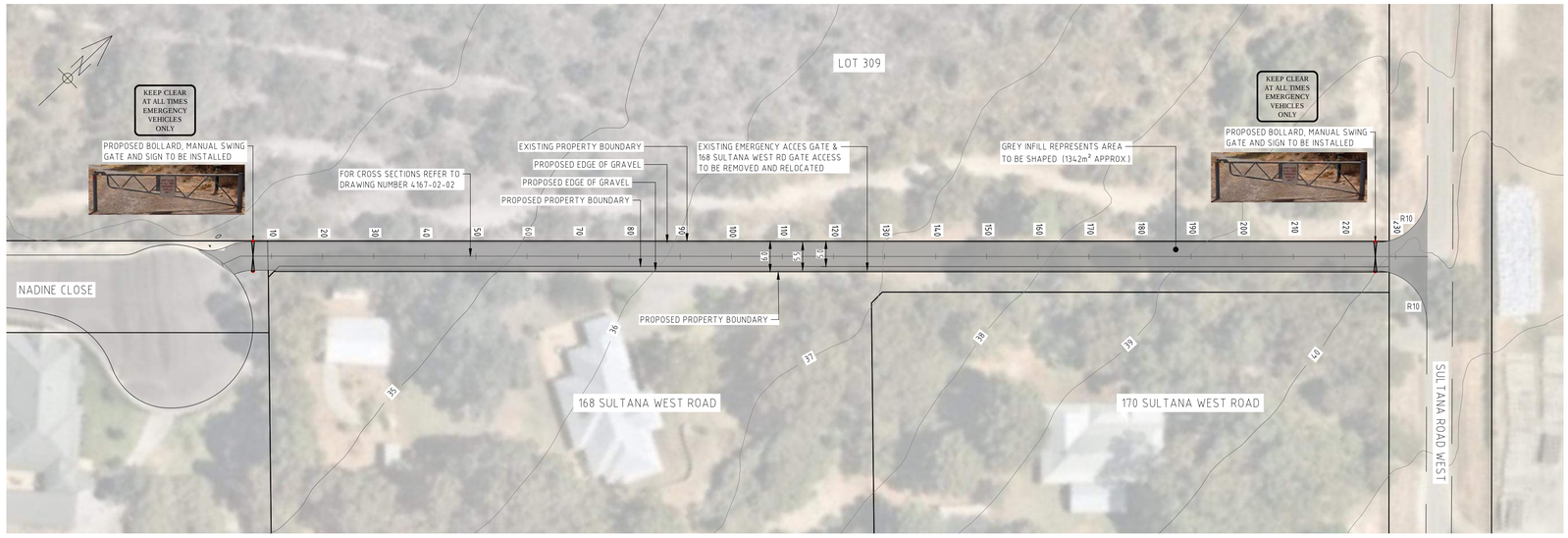
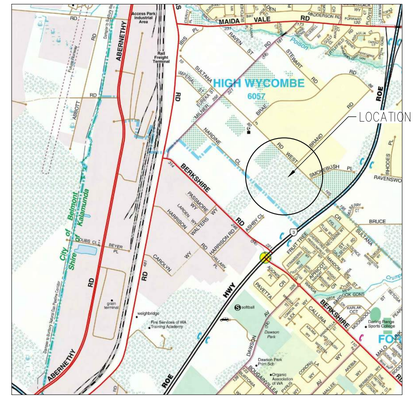
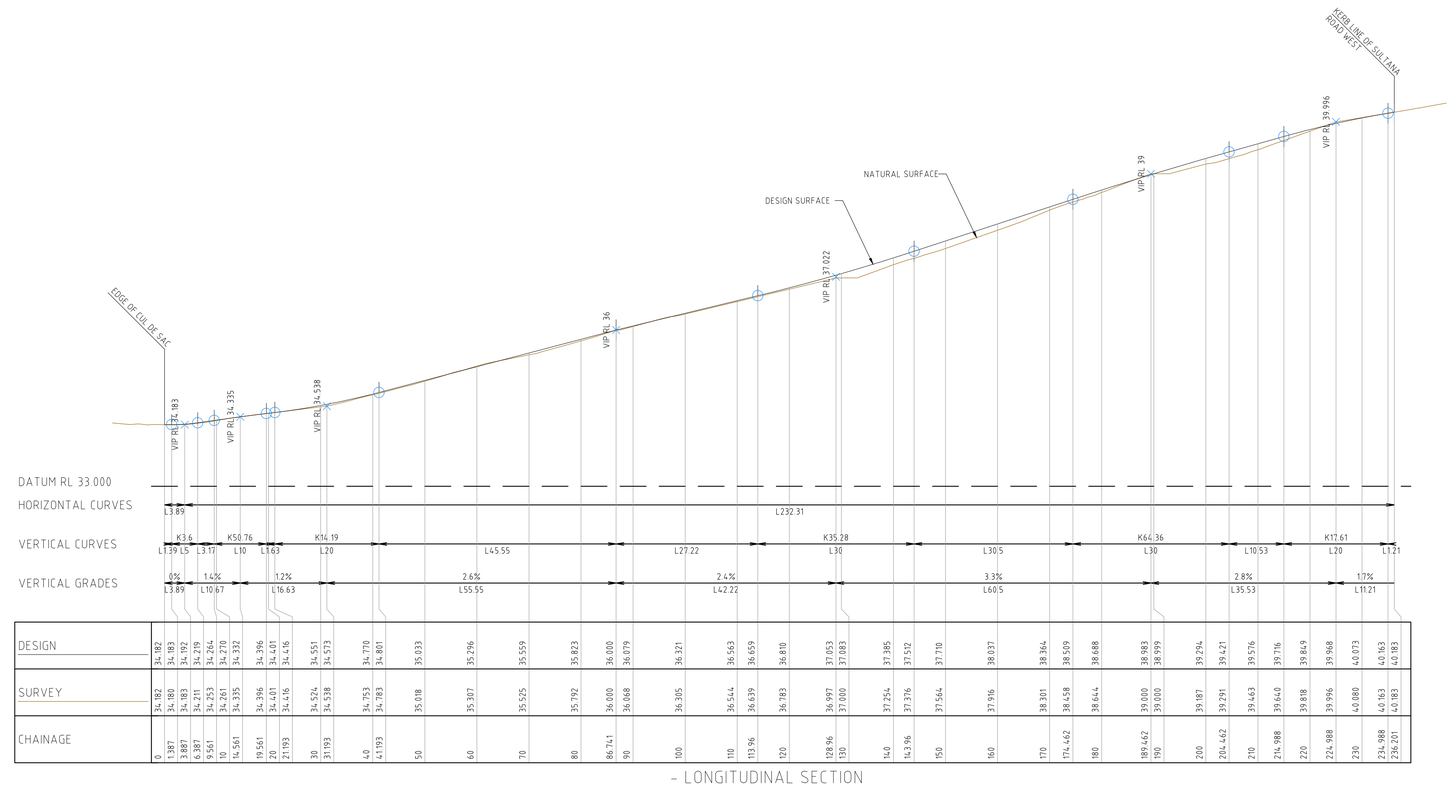
DRAWING TITLE:
ASHBY CLOSE & SULTANA ROAD
HIGH WYCOMBE, STAGE 1
NBN PIT AND PIPE LAYOUT
ROAD WAY EXTENSION

ENABLE#:	N/A		
STATE:	WA	REGION:	PCG94
FSA:	N/A	SAM: N/A	ADA: N/A
PROJECT No:	AYCA-4A7VBV		
CADREF No:	3E18121-11		
SCALE	1:500	SHEET No.	3 OF 3
REV.	2		

ATTACHMENT 3:
City of Kalamunda Emergency access way concept plan (4167-02-01/A)







LOCALITY PLAN
N.T.S

DESIGN	SURVEY	CHAINAGE
34.182	34.182	0
34.183	34.180	1.387
34.192	34.183	3.887
34.219	34.211	6.387
34.264	34.253	9.561
34.270	34.261	10
34.332	34.335	14.561
34.396	34.396	19.561
34.401	34.401	20
34.416	34.416	21.193
34.551	34.524	30
34.573	34.538	31.193
34.770	34.753	40
34.801	34.783	41.193
35.033	35.018	50
35.296	35.307	60
35.559	35.525	70
35.823	35.792	80
36.000	36.000	86.741
36.079	36.068	90
36.321	36.305	100
36.563	36.544	110
36.659	36.639	113.96
36.810	36.783	120
37.053	36.997	128.96
37.083	37.000	130
37.385	37.254	140
37.512	37.376	143.96
37.710	37.564	150
38.037	37.916	160
38.364	38.301	170
38.509	38.458	174.462
38.688	38.644	180
38.983	39.000	189.462
38.999	39.000	190
39.294	39.187	200
39.421	39.291	204.462
39.576	39.463	210
39.716	39.640	214.988
39.849	39.818	220
39.968	39.996	224.988
40.073	40.080	230
40.163	40.163	234.988
40.183	40.183	236.201

- LONGITUDINAL SECTION
A1 HORZ SCALE 1:500
A1 VERT SCALE 1:50

LEGEND:

▨ AREA OF LANE TO BE SHAPED (1342m^2 Approx.)

NOTES:

1. THIS DESIGN IS NOT FINAL AND IS CONCEPTUAL IN NATURE ONLY.
2. CADASTRAL INFORMATION APPROXIMATE ONLY.
3. DIMENSION IN METERS U.N.O
4. CONTOURS FOR INFORMATION ONLY. FINAL SURVEY REQUIRED FOR FINAL DESIGN. GROUND LOCATIONS.
5. SERVICE LOCATIONS DIAGRAMMATIC ONLY. CONTACT SERVICE AUTHORITIES FOR EXACT IN GROUND LOCATIONS.
6. KERBING TO BE CONSTRUCTED IN ACCORDANCE WITH CITY OF KALAMUNDA DRGS. 7A TO 7D
7. ALL DISTURBANCES TO EXISTING VERGE RETICULATION AND TURFING TO BE REINSTATED.

NOT FOR CONSTRUCTION

CONCEPT ONLY

WARNING
SERVICES AND CADASTRAL BOUNDARY LOCATIONS ARE ONLY INDICATIVE AND MUST NOT BE USED FOR EXCAVATION. THE "ONE CALL 1100" SYSTEM SHALL BE USED TO OBTAIN ACCURATE SERVICE LOCATIONS.

Shire of Kalamunda
ASSET SERVICES

EMERGENCY ACCESS
NARDINE CLOSE TO SULTANA ROAD WEST

MAIDA VALE

CONCEPT PLAN
1 OF 1

No.	REVISION	BY	DATE	AUTH
A	INTERNAL REVIEW	CE	19/03/20	

SCALE: 1:250
2.5 0 2.5 5.0 7.5 10.0 12.5
SCALE IN METRES
DATUM: AHD
GRID: PCG94
SURVEYED: ENGINEERING SURVEYOR
DESIGNED: C.EDMEADES 19/03/2020 TRAFFIC DESIGN OFFICER
DRAWN: C.EDMEADES 19/03/2020 TRAFFIC DESIGN OFFICER
CHECKED: L. PUDHOTA 24/04/2020 COORDINATOR DESIGN SERVICES
AUTHORISED: N. PARKER 23/04/2020 MANAGER ASSET DELIVERY
APPROVED: B. JACKSON 24/04/2020 DIRECTOR ASSET SERVICES
Discipline: TR
Structure Code: 420
JOB No. JOB NUMBER
DRAWING–No. –SHEET /REVISION 4167-02-01/A
ORIGINAL DRG. SIZE A1

4167-02-01/A

ATTACHMENT 4:
Indicative Costs for retention of the existing cul-de-sac (T092.20)

Project	**Nardine Close, High Wycombe – Temporary cul-de-sac and cost review**
Option	**The existing cul-de-sac remaining in its current position**
Client	**City of Kalamunda**
Engineer	**Michael Cook**
Job Number	**20-06-081**
Date	**19 June 2020**
File Name	**T092.20**
Revision	**B**
Reference Document	**R43.20**

Porter Consulting Engineers

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PO Box 1036
Canning Bridge WA 6153
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office@portereng.com.au
www.portereng.com.au

INDICATIVE DEVELOPMENT COSTS		
CONSTRUCTION COSTS	**TOTAL COST**	
Preliminaries	$	11,600
Earthworks and Siteworks	$	12,700
Water Reticulation	$	37,800
Roads and Paths	$	14,300
Fencing	$	7,200
Underground Power	$	17,800
Communications	$	13,700
Gas Servicing	$	2,100
Provisional: Adjustment of internal services by the western side of the residential home	$	3,000
Construction Contingency (7.5% of construction)	$	12,000
CONSTRUCTION TOTAL	**$**	**132,200**
Extra over costs for works from the interim to permanent reservation boundary.	**$**	**28,000**
DEVELOPMENT FEES AND CHARGES	**TOTAL COST**	
Local Authority Fees	$	800
Water Corporation Fees	$	1,500
Western Power Fees	$	2,500
Communications Headworks and Backhaul Charges	$	-
WAPC and Landgate Fees	$	-
Professional Fees	$	22,300
Administration Contingency (5% of fees/charges)	$	2,000
DEVELOPMENT FEES AND CHARGES TOTAL	**$**	**29,100**
SUB TOTAL COSTS	**$**	**189,300**
GST	**$**	**18,930**
TOTAL COSTS	**$**	**208,230**

We stress that these costs are indicative only and are reflective of current construction costs in the area. No allowances have been made for property costs. The reader should be satisfied that the costs are appropriate for their purpose. Porter Consulting Engineers does not accept responsibility or liability for their interpretation or use.

ATTACHMENT 5:
Indicative Costs for Emergency Access way to tie into existing cul-de-sac (T095.20)

Project	**Nardine Close, High Wycombe - Emergency Access Way development**
Option	**As per City of Kalamunda Emergency access concept plan 4167-02-01/A, based on retaining the existing cul-de-sac.**

Client	**City of Kalamuna**
Engineer	**Michael Cook**
Job Number	**20-06-081**
Date	**19 June 2020**
File Name	**T095.20**
Revision	**B**
Reference Document	**R43.20**

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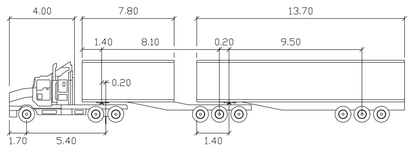
INDICATIVE DEVELOPMENT COSTS		
CONSTRUCTION COSTS		**TOTAL COST**
Preliminaries	$	8,000
Earthworks and Siteworks	$	17,000
Accessway pavement works	$	15,500
Fencing	$	19,800
Firebreaks	$	-
Electrical	$	2,800
Construction Contingency (5% of construction)	$	4,000
CONSTRUCTION TOTAL	**$**	**67,100**
DEVELOPMENT FEES AND CHARGES		**TOTAL COST**
Local Authority Fees	$	600
Professional Fees	$	6,400
Administration Contingency (5% of fees/charges)	$	1,000
DEVELOPMENT FEES AND CHARGES TOTAL	**$**	**8,000**
SUB TOTAL COSTS	**$**	**75,100**
GST	**$**	**7,510**
TOTAL COSTS	**$**	**82,610**

We stress that these costs are indicative only and are reflective of current construction costs in the area. No allowances have been made for property costs. The reader should be satisfied that the costs are appropriate for their purpose. Porter Consulting Engineers does not accept responsibility or liability for their interpretation or use.

ATTACHMENT 6:
Relocating the cul-de-sac layout

27.5m TRUCK TURNING MOVEMENT
SCALE: 1:250

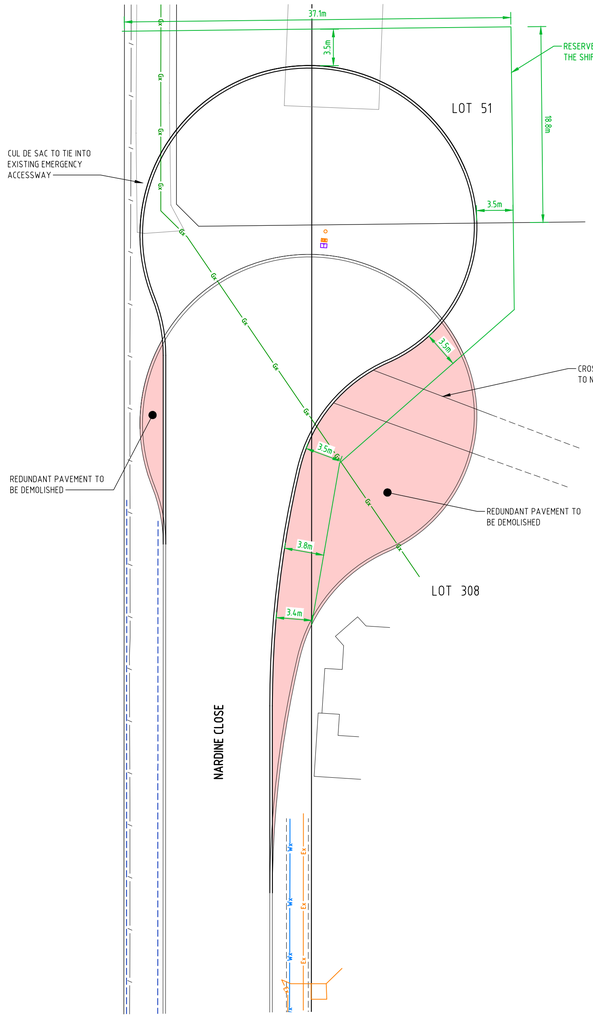


MRWA B-Double 27.5

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.5
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

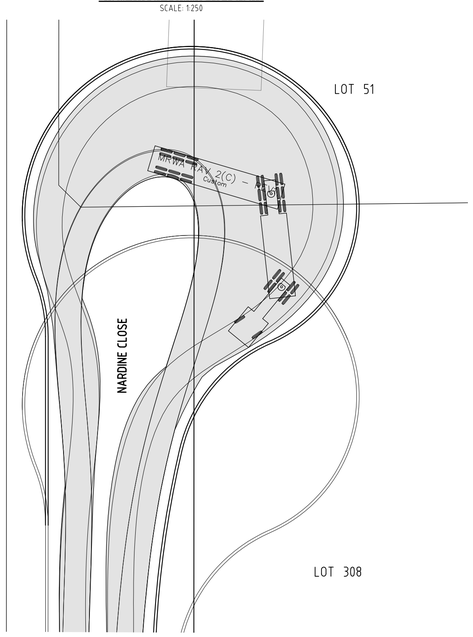
LEGEND

- EXISTING CONTOUR
- PROPOSED ROAD RESERVE BOUNDARY
- PROPOSED FUTURE ROAD RESERVE BOUNDARY
- EXISTING ROAD/KERB
- EXISTING RETAINING WALL
- EXISTING DRAINAGE OPEN DRAIN
- Wx EXISTING WATER MAIN
- Ex EXISTING POWER LINE
- Tx EXISTING TELECOMMUNICATIONS
- Gx EXISTING GAS
- PROPOSED TURN AROUND



PROPOSED ROAD RESERVE BOUNDARY PLAN
SCALE: 1:250

NARDINE CLOSE ROAD LAYOUT
SCALE: 1:500



27.5m TRUCK TURNING MOVEMENT
SCALE: 1:250

DIAL BEFORE YOU DIG www.1100.com.au

1:250 0 2.5 5 10 15 Half Size 1:500 - SCALE (m)

1:500 0 5 10 20 30 Half Size 1:1000 - SCALE (m)

PROJECT: **NADINE CLOSE FORRESTFIELD**

No.	DATE	REVISION	BY
A	15-6-2020	ISSUED FOR APPROVAL	MEG

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TIGMO Pty Ltd ACN 070 097 948 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT: **CITY OF KALAMUNDA**

DRAWING: **POSSIBLE SHIFT OF TURN AROUND**

STATUS: **FOR APPROVAL**

SCALE	AS ABOVE
DATE	JUNE 2020
DESIGN	MC
DRAWN	MEG
CHECK	
APP'D	
DRAWING No.	20-6-81/801
REV No.	A
ORIGINAL DRAWING SIZE	A1
FILE NAME	S:\ACTIVE PROJECTS\20-06-081\ACAD\20681-801.dwg

ATTACHMENT 7:
Indicative Costs for relocating the cul-de-sac layout (T093.20)

Project	**Nardine Close, High Wycombe – Temporary cul-de-sac and cost review**
Option	**Relocate the cul-de-sac**
Client	**City of Kalamunda**
Engineer	**Michael Cook**
Job Number	**20-06-081**
Date	**17 June 2020**
File Name	**T093.20**
Revision	**A**
Reference Document	**R43.20**

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INDICATIVE DEVELOPMENT COSTS		
CONSTRUCTION COSTS		**TOTAL COST**
Preliminaries	$	13,800
Earthworks and Siteworks	$	30,700
Water Reticulation	$	38,200
Roads and Paths	$	75,500
Fencing	$	8,800
Underground Power	$	20,400
Communications	$	14,500
Gas Servicing	$	2,300
Provisional: Adjustment of internal services by the western side of the residential home	$	3,000
Construction Contingency (7.5% of construction)	$	16,000
CONSTRUCTION TOTAL FOR THE INTERIM BOUNDARY	**$**	**223,200**
DEVELOPMENT FEES AND CHARGES		**TOTAL COST**
Water Corporation Standard Sewer Infrastructure Contribution	$	-
Water Corporation Standard Water Infrastructure Contribution	$	-
Water Corporation Standard Drainage Infrastructure Contribution	$	-
Local Authority Fees	$	1,400
WAPC and Landgate Fees	$	-
Professional Fees	$	15,600
Developer Contribution Scheme	$	-
DEVELOPMENT FEES AND CHARGES TOTAL	**$**	**23,400**
SUB TOTAL COSTS	**$**	**246,600**
GST	**$**	**24,660**
TOTAL COSTS	**$**	**271,260**

We stress that these costs are indicative only and are reflective of current construction costs in the area. No allowances have been made for property

ATTACHMENT 8:
Indicative Costs for Emergency Access way to tie into relocated cul-de-sac (T096.20)

Project	**Nardine Close, High Wycombe - Emergency Access Way development**
Option	**As per City of Kalamunda Emergency access concept plan 4167-02-01/A, based on the cul-de-sac being relocated.**

Client	**City of Kalamuna**
Engineer	**Michael Cook**
Job Number	**20-06-081**
Date	**19 June 2020**
File Name	**T096.20**
Revision	**B**
Reference Document	**R43.20**

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INDICATIVE DEVELOPMENT COSTS		
CONSTRUCTION COSTS		**TOTAL COST**
Preliminaries	$	8,000
Earthworks and Siteworks	$	16,400
Accessway pavement works	$	13,500
Fencing	$	17,400
Firebreaks	$	-
Electrical	$	2,800
Construction Contingency (5% of construction)	$	3,000
CONSTRUCTION TOTAL	**$**	**61,100**
DEVELOPMENT FEES AND CHARGES		**TOTAL COST**
Local Authority Fees	$	600
Professional Fees	$	5,900
Administration Contingency (5% of fees/charges)	$	1,000
DEVELOPMENT FEES AND CHARGES TOTAL	**$**	**7,500**
SUB TOTAL COSTS	**$**	**68,600**
GST	**$**	**6,860**
TOTAL COSTS	**$**	**75,460**

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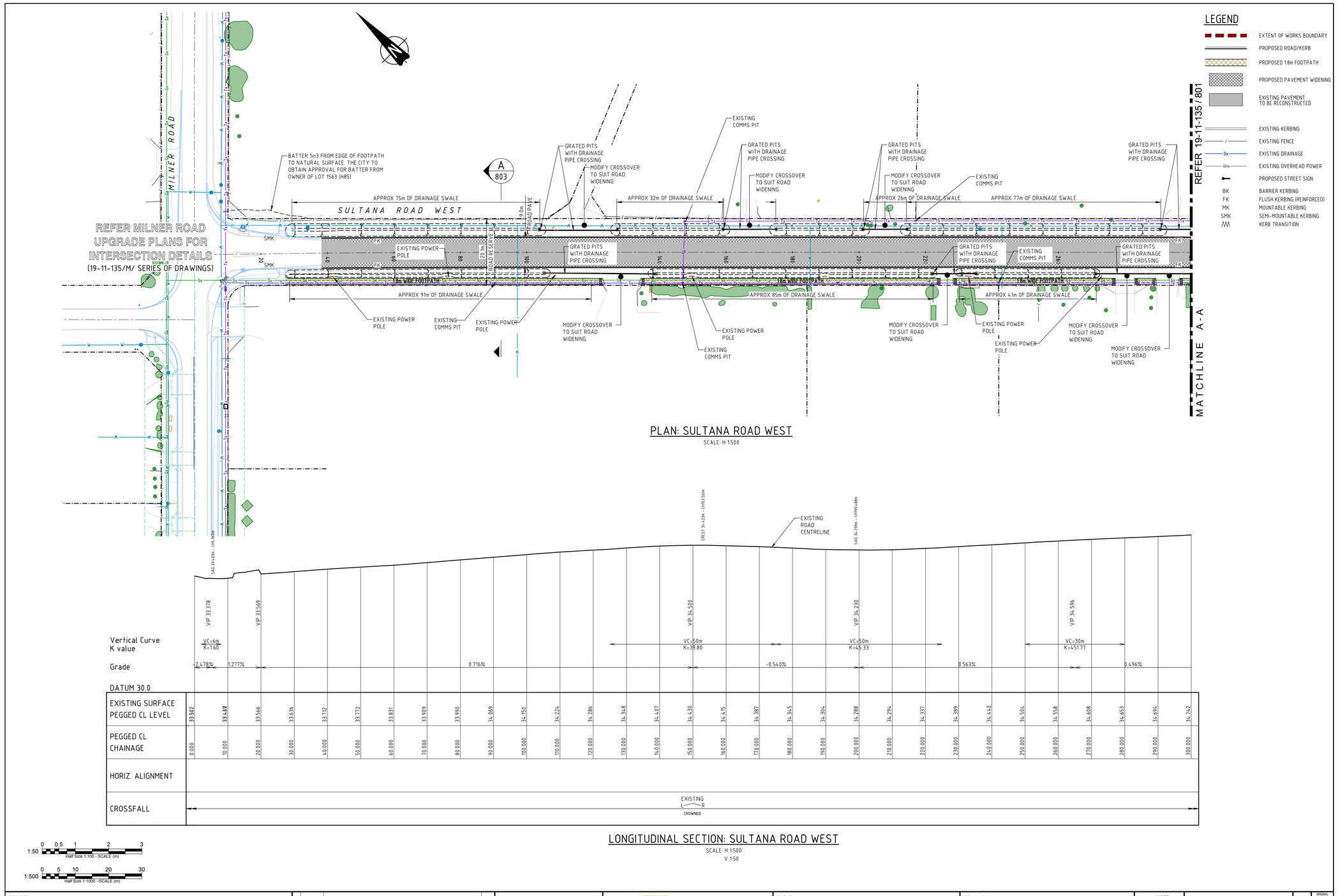
Attachment 9:
Sultana Road West (85% design status drawings)



PLAN: SULTANA ROAD WEST

SCALE: H 1:500

LONGITUDINAL SECTION: SULTANA ROAD WEST

SCALE: H 1:500
V 1:50

1:50 0 0.5 1 2 3 Half Size 1:100 - SCALE (m)

1:500 0 5 10 20 30 Half Size 1:1000 - SCALE (m)

PROJECT:
SULTANA ROAD WEST HIGH WYCOMBE

No.	DATE	REVISION	BY
C	08-06-2020	ISSUED FOR 85% DESIGN STATUS	DPE
B	15-01-2020	ISSUED FOR 25% DESIGN COMMENT	DPE
A	5-12-2019	ISSUED FOR COMMENT	DPE

Porter Consulting Engineers
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Email: office@portereng.com.au
www.porterseng.com.au
TUOAO Pty Ltd ACN 070 097 168 as Trustee for the Consulting Engineering Unit Trust Trading as Porter Consulting Engineers ABN 78 636 396 385

CLIENT:
CITY OF KALAMUNDA

DRAWING:
ROAD WIDENING CONCEPT PLAN & LONGITUDINAL SECTION SHEET 1

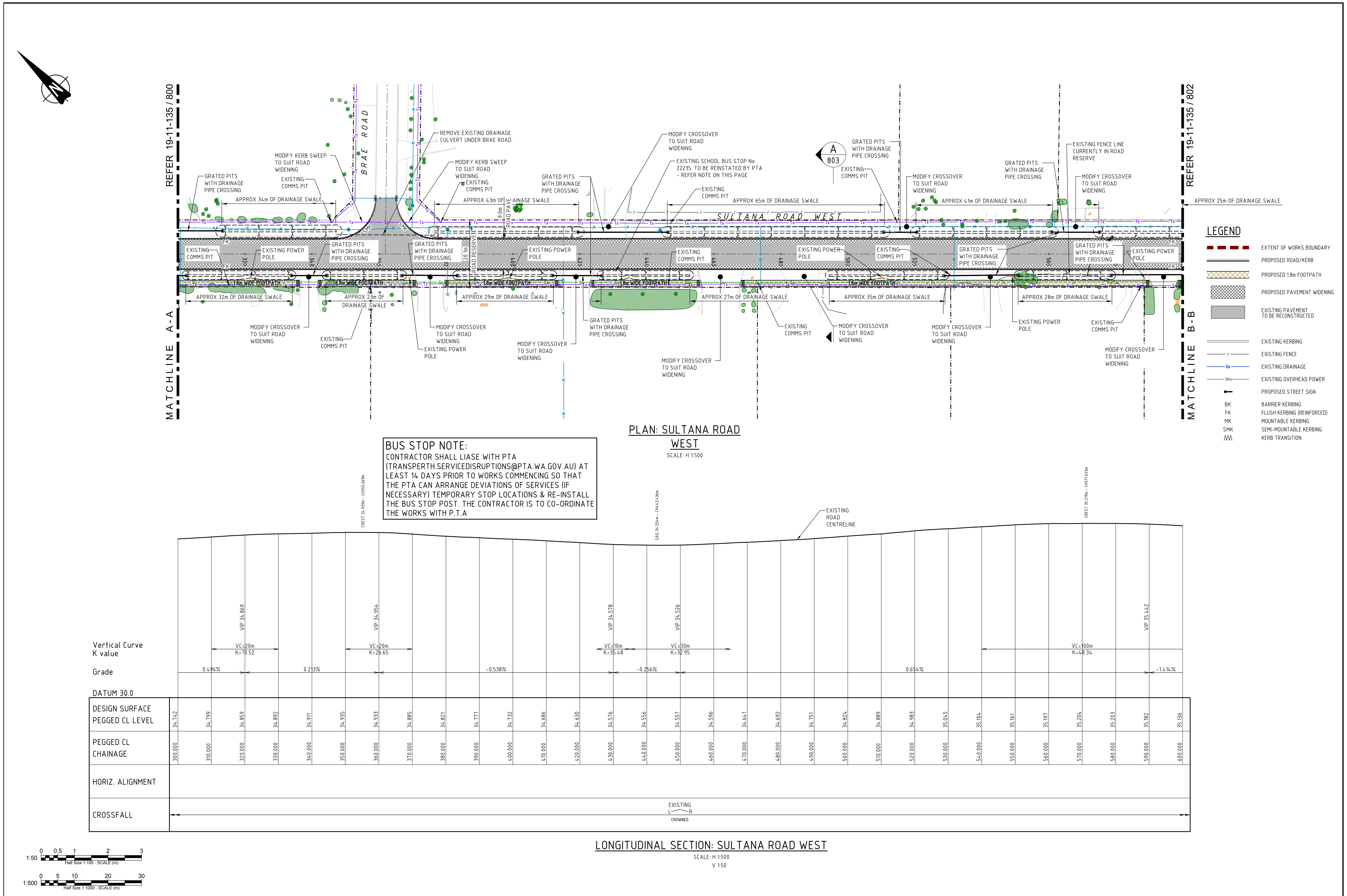
STATUS: **FOR COMMENT**

SCALE	1:1000
DATE	NOV 2019
DESIGN	DLC
DRAWN	DLC
CHECK	

DRAWING No. **19-11-135/800** REV No. **C** ORIGINAL DRAWING SIZE **A1**

FILE NAME S:\ACTIVE PROJECTS\19-11-135\ACAD\1911135-800-803.dwg

APP'D



C	08-06-2020	ISSUED FOR 85% DESIGN STATUS	DPE
B	15-01-2020	ISSUED FOR 25% DESIGN COMMENT	DPE
A	5-12-2019	ISSUED FOR COMMENT	DPE
No.	DATE	REVISION	BY

PROJECT:
SULTANA ROAD WEST
HIGH WYCOMBE

Porter Consulting Engineers
Level 2 Kishorn Court 58 Kishorn Road Mt Pleasant 6153 WA
PO Box 1036 Canning Bridge 6153 WA
Tel (08) 9315 9955
Email office@portereng.com.au
www.portereng.com.au

CLIENT:
CITY OF KALAMUNDA

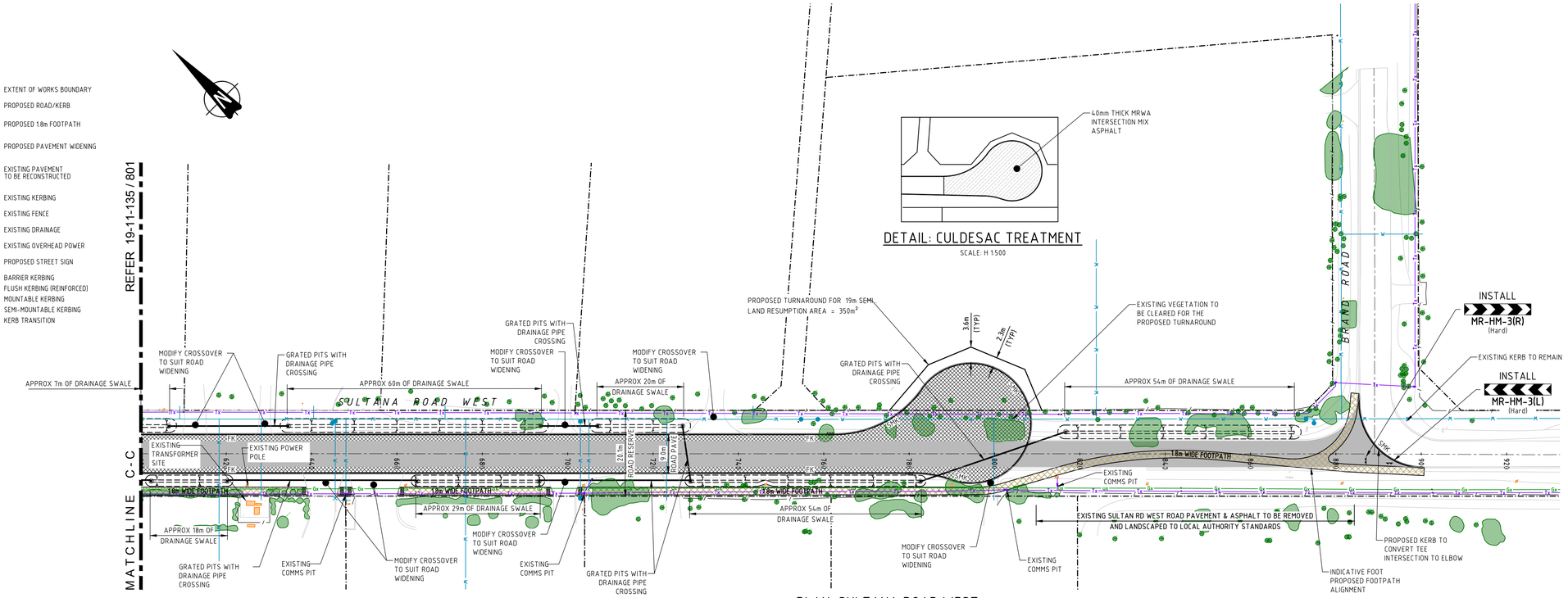
DRAWING:
ROAD WIDENING CONCEPT PLAN & LONGITUDINAL SECTION SHEET 2

STATUS: **FOR COMMENT**

SCALE: 1:1000
DATE: NOV 2019
DESIGN: DLC
DRAWN: DLC
CHECK:
DRAWING No: 19-11-135/801
REV No: C
ORIGINAL DRAWING SIZE: A1
FILE NAME: S:\ACTIVE PROJECTS\19-11-135\ACAD\1911135-800-803.dwg
APP'D:

LEGEND

- EXTENT OF WORKS BOUNDARY
- PROPOSED ROAD/KERB
- PROPOSED 18m FOOTPATH
- PROPOSED PAVEMENT WIDENING
- EXISTING PAVEMENT TO BE RECONSTRUCTED
- EXISTING KERBING
- EXISTING FENCE
- EXISTING DRAINAGE
- EXISTING OVERHEAD POWER
- PROPOSED STREET SIGN
- BK BARRIER KERBING
- FK FLUSH KERBING (REINFORCED)
- MK MOUNTABLE KERBING
- SMK SEMI-MOUNTABLE KERBING
- KERB TRANSITION

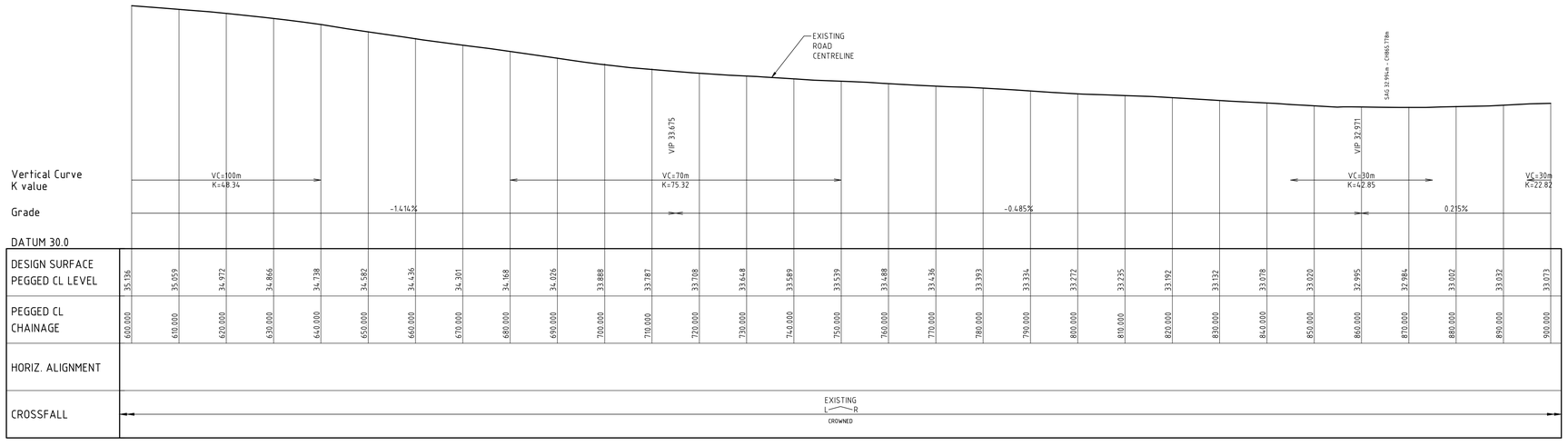


DETAIL: CULDESAC TREATMENT

SCALE: H 1:500

PLAN: SULTANA ROAD WEST

SCALE: H 1:500



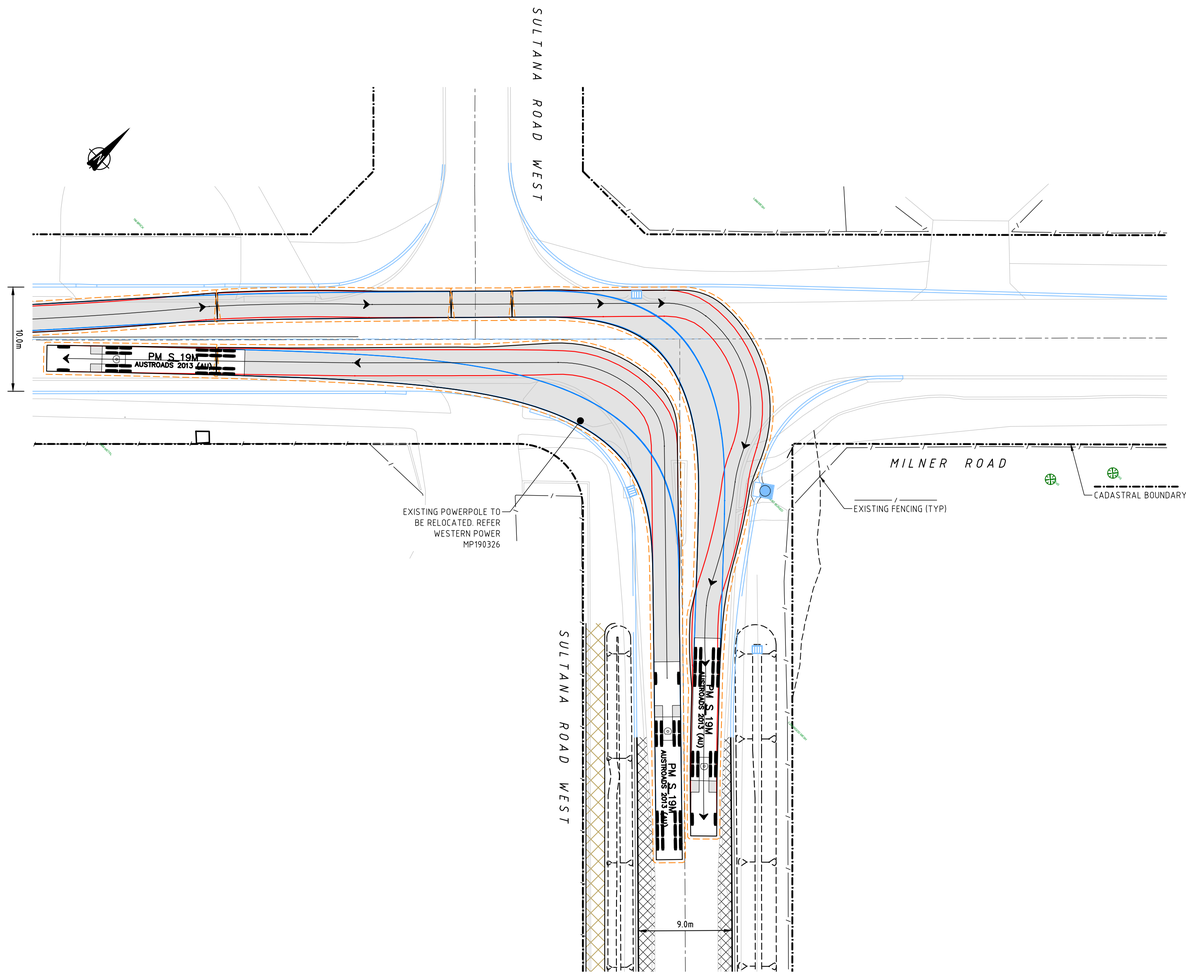
LONGITUDINAL SECTION: SULTANA ROAD WEST

SCALE: H 1:500
V 1:50

1:50 0 0.5 1 2 3 Half Size 1:100 - SCALE (m)

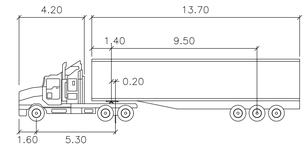
1:500 0 5 10 20 30 Half Size 1:1000 - SCALE (m)

PROJECT: **SULTANA ROAD WEST HIGH WYCOMBE**	C 08-06-2020 ISSUED FOR 85% DESIGN STATUS B 15-01-2020 ISSUED FOR 25% DESIGN COMMENT A 5-12-2019 ISSUED FOR COMMENT No. DATE REVISION	DPE DPE DPE BY	COPYRIGHT COPYRIGHT IN THIS DRAWING IS THE PROPERTY OF THE CONSULTANT. THE CLIENT HAS LICENSE TO USE THIS DRAWING FOR THE PROJECT ONLY. THE USER SHALL BE RESPONSIBLE FOR "SITE CHECKING" ALL DIMENSIONS BEFORE COMMENCEMENT OF WORK. CAD DRAWING DO NOT MANUALLY ALTER. ONLY PLANS WITH NUMERICAL REVISION (REV 'C' OR HIGHER) AND SIGNED AS APPROVED SHALL BE USED FOR CONSTRUCTION.	Porter Consulting Engineers Level 2 Kishorn Court 58 Kishorn Road Mt Pleasant 6153 WA PO Box 1036 Canning Bridge 6153 WA Tel (08) 9315 9955 Email office@portereng.com.au www.portereng.com.au TUDAO Pty Ltd ACN 070 097 948 as Trustee for the Consulting Engineering Unit Trust Trading as Porter Consulting Engineers ABN 78 636 396 385	CLIENT: **CITY OF KALAMUNDA**	DRAWING: **ROAD WIDENING CONCEPT PLAN & LONGITUDINAL SECTION SHEET 1** STATUS: **FOR COMMENT** SCALE 1:1000 · DATE NOV 2019 · DESIGN DLC · DRAWN DLC · CHECK DRAWING No. **19-11-135/802** · REV No. **C** · ORIGINAL DRAWING SIZE **A1** FILE NAME: S:\ACTIVE PROJECTS\19-11-135\ACAD\191135-800-803.dwg APP'D



MILNER ROAD / SULTANA ROAD WEST TURNING MOVEMENT

SCALE: 1:250



PM S 19M

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

0m 1.0 2.0 3.0m
1:50

0m 5 10 15m
1:250

PROJECT:
SULTANA ROAD WEST
HIGH WYCOMBE

No.	DATE	REVISION	BY
B	08-06-2020	ISSUED FOR 85% DESIGN STATUS	DPE
A	15-01-2020	ISSUED FOR 25% DESIGN COMMENT	DPE

Porter Consulting Engineers

Level 2 Kishorn Court
58 Kishorn Road
Mt Pleasant 6153 WA

PO Box 1036
Canning Bridge 6153 WA

Tel (08) 9315 9955
Email office@portereng.com.au
www.portereng.com.au

TUONO Pty Ltd ACN 070 097 168 as Trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 616 396 389

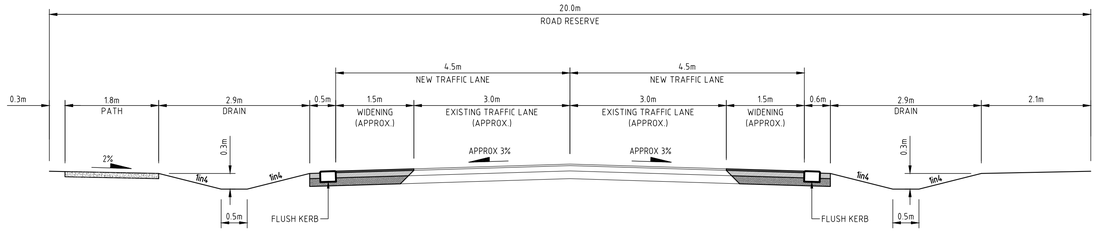
CLIENT:
CITY OF KALAMUNDA

DRAWING:
ROAD WIDENING CONCEPT
TYPICAL CROSS-SECTION & TURNING MOVEMENT
10m SULTANA ROAD WEST PAVEMENT

STATUS: **FOR COMMENT**

SCALE	1:1000
DATE	NOV 2019
DESIGN	DLC
DRAWN	DLC
CHECK	

DRAWING No: **19-11-135/802**
REV No: **C**
ORIGINAL DRAWING SIZE: **A1**
FILE NAME: S:\ACTIVE PROJECTS\19-11-135\ACAD\19111135-800-803.dwg
APP'D



TYPICAL ROAD CROSS SECTION 'A' - SULTANA ROAD WEST

SCALE: 1:50

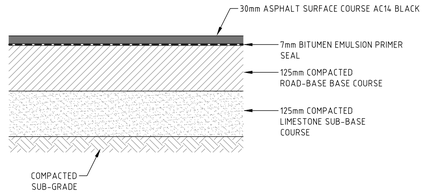
CITY OF KALAMUNDA STANDARD DRAWINGS:

- ~~TIMBER BOLLARDS ADJACENT PUBLIC OPEN SPACE ..... 1/30~~
- STANDARD DRAINAGE 2/30
- ~~STANDARD SUBSOIL DRAINAGE ..... 3/30~~
- FOOTPATH DETAIL 4/30
- ~~HEADWALL DESIGN ..... 6/30~~
- KERB DETAILS 7A/30
- MOUNTABLE KERB DETAIL 7B/30
- SEMI MOUNTABLE KERB DETAIL 7C/30
- BARRIER AND FLUSH KERB DETAIL 7D/30
- BRICK MANHOLE/GULLY PITS (BENCHED) 8/30
- MANHOLE DETAIL - PIPES 300-750 DIAMETER 9/30
- MANHOLE/FOOTPATH DETAIL 10/30
- PIPE BEDDING DETAILS 11/30
- PRAM RAMPS 12/30
- TYPICAL ROAD CROSS SECTION - URBAN 13/30
- STORMWATER - SEWER CROSSING (TYP) 14/30
- ~~TYPICAL SLOT LAYOUT - SUBSOIL DRAINAGE ..... 15/30~~
- STEP IRON DETAILS 16/30
- ~~SIDE ENTRY PIT DETAIL ..... 17/30~~

- TYPICAL CROSSOVERS - PLAN VIEW 1/3
- TYPICAL CROSSOVERS 2/3
- TYPICAL CROSSOVERS - INDUSTRIAL CROSSOVER 3/3

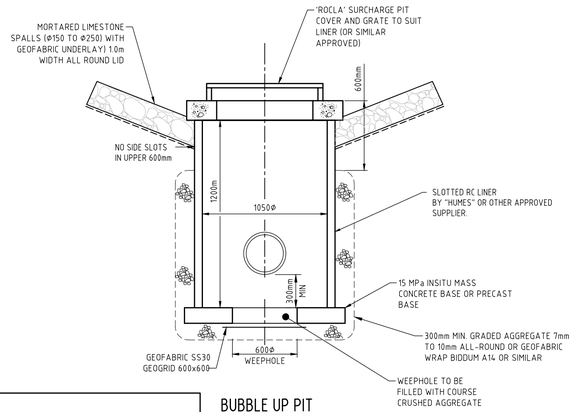
REFER CITY OF KALAMUNDA WEBSITE TO CHECK FOR CURRENT REVISIONS

https://www.kalamunda.wa.gov.au/building-development/city-assets/engineering-services



PAVEMENT RECONSTRUCTION AND WIDENING DETAIL (ON SAND SUB-GRADE)

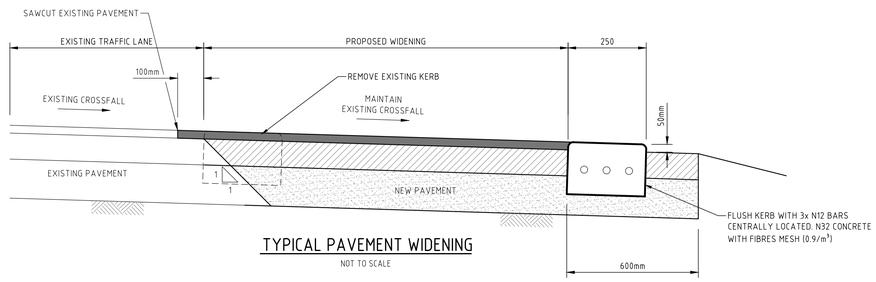
SCALE 1:10



NOTE:
STEP IRONS (NOT SHOWN) SHALL BE HOT DIP GALV. & PROVIDED IN ALL MANHOLES GREATER THAN 1000mm DEEP. STEP IRONS SHALL BE FIXED TO WALL UNITS BEFORE INSTALLATION

BUBBLE UP PIT

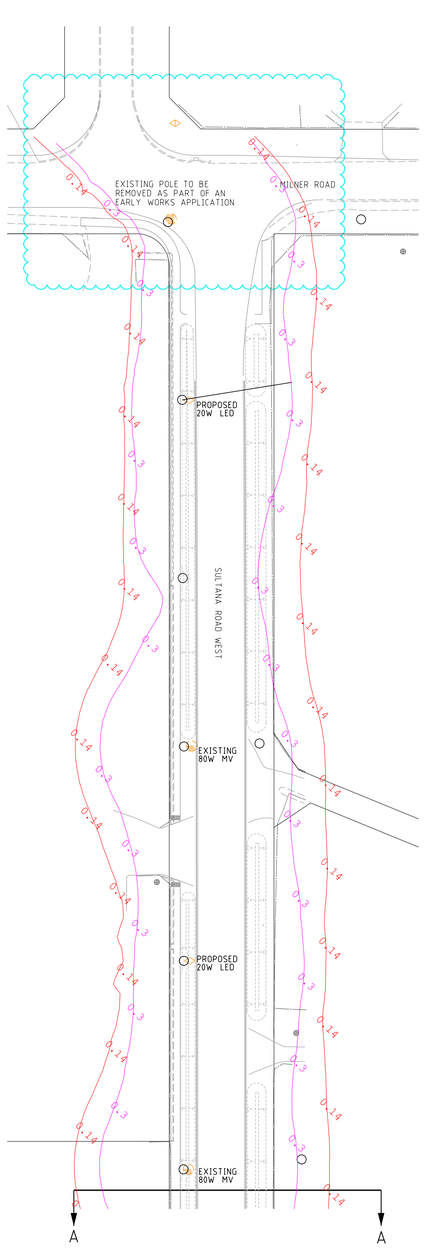
NOT TO SCALE

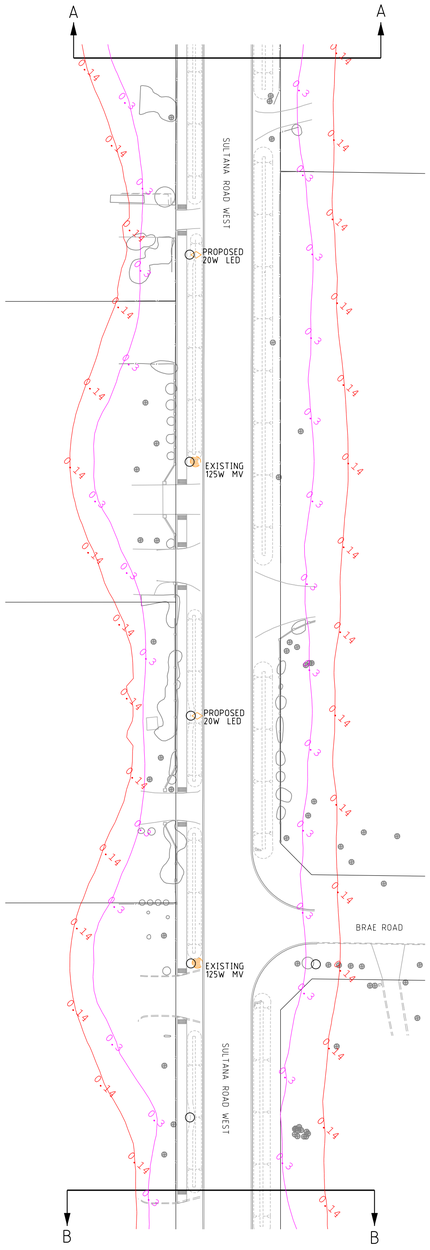


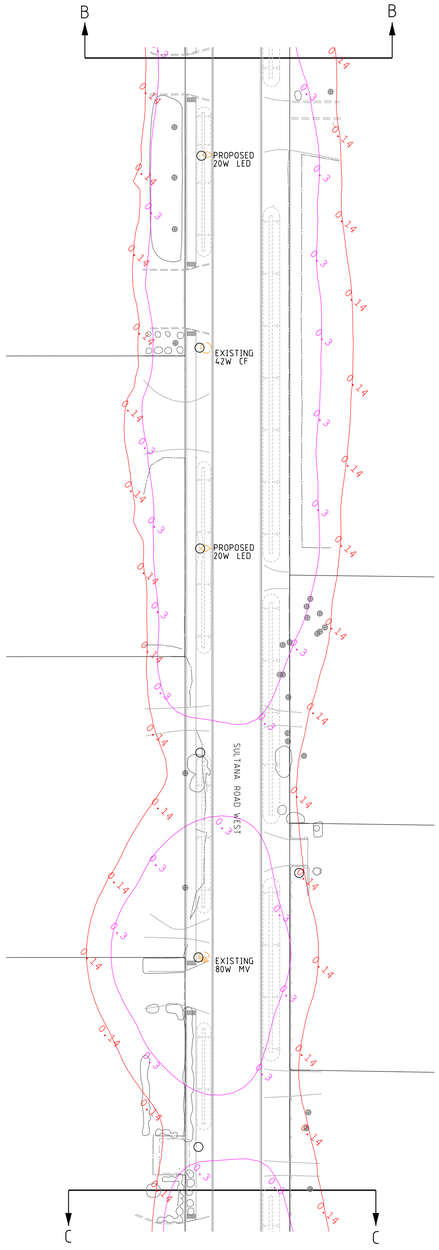
TYPICAL PAVEMENT WIDENING

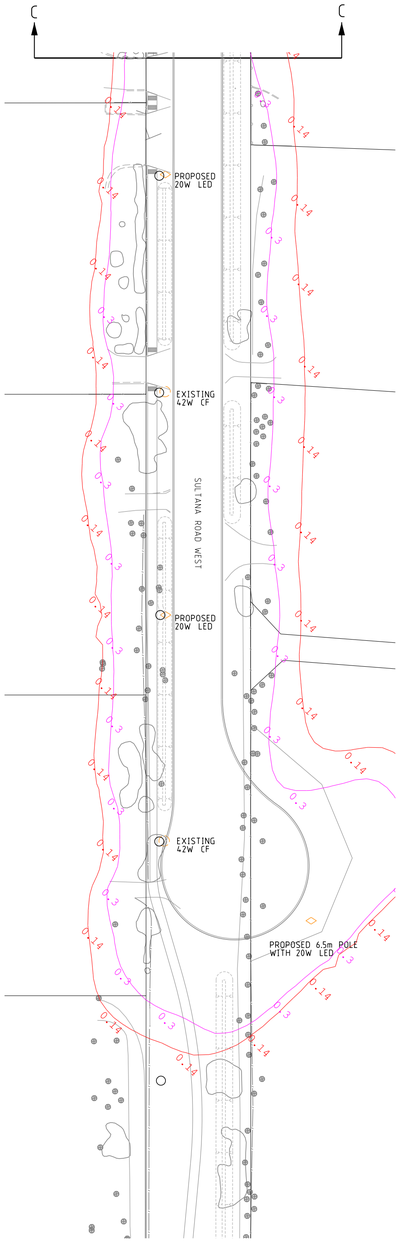
NOT TO SCALE

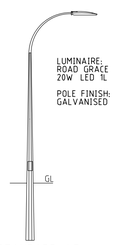
PROJECT: **SULTANA ROAD WEST HIGH WYCOMBE**	No. A	DATE 08-06-2020	REVISION ISSUED FOR 85% DESIGN STATUS — BY DPE
COPYRIGHT: COPYRIGHT IN THIS DRAWING IS THE PROPERTY OF THE CONSULTANT. THE CLIENT HAS LICENCE TO USE THIS DRAWING FOR THE PROJECT ONLY. THE USER SHALL BE RESPONSIBLE FOR "SITE CHECKING" ALL DIMENSIONS BEFORE COMMENCEMENT OF WORK. CAD DRAWING DO NOT MANUALLY ALTER. ONLY PLANS WITH NUMERICAL REVISION (REV '0' OR HIGHER) AND SIGNED AS APPROVED SHALL BE USED FOR CONSTRUCTION.			
Porter Consulting Engineers — TG340 Pty Ltd ACN 070 097 948 as Trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 636 396 385	Level 2 Kisbern Court 50 Kisbern Road Mt Pleasant 6153 WA; PO Box 1836 Canning Bridge 6153 WA; Tel (08) 9315 9955; Email. office@porterseng.com.au; www.porterseng.com.au		
CLIENT: **CITY OF KALAMUNDA**			
DRAWING: **ROAD WIDENING CONCEPT STANDARD DETAILS**	STATUS: **FOR COMMENT**		
SCALE 1:1000; DATE NOV 2019; DESIGN DPE; DRAWN DPE; CHECK			
DRAWING No. **19-11-135/804**; REV No. **A**; ORIGINAL DRAWING SIZE **A1**			
FILE NAME S:\ACTIVE PROJECTS\19-11-135\ACAD\19111135-800-803.dwg; APP'D			











WP STANDARD 6.5m
SINGLE OUTREACH POLE
NOT TO SCALE

CALC. POINTS
LEGEND

> 0.14 LUX (P4)

> 0.3 LUX (P3)

Luminaire Schedule					
Symbol	Qty	Label	Mounting Type	Total Lamp Lumens	LLF
	3	EXISTING 42W CF	OVERHEAD POLE	3200	0.700
	3	EXISTING 80W MV	OVERHEAD POLE	3800	0.700
	2	EXISTING 125W MV	OVERHEAD POLE	6300	0.700
	8	PROPOSED 20W LED	OVERHEAD POLE	2300	0.800
	1	PROPOSED 20W LED	6.5m WP POLE	2300	0.800

Calculation Summary						
Label	CalcType	Units	Avg	Max	Min	Max/Avg
Sultana Road	Illuminance	Lux	1.41	8.77	0.17	6.22

REV	DESCRIPTION	DATE	DRAWN	CHKD
2	CIVIL BASE UPDATED TO SUIT OPTION 1. MILNER INTERSECTION LIGHTING UPDATED TO MATCH MP190326	17.06.2020	DA	VH
	ISSUED TO LGA	06.03.2020	DA	VH
1	ISSUED TO CLIENT FOR COMMENT	25.02.2020	DA	VH

3E CONSULTING ENGINEERS PTY LTD

Electrical Engineering Excellence

Suite 1, Level 2, Condor Tower
22 St George's Tce, Perth WA 6000
PO Box 3184, East Perth WA 6892
Tel: 08 6314 9000 Email: admin@3ece.com.au

Preliminary
Not For Construction

IF WORKING IN THE VICINITY OF EXISTING OVERHEAD DISTRIBUTION OR TRANSMISSION LINES.
REFER TO "WORKSAFE" REGULATION 344

THE LOCATION OF EXISTING SERVICES IS APPROXIMATE ONLY. IT IS THE CONTRACTORS DUTY TO ENSURE ALL EXISTING SERVICES ARE SHOWN. ALWAYS REFER TO CURRENT DBYD DRAWINGS. CONFIRM ASSET LOCATIONS ON SITE BEFORE COMMENCEMENT OF WORK.
REFER TO "WORKSAFE" REGULATION 321

LAT 31° 57' 31" S
LONG 115° 59' 56" E

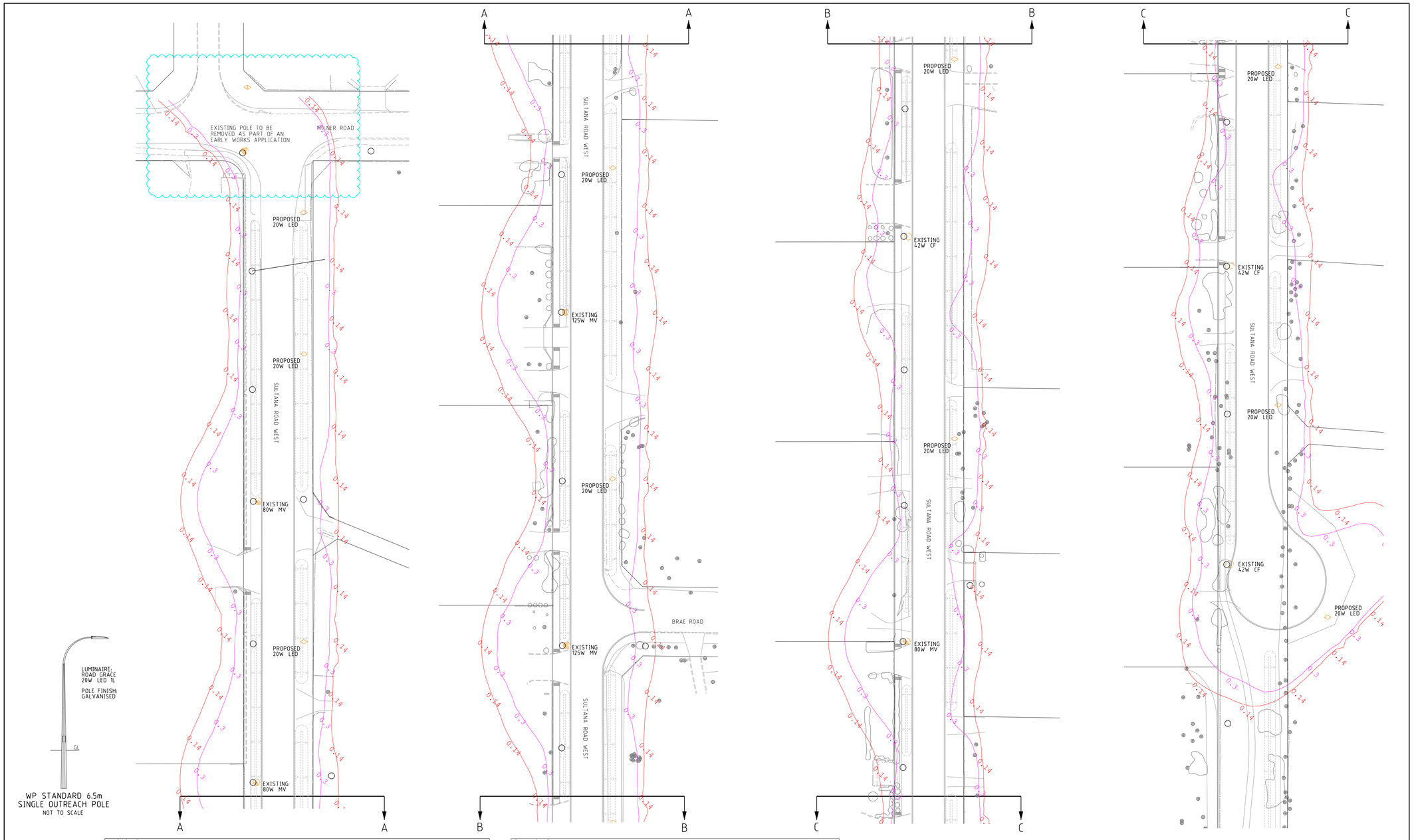
0 5 10 20 30 40

Scale	1:500 @ A1	Original Paper Size	
Base File Date	15-06-2020	H. Datum	PCG94
Designed: DA	Drawn: DA	Checked: VH	Appr: DLJ
Western Power Reference No.	TBA	WAPC No.	N/A
Local Authority	CITY OF KALAMUNDA		
Civil Consultant	PORTER CONSULTING ENGINEERS		

SULTANA ROAD WEST, HIGH WYCOMBE

DEMONSTRATION OF COMPLIANCE OF ILLUMINANCE & LUMINANCE TO AS1158.3.1 - PR5 - OPTION 1

Sheet	Of	3E Drawing Number	Revision
1	2	3E19102-03	2



CALC. POINTS LEGEND

- > 0,14 LUX (P4)
- > 0,3 LUX (P3)

Luminaire Schedule					
Symbol	Qty	Label	Mounting Type	Total Lamp Lumens	LLF
	3	EXISTING 42W CF	OVERHEAD POLE	3200	0.700
	3	EXISTING 80W MV	OVERHEAD POLE	3800	0.700
	2	EXISTING 125W MV	OVERHEAD POLE	6300	0.700
	10	PROPOSED 20W LED	6.5m WP POLE	2300	0.800

Calculation Summary						
Label	CalcType	Units	Avg	Max	Min	Max/Avg
Sultana Road	Illuminance	Lux	1.54	8.71	0.20	5.66

REV	DESCRIPTION	DATE	DRAWN	CHKD
2	CIVIL BASE UPDATED TO SUIT OPTION 1.MILNER INTERSECTION LIGHTING UPDATED TO MATCH MP190326	17.06.2020	DA	VH
	ISSUED TO LGA	06.03.2020	DA	VH
1	ISSUED TO CLIENT FOR COMMENT	25.02.2020	DA	VH

3E CONSULTING ENGINEERS PTY LTD
Electrical Engineering Excellence

Suite 1, Level 2, Condor Tower
22 St George's Tce, Perth WA 6000
PO Box 3184, East Perth WA 6892
Tel: 08 6314 9000 Email: admin@3ece.com.au

Preliminary
Not For Construction

IF WORKING IN THE VICINITY OF EXISTING OVERHEAD DISTRIBUTION OR TRANSMISSION LINES:
REFER TO 'WORKSAFE' REGULATION 3.64

THE LOCATION OF EXISTING SERVICES SHOWN IS FOR GUIDANCE ONLY. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN. ALWAYS REFER TO CURRENT DBYD DRAWINGS.CONFIRM ASSET OWNERS ON SITE BEFORE COMMENCEMENT OF WORK.
REFER TO 'WORKSAFE' REGULATION 3.21

LAT 31° 57' 31" S
LONG 115° 59' 56" E

0 5 10 20 30 40

Scale	1:500 @ A1 Original Paper Size
Base File Date	15-06-2020 H. Datum PCG94
Designed: DA	Drawn: DA Checked: VH Appr: DLJ
Western Power Reference No.	TBA WAPC No. N/A
Local Authority	CITY OF KALAMUNDA
Civil Consultant	PORTER CONSULTING ENGINEERS

SULTANA ROAD WEST, HIGH WYCOMBE

DEMONSTRATION OF COMPLIANCE OF ILLUMINANCE & LUMINANCE TO AS1158.3.1 - PR5 - OPTION 2

Sheet	Of	3E Drawing Number	Revision
2	2	3E19102-03	2

Attachment 10:
Milner Road / Nardine Close intersection drawings

1807009-111

CITY OF KALAMUNDA
FORRESTFIELD INDUSTRIAL AREA
NARDINE CLOSE AND MILNER ROAD INTERSECTION

FORRESTFIELD DRAWING LIST	
DRAWING TITLE	DRAWING No.
LOCALITY PLAN & DRAWING INDEX	1807009-111
GENERAL ARRANGEMENT	1807009-211
PAVEMENT & SURFACING	1807009-212
COMBINED SERVICES	1807009-411
TYPICAL DETAILS - SHEET 1 OF 2	1807009-511
TYPICAL DETAILS - SHEET 2 OF 2	1807009-512
CROSS SECTIONS - CH 320.00 TO CH 440.00	1807009-711
36.5m B-TRIPLE TURNING TEMPLATES	1807009-911

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	20.09.18	IB

No.	REVISION	BY	DATE	AUTH

PLOTTED: Cameron Fare , 27/2019 1:56:19 PM FILE: Y:\JOBS ACTIVE 2018\LE - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\NARDINE MILNER INTERSECTION\1807009-111.DWG PRN:----

NTS	SURVEYED: ENGINEERING SURVEYOR	DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER	AUTHORISED: R. KORENHOF, MANAGER ASSET DELIVERY, 06.02.19	Discipline: CI	Structure Code: 420	DRAWING-No. -SHEET /REVISION	ORG. SIZE
DATUM: AHD / GRID: PCG94	DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER	CHECKED: G. BUDGE, COORDINATOR PROJECT DESIGN, 06.02.19	APPROVED: B. JACKSON, DIRECTOR ASSET SERVICES, 06.02.19	JOB No. 1807009		1807009-111-1/0	A1

SHAWMAC

SHAWMAC
1ST FLOOR, 908 ALBANY HIGHWAY
EAST VICTORIA PARK, WA 6101
P 9355 1300
E admin@shawmac.com.au

	NAME	SIGN	DATE
DESIGNED BY:	JC		10.07.18
DRAWN BY:	CRF		10.07.18
CHECKED BY:	WC		20.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda ASSET SERVICES

CITY OF KALAMUNDA
FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
MILNER ROAD & NARDINE CLOSE

LOCALITY & DRAWING LIST
SHEET 1 OF 1

1807009-211

CONTRACTOR TO NOTE:

THERE ARE EXISTING DN160MM PE HIGH PRESSURE 'LIVE' 700KPA GAS PIPELINES AND DN155mm PVC MEDIUM PRESSURE 'LIVE' GAS PIPELINES IN YOUR PROPOSED WORKS AREAS.

SCOPE OF WORKS ALLOWS FOR FINAL LEVEL TO BE AT LEAST:

(i) 1200mm DEPTH-OF-COVER OVER THE EXISTING PE HIGH PRESSURE GAS PIPELINES, AND
(ii) 750mm DEPTH-OF-COVER OVER THE EXISTING PVC MEDIUM PRESSURE GAS PIPELINES.

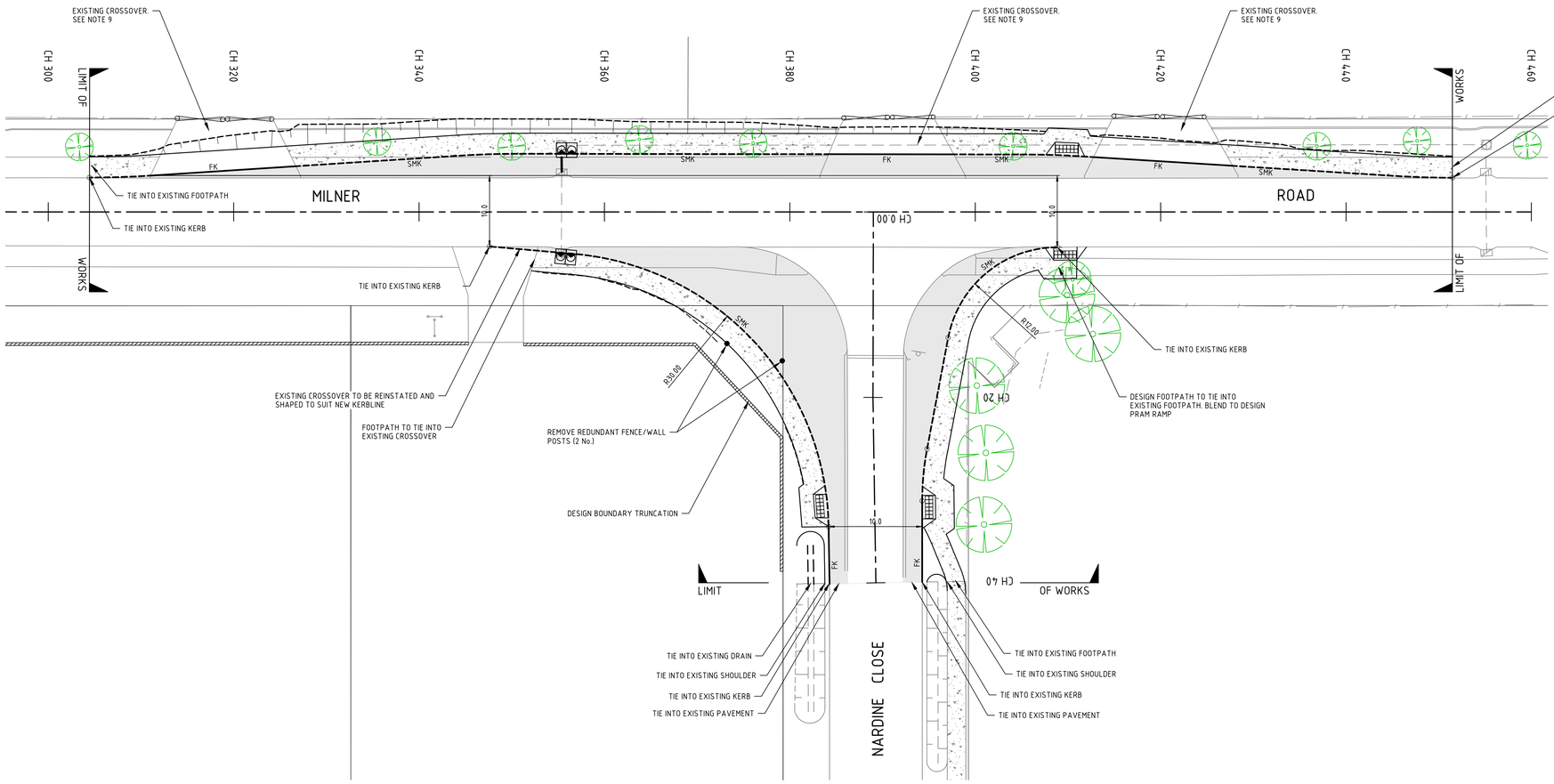
PRIOR TO COMMENCEMENT OF WORKS THE CONTRACTOR WILL CONTACT THE ATCO HP NOTIFICATION ISSUING OFFICER ON 1300 926 755 AND QUOTE REFERENCE NUMBER ES201805043-REV 1 AND VALID DBYD SEQUENCE NUMBER, TO OBTAIN A HP NOTIFICATION NUMBER PRIOR TO ANY WORK OR ACTIVITY COMMENCING.

DIAL BEFORE YOU DIG www.1100.com.au

WARNING
SERVICES AND CADASTRAL BOUNDARY LOCATIONS SHOWN ARE INDICATIVE ONLY AND MUST NOT BE USED FOR EXCAVATION. THE "ONE CALL 1100" SYSTEM SHALL BE USED TO OBTAIN ACCURATE SERVICE LOCATIONS.

NOTES:

1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH SPECIFICATION AND CITY OF KALAMUNDA REQUIREMENTS
2. ALL EXISTING PROPERTY SERVICE CONNECTIONS TO BE REINSTATED
3. CONTRACTOR TO POTHOLE ALL EXISTING SERVICES UNDER NEW ROAD AREAS PRIOR TO COMMENCEMENT OF WORKS
4. CONTRACTOR TO ARRANGE ALL ADJUSTMENTS, RELOCATIONS AND PROTECTIONS OF EXISTING SERVICES WITH THE RELEVANT UTILITY PROVIDERS
5. VERGE RETICULATION AND VERGE LANDSCAPING TO BE REINSTATED ON COMPLETION OF WORKS.
6. VEGETATION TO BE REMOVED AS REQUIRED.
7. TREE REMOVAL ON WESTERN VERGE OF MILNER TO BE NEGOTIATED/ARRANGED BY THE CITY OF KALAMUNDA
8. CONTRACTOR TO LIAISE WITH OWNERS/TENANTS OF AFFECTED PROPERTIES TO ACCOMMODATE ACCESS REQUIREMENTS
9. TRANSITION SEMI-MOUNTABLE KERBS TO FLUSH KERBS FOR ALL CROSSOVERS AS PER KERB TRANSITION DETAIL ON DRG No. 1807009-512



LEGEND

- CADASTRAL BOUNDARY
- EXISTING FENCE
- EXISTING WALL
- EXISTING KERBLINE
- EXISTING DRAINAGE MANHOLE
- EXISTING COMBINATION GULLY/SEP
- DESIGN ALIGNMENT
- CH 20 — DESIGN CHAINAGE
- DESIGN FLUSH KERB
- DESIGN SEMI-MOUNTABLE KERB
- FK — DENOTES FLUSH KERB
- SMK — DENOTES SEMI MOUNTABLE KERB
- DESIGN VERGE
- DESIGN DRAIN
- DESIGN EARTHWORKS INTERFACE
- DESIGN DRAINAGE PIPE
- DESIGN SEP (SIDE ENTRY PIT)
- DESIGN FOOTPATH
- DESIGN PRAM RAMP
- DESIGN CARRIAGEWAY WIDENING (40mm AC14)

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	20.09.18	IB

SCALE: 1:250 — 2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES
DATUM: AHD | GRID: PCG94

	NAME	SIGN	DATE
SURVEYED: ENGINEERING SURVEYOR			
DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER			
DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER			
CHECKED: G. BUDGE, COORDINATOR PROJECT DESIGN			06.02.19
AUTHORISED: R. KORENHOF, MANAGER ASSET DELIVERY			06.02.19
APPROVED: B. JACKSON, DIRECTOR ASSET SERVICES			06.02.19

Discipline: CI | Structure Code: 420 | JOB No. 1807009

SHAWMAC

SHAWMAC
1ST FLOOR, 908 ALBANY HIGHWAY
EAST VICTORIA PARK, WA 6101
P 9355 1300
E admin@shawmac.com.au

	NAME	SIGN	DATE
DESIGNED BY:	JC		10.07.18
DRAWN BY:	CF		10.07.18
CHECKED BY:	WC		20.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
MILNER ROAD AND NARDINE CLOSE

GENERAL ARRANGEMENT

SHEET 1 OF 1

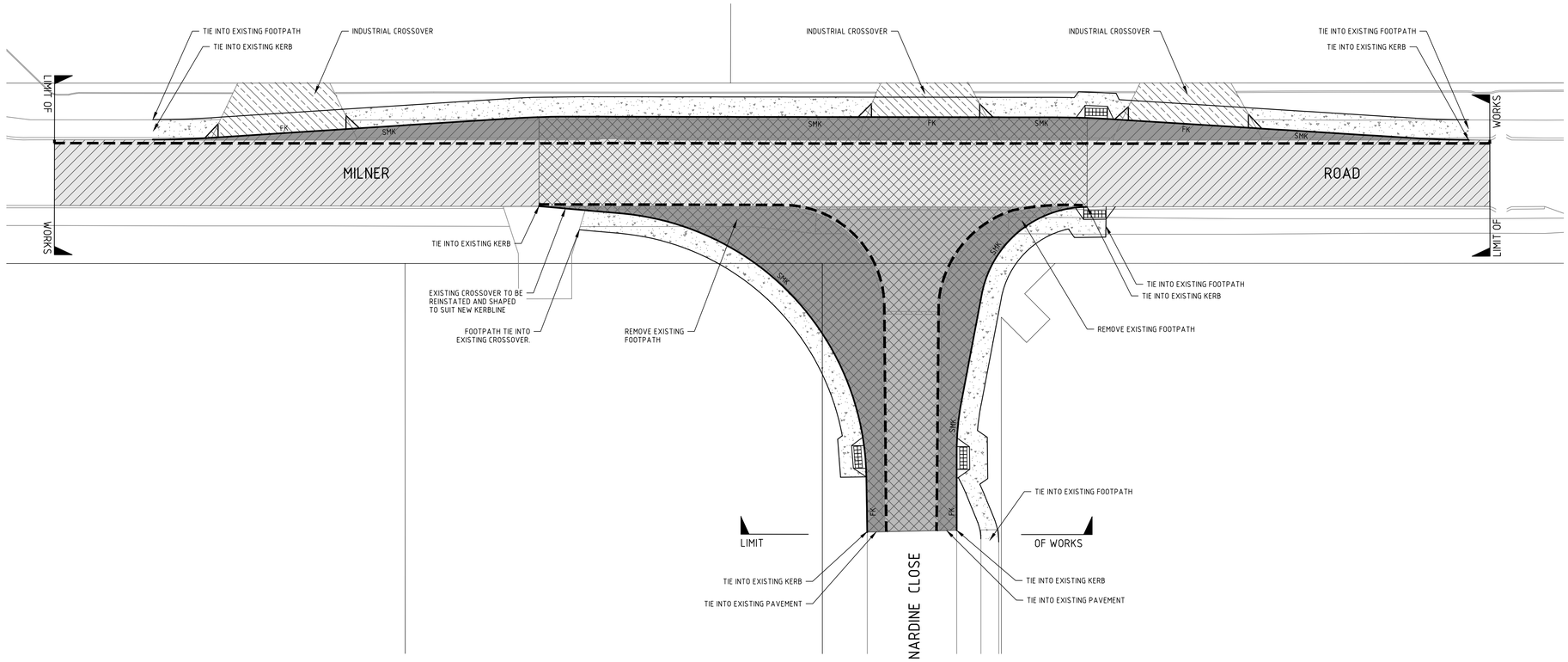
DRAWING-No. 1807009-211-1/0 | /REVISION 0 | DRG. SIZE A1

PLOTTED: Cameron Fare , 27/7/2019 1:56:21 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\NARDINE MILNER INTERSECTION\1807009-211DWG PRN=----

1807009-212

NOTES:

1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH SPECIFICATION AND CITY OF KALAMUNDA REQUIREMENTS
2. CROSSOVER TO BE REPLACED/REINSTATED IN CONCRETE TO CITY OF KALAMUNDA SPECIFICATIONS FOR INDUSTRIAL CROSSOVERS
3. CONCRETE FOOTPATHS TO BE 2.0m WIDE



LEGEND

- CADASTRAL BOUNDARY
- EXISTING KERB
- EXISTING FOOTPATH
- DESIGN CUTLINE
- DESIGN KERB FACE
- FK — DENOTES FLUSH KERB
- SMK — DENOTES SEMI-MOUNTABLE KERB
- DEMOLISH AND DISPOSE OF 100mm PAVEMENT AND REPLACE WITH 100mm NEW BASECOURSE
- DEMOLISH AND DISPOSE OF EXISTING PAVEMENT. INSTALL 100mm BASECOURSE ON 220mm SUB-BASE
- DESIGN CARRIAGEWAY WIDENING, NEW 100mm BASECOURSE ON 220mm SUB-BASE
- 7mm PRIMERSEAL AND 30mm ASPHALT AC10
- 7mm PRIMERSEAL AND 40mm ASPHALT AC14 INTERSECTION MIX
- EXISTING INDUSTRIAL CROSSOVER TO BE MODIFIED TO SUIT NEW KERB ALIGNMENT
- DESIGN CONCRETE FOOTPATH

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	20.09.18	IB

SCALE: 1:250 — 2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES

DATUM: AHD | GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR

DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE, 06.02.19, COORDINATOR PROJECT DESIGN

AUTHORISED: R. KORENHOF, 06.02.19, MANAGER ASSET DELIVERY

APPROVED: B. JACKSON, 06.02.19, DIRECTOR ASSET SERVICES

Discipline: CI | Structure Code: 420

JOB No.: 1807009

DRAWING-No: 1807009-212-1/0 | -SHEET /REVISION | ORG. SIZE: A1

PLOTTED: Cameron Fare , 27/2019 1:56:23 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\NARDINE MILNER INTERSECTION\1807009-212.DWG PRN----

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City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
MILNER ROAD AND NARDINE CLOSE

PAVEMENT & SURFACING

SHEET 1 OF 1

CONTRACTOR TO NOTE:

THERE ARE EXISTING DN160MM PE HIGH PRESSURE 'LIVE' 700KPA GAS PIPELINES AND DN155mm PVC MEDIUM PRESSURE 'LIVE' GAS PIPELINES IN YOUR PROPOSED WORKS AREAS.

SCOPE OF WORKS ALLOWS FOR FINAL LEVEL TO BE AT LEAST:

(i) 1200mm DEPTH-OF-COVER OVER THE EXISTING PE HIGH PRESSURE GAS PIPELINES, AND
(ii) 750mm DEPTH-OF-COVER OVER THE EXISTING PVC MEDIUM PRESSURE GAS PIPELINES.

PRIOR TO COMMENCEMENT OF WORKS THE CONTRACTOR WILL CONTACT THE ATCO HP NOTIFICATION ISSUING OFFICER ON 1300 926 755 AND QUOTE REFERENCE NUMBER ES20180504 3-REV 1 AND VALID DBYD SEQUENCE NUMBER, TO OBTAIN A HP NOTIFICATION NUMBER PRIOR TO ANY WORK OR ACTIVITY COMMENCING.

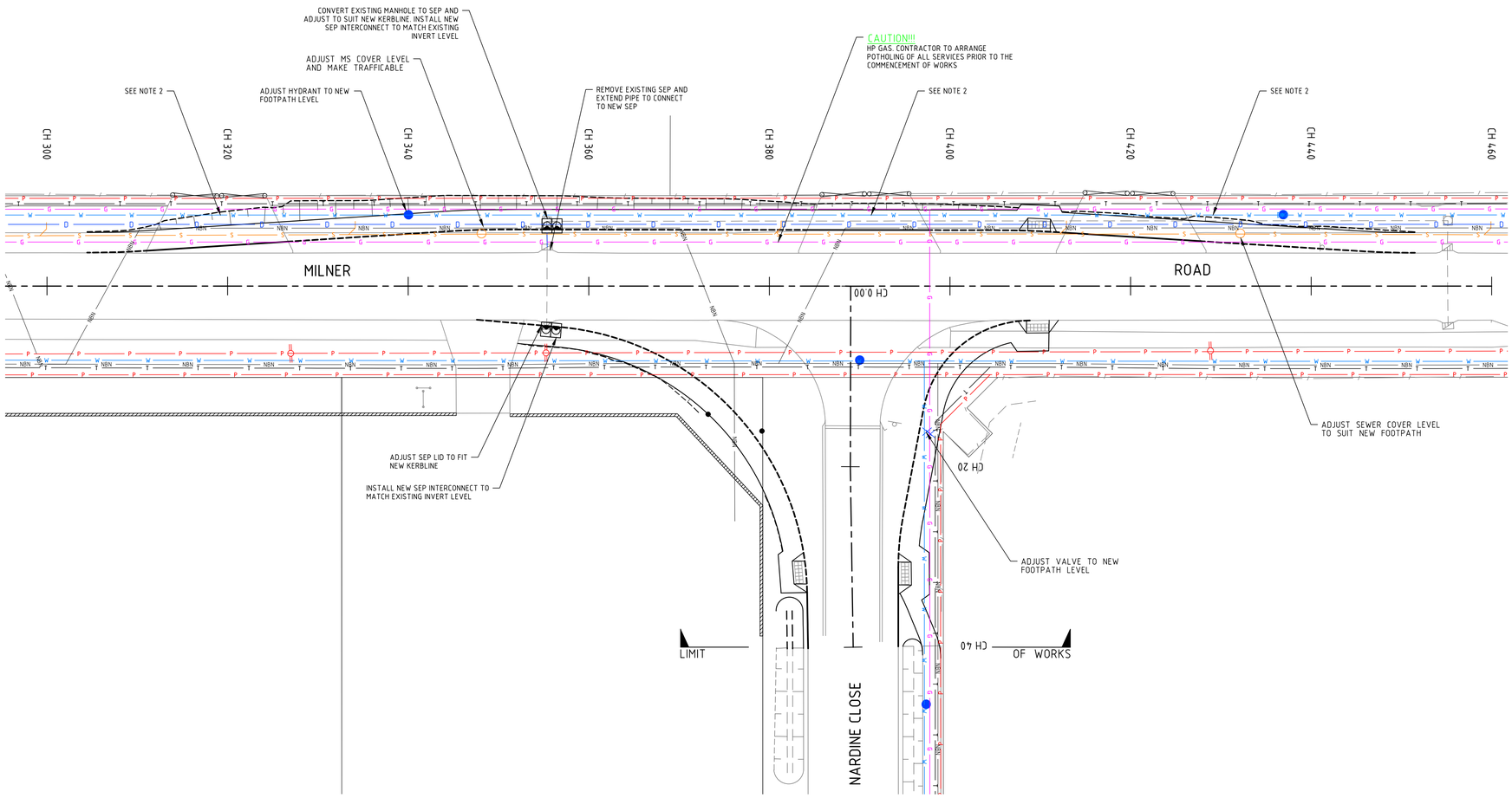
DIAL BEFORE YOU DIG www.1100.com.au

WARNING
SERVICES AND CADASTRAL BOUNDARY LOCATIONS SHOWN ARE INDICATIVE ONLY AND MUST NOT BE USED FOR EXCAVATION.
THE "ONE CALL 1100" SYSTEM SHALL BE USED TO OBTAIN ACCURATE SERVICE LOCATIONS.

NOTES:

1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH SPECIFICATION AND CITY OF KALAMUNDA REQUIREMENTS
2. ALL EXISTING PROPERTY SERVICE CONNECTIONS TO BE REINSTATED
3. CONTRACTOR TO POTHOLE ALL EXISTING SERVICES UNDER NEW ROAD AREAS PRIOR TO COMMENCEMENT OF WORKS
4. CONTRACTOR TO ARRANGE ALL ADJUSTMENTS, RELOCATIONS AND PROTECTIONS OF EXISTING SERVICES WITH THE RELEVANT UTILITY PROVIDERS
5. VERGE RETICULATION AND VERGE LANDSCAPING TO BE REINSTATED ON COMPLETION OF WORKS.
6. VEGETATION TO BE REMOVED AS REQUIRED.
7. TREE REMOVAL ON WESTERN VERGE OF MILNER TO BE NEGOTIATED/ARRANGED BY THE CITY OF KALAMUNDA
8. CONTRACTOR TO LIAISE WITH OWNERS/TENANTS OF AFFECTED PROPERTIES TO ACCOMMODATE ACCESS REQUIREMENTS
9. ALL PROPOSED DRAINAGE PIPES TO BE 300ø RCP CLASS 4

1807009-411



LEGEND

- CADASTRAL BOUNDARY
- EXISTING KERBLINE
- D EXISTING DRAINAGE
- S EXISTING SEWER
- G EXISTING GAS
- W EXISTING WATER
- T EXISTING TELSTRA
- P EXISTING UNDERGROUND POWER (HV)
- OH EXISTING OVERHEAD POWER
- EXISTING POWER POLE
- EXISTING TELSTRA SERVICE COVERS
- EXISTING SEWER CONNECTION
- EXISTING WATER COVERS
- EXISTING DRAINAGE MANHOLE
- EXISTING SEP (SIDE ENTRY PIT)
- DESIGN ALIGNMENT
- CH 20 DESIGN CHAINAGE
- DESIGN FLUSH KERB
- DESIGN SEMI-MOUNTABLE KERB
- DESIGN FOOTPATH
- DESIGN DRAINAGE PIPE
- DESIGN SEP (SIDE ENTRY PIT)
- DESIGN PRAM RAMP

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	20.09.18	IB

SCALE: 1:250 — 2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES
DATUM: AHD
GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR
DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER
DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER
CHECKED: G. BUDGE, 06.02.19, COORDINATOR PROJECT DESIGN
AUTHORISED: R. KORENHOF, 06.02.19, MANAGER ASSET DELIVERY
APPROVED: B. JACKSON, 06.02.19, DIRECTOR ASSET SERVICES

Discipline: CI
Structure Code: 420
JOB No. 1807009

PLOTTED: Cameron Fore ; 2/7/2019 1:56:25 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CSK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\NARDINE MILNER INTERSECTION\1807009-411.DWG PRN:---

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City of Kalamunda — ASSET SERVICES

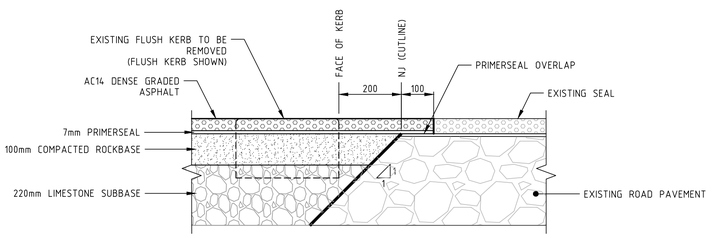
CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
MILNER ROAD AND NARDINE CLOSE

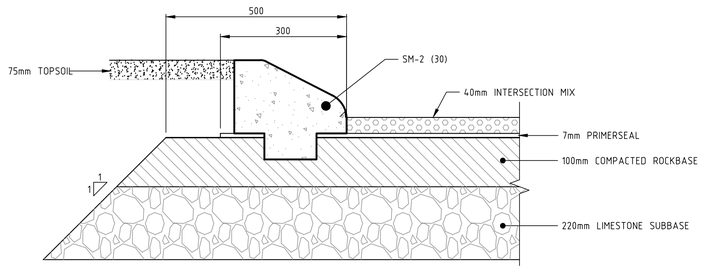
COMBINED SERVICES

SHEET 1 OF 1

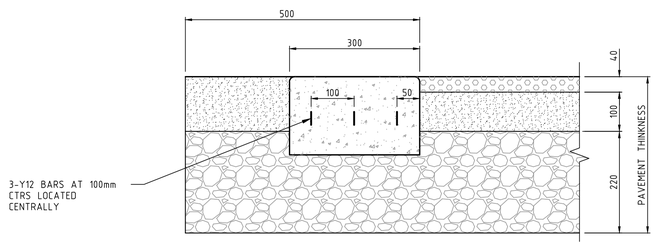
DRAWING-No. 1807009-411-1/0 | -SHEET | /REVISION | DRG. SIZE A1



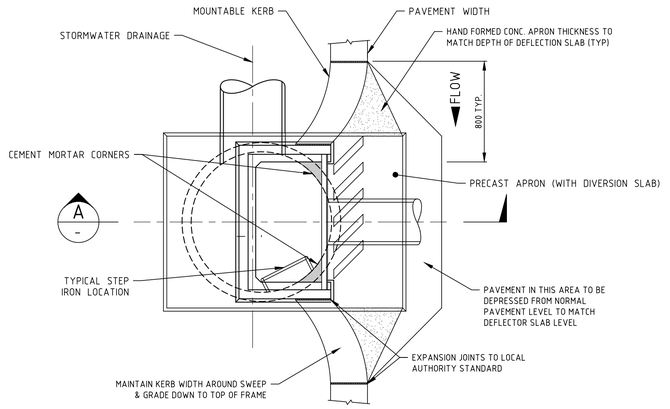
TYPICAL PAVEMENT WIDENING
NTS



TYPICAL PAVEMENT AND SEMI-MOUNTABLE KERBING DETAIL
NTS

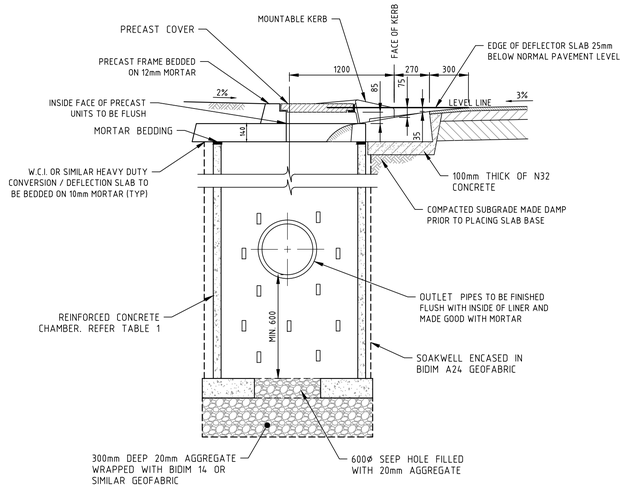


TYPICAL PAVEMENT AND FLUSH KERB DETAIL
NTS



PLAN - SIDE ENTRY PIT
NTS

NOTES
a) THE CLEAR OPENING IS ± 85mm.
b) THE MEAN DEVIATION ACROSS THE FACE OF OPENING ± 2mm.



SECTION A - NTS — TYPICAL SEP WITH SOAKWELL

NOTES
1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS NOTED OTHERWISE
2. DEMOLISH AND DISPOSE OF ALL EXISTING KERBING AND PATHS U.N.O
3. DESIGN LEVELS ARE TO TOP OF SEAL
4. CONTRACTOR TO REFER TO THE CITY OF KALAMUNDA STANDARD DRAWINGS FOR:
   (a) CROSSOVERS: DRAWING No. 3/3
   (b) PRAM RAMPS: DRAWING No. 12/3
5. ALL PRAM RAMPS TO INCLUDE TACTILE PAVERS

TABLE 1 - LINER DETAILS	
LINER Ø	MAX. Ø PIPE CONNECTING TO LINER
NOM. 900	NOM. 450
NOM. 1050	NOM. 525
NOM. 1200	NOM. 600

1807009-511

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	20.09.18	IB

NTS	SURVEYED: ENGINEERING SURVEYOR	DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER	AUTHORISED: R. KORENHOF, MANAGER ASSET DELIVERY, 06.02.19
DATUM: AHD / GRID: PCG94	DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER	CHECKED: G. BUDGE, COORDINATOR PROJECT DESIGN, 06.02.19	APPROVED: B. JACKSON, DIRECTOR ASSET SERVICES, 06.02.19

Discipline: CI | Structure Code: 420 | JOB No. 1807009

DRAWING-No. 1807009-511-1/0 | -SHEET /REVISION | DRG. SIZE A1

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City of Kalamunda — ASSET SERVICES

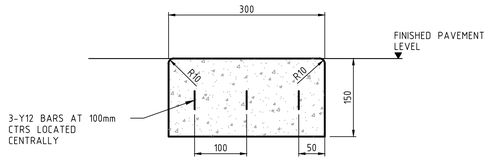
CITY OF KALAMUNDA
FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
MILNER ROAD AND NARDINE CLOSE

TYPICAL DETAILS
SHEET 1 OF 2

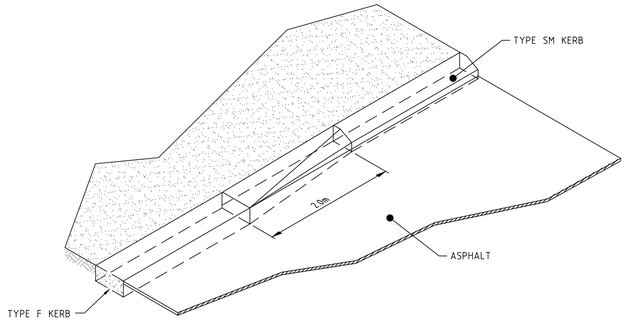
1807009-512

NOTES

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS NOTED OTHERWISE

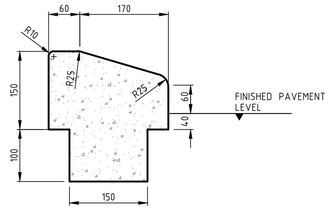


FLUSH KERB PROFILE
SCALE 1:5

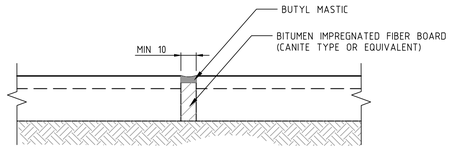


KERB TYPE F TO SM TRANSITION
SCALE 1:20

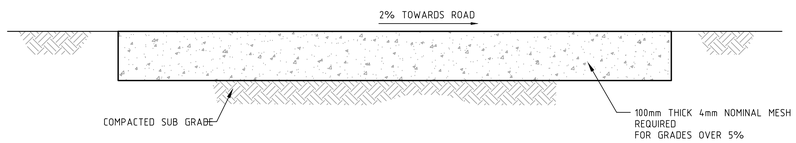
NOTE: KERB TRANSITION SHALL BE TROWELLED SMOOTH TO MATCH SURFACE ON ADJACENT KERBING



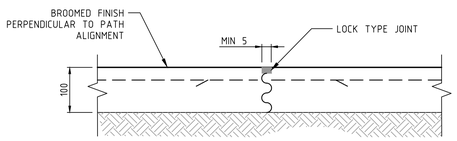
SEMI MOUNTABLE KEYED KERB PROFILE
1:5



EXPANSION JOINT DETAILS
SCALE 1:4



TYPICAL PATH DETAILS
NTS



CONTRACTION JOINT DETAILS
SCALE 1:4

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	20.09.18	IB

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AS SHOWN	SURVEYED: ENGINEERING SURVEYOR	DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER	AUTHORISED: R. KORENHOF, MANAGER ASSET DELIVERY, 06.02.19
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Discipline: CI | Structure Code: 420 | JOB No. 1807009

DRAWING-No. 1807009-512-1/0 | -SHEET /REVISION | ORG. SIZE A1

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City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
MILNER ROAD AND NARDINE CLOSE

TYPICAL DETAILS

SHEET 2 OF 2

PLOTTED: Cameron Fare , 27/2019 1:56:27 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\NARDINE MILNER INTERSECTION\1807009-511 & 512.DWG PRN:----

1807009-711

Datum R.L. 30.000

DESIGN SURFACE R.L. (m)	31.434	31.275	31.235	31.235	31.185	31.11	31.193		31.193	31.155	31.23	31.279	31.303	31.287
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	-0.128	-0.130	-0.131	-0.183	-0.258	-0.000		0.000	-0.223	-0.148	-0.093	0.013	0.000
NATURAL SURFACE R.L. (m)	31.434	31.403	31.365	31.365	31.367	31.367	31.193	31.307	31.193	31.379	31.379	31.373	31.290	31.287
OFFSETS (m)	-9.422	-8.467	-6.467	-6.407	-6.237	-6.236	-3.474	0.000	5.213	19.117	19.119	19.455	24.160	24.329

CHAINAGE 380.000

Datum R.L. 30.000

DESIGN SURFACE R.L. (m)	31.423	31.192	31.152	31.152	31.102	31.027	31.11		31.085	31.09	31.165	31.215	31.215	31.257	31.275
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	-0.219	-0.134	-0.135	-0.189	-0.264	0.000		0.000	-0.157	-0.082	-0.034	-0.035	-0.024	-0.007
NATURAL SURFACE R.L. (m)	31.423	31.412	31.286	31.288	31.292	31.292	31.110		31.085	31.246	31.246	31.249	31.250	31.281	31.283
OFFSETS (m)	-9.879	-8.493	-6.493	-6.433	-6.263	-6.262	-3.515	0.000	3.754	4.985	4.986	5.159	5.220	7.262	7.339

CHAINAGE 360.000

Datum R.L. 29.000

DESIGN SURFACE R.L. (m)	31.367	31.073	31.033	31.033	30.983	30.908	30.977	
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	-0.250	-0.138	-0.138	-0.185	-0.260	-0.000	
NATURAL SURFACE R.L. (m)	31.367	31.323	31.171	31.171	31.168	31.168	30.977	
OFFSETS (m)	-9.783	-8.018	-6.018	-5.958	-5.788	-5.787	-3.484	0.000

CHAINAGE 340.000

Datum R.L. 29.000

DESIGN SURFACE R.L. (m)	31.255	30.994	30.954	30.954	30.904	30.829	30.859	
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	-0.181	-0.120	-0.117	-0.158	-0.233	0.000	
NATURAL SURFACE R.L. (m)	31.255	31.175	31.074	31.070	31.062	31.062	30.859	30.986
OFFSETS (m)	-8.294	-6.729	-4.729	-4.669	-4.499	-4.498	-3.493	0.000

CHAINAGE 320.000

Datum R.L. 30.000

DESIGN SURFACE R.L. (m)	31.855	31.825	31.785	31.785	31.735	31.66	31.682	
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	-0.042	-0.063	-0.062	-0.110	-0.185	0.000	
NATURAL SURFACE R.L. (m)	31.855	31.868	31.848	31.847	31.845	31.845	31.682	31.669
OFFSETS (m)	-6.625	-6.445	-4.445	-4.385	-4.215	-4.214	-3.488	0.000

CHAINAGE 440.000

Datum R.L. 30.000

DESIGN SURFACE R.L. (m)	31.628	31.582	31.542	31.542	31.492	31.417	31.477	
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	-0.046	-0.083	-0.082	-0.132	-0.207	-0.000	
NATURAL SURFACE R.L. (m)	31.628	31.628	31.625	31.625	31.625	31.625	31.477	31.602
OFFSETS (m)	-7.969	-7.697	-5.697	-5.637	-5.467	-5.466	-3.472	0.000

CHAINAGE 420.000

Datum R.L. 30.000

DESIGN SURFACE R.L. (m)	31.498	31.395	31.355	31.355	31.305	31.23	31.312		31.351	31.325	31.4	31.449	31.474	31.212
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	-0.101	-0.112	-0.111	-0.164	-0.239	0.000		0.000	-0.121	-0.046	0.013	0.182	0.000
NATURAL SURFACE R.L. (m)	31.498	31.496	31.467	31.466	31.469	31.469	31.312	31.441	31.351	31.447	31.447	31.436	31.292	31.212
OFFSETS (m)	-9.059	-8.438	-6.438	-6.378	-6.208	-6.207	-3.482	0.000	4.574	7.200	7.201	7.440	10.756	13.141

CHAINAGE 400.000

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City of Kalamunda

ASSET SERVICES

CITY OF KALAMUNDA
FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
MILNER ROAD AND NARDINE CLOSE

NARDINE CLOSE CROSS SECTIONS
CH 320.00 TO CH 440.00

0 2 4 6 8 10m
1 : 400 (A3) 1 : 200 (A1)

0 1 2 3 4 5m
1 : 200 (A3) 1 : 100 (A1)

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH	No.	REVISION	BY	DATE	AUTH
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1:200H 1:100V

DATUM: AHD

GRID: PCG94

SURVEYED:
ENGINEERING SURVEYOR

DESIGNED: J. CURTIS
INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE
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CHECKED: G. BUDGE 06.02.19
COORDINATOR PROJECT DESIGN

AUTHORISED: R. KORENHOF 06.02.19
MANAGER ASSET DELIVERY

APPROVED: B. JACKSON 06.02.19
DIRECTOR ASSET SERVICES

Discipline: CI

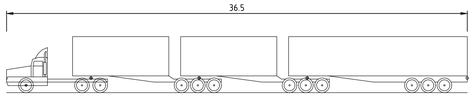
Structure Code: 420

JOB No. 1807009

DRAWING-No. -SHEET /REVISION
1807009-711-1/0

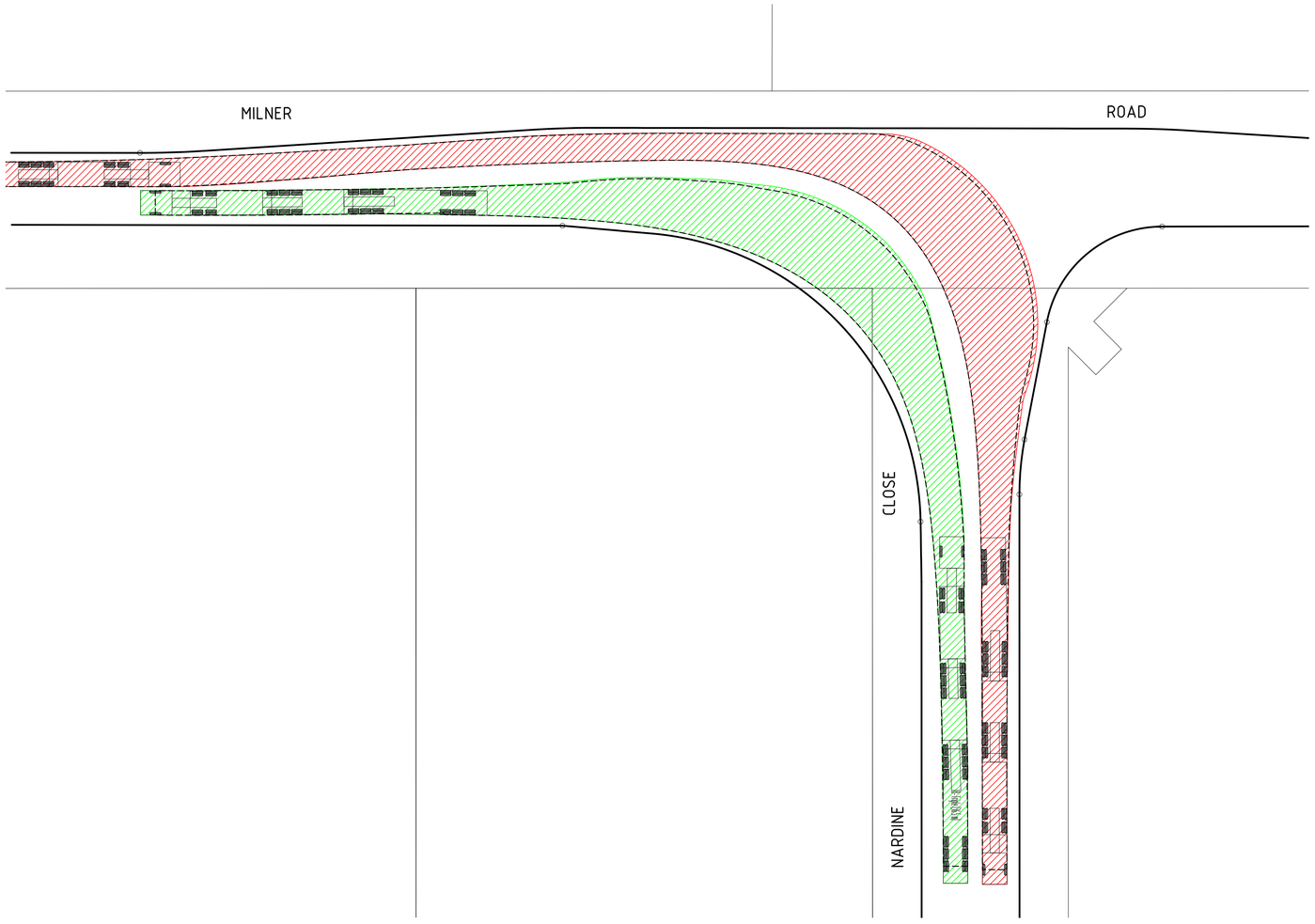
DRG. SIZE
A1

PLOTTED: Cameron Fare ; 2/7/2019 1:56:28 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\COK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\NARDINE MILNER INTERSECTION\1807009-711.DWG PRN:----



B-TRIPLE (36.5m) MRWA

OVERALL LENGTH	36.5m
OVERALL WIDTH	2.5m
OVERALL BODY HEIGHT	4.3m
MIN BODY GROUND CLEARANCE	0.54m
TRACK WIDTH	2.5m
LOCK-TO-LOCK TIME	6.00sec
KERB-TO-KERB TURNING RADIUS	20.0m



PLAN
1:250

LEGEND

- CADASTRAL BOUNDARY
- DESIGN CADASTRAL BOUNDARY
- DESIGN KERB FACE
- 36.5m SEMI-TRAILER RIGHT TURN INTO NARDINE CLOSE
- 36.5m SEMI-TRAILER LEFT TURN INTO MILNER ROAD

SCALE 1:250

A1

REV	DATE	DESCRIPTION	APPROVED
D	21.07.17	ISSUED FOR MRWA REVIEW	RN
C	03.03.17	ISSUED FOR TENDER	RN
B	22.12.16	ISSUED FOR SHIRE REVIEW	RN
A	07.10.16	ISSUED FOR CLIENT REVIEW	RN

ISSUE AND REVISION HISTORY

CLIENT: shire of kalamunda

LOCAL GOVERNMENT AUTHORITY: shire of kalamunda

SCALE @A1
HORIZ: 1:250

DATUM
HORIZONTAL: MGA94
VERTICAL: AHD

SHAWMAC

ISSUED FOR INFORMATION

DATE DRAWN:	30.09.16
DESIGNED:	PN
DRAWN:	TR
CHECKED:	RN
APPROVED:	RN

SHIRE OF KALAMUNDA
FORRESTFIELD INDUSTRIAL AREA
NARDINE CLOSE AND MILNER ROAD INTERSECTION
TURNING TEMPLATES - 36.5m B-TRIPLES MRWA

DRAWING NUMBER: 1601028-603

REV. D

FILE REF: Y:\Jobs Active 2016\CE - Roads and Drainage\Forrestfield_ Nardine Rd Widening_ Shire of Kalamunda_ 1601028\Drawings\Nardine Milner Intersection\Superseded\2018.07.09\1601028-603 Turning Templates

LAST SAVED BY: Rneedham DATE: 31 August 2017 9:09 AM

Attachment 11:
Berkshire Road and Ashby Close intersection drawings

1807009-121

CITY OF KALAMUNDA
FORRESTFIELD INDUSTRIAL AREA
BERKSHIRE ROAD & ASHBY CLOSE INTERSECTION

FORRESTFIELD DRAWING LIST	
DRAWING TITLE	DRAWING No.
LOCALITY PLAN & DRAWING INDEX	1807009-121
GENERAL ARRANGEMENT	1807009-221
PAVEMENT & SURFACING PLAN	1807009-222
INTERSECTION PLAN	1807009-223
DRAINAGE PLAN	1807009-421
COMBINED SERVICES	1807009-422
TYPICAL DETAILS - SHEET 1 OF 2	1807009-521
TYPICAL DETAILS - SHEET 2 OF 2	1807009-522
ASHBY CLOSE CROSS SECTIONS - CH 15.00 TO CH 60.00	1807009-721
SIGNS & PAVEMENT MARKINGS - INTERIM	1807009-821
SIGNS & PAVEMENT MARKINGS - ULTIMATE	1807009-822
TURNING TEMPLATES - 36.5 B-TRIPLE ROAD TRAIN	1807009-921

2

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB
1	GENERAL MINOR AMENDMENTS, RE-ISSUED FOR TENDER	CRF	21.11.18	IB
2	SIGNS & PAVEMENT MARKING DRAWING ADDED	CRF	18.12.18	IB

PLOTTED: Cameron Fare , 2/7/2019 1:42:27 PM FILE: Y:\JOBS ACTIVE 2018\12 - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE ASHBY INTERSECTION\1807009-121.DWG PRN:----

NTS

DATUM: AHD GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR

DESIGNED: J. CURTIS INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE 06.02.19 COORDINATOR PROJECT DESIGN

AUTHORISED: R. KORENHOF 06.02.19 MANAGER ASSET DELIVERY

APPROVED: B. JACKSON 06.02.19 DIRECTOR ASSET SERVICES

Discipline: CI

Structure Code: 420

JOB No. 1807009

DRAWING-No. -SHEET /REVISION: 1807009-121-1/2

ORG. SIZE: A1

SHAWMAC

1ST FLOOR, 908 ALBANY HIGHWAY
EAST VICTORIA PARK, WA 6101
P 9355 1300
E admin@shawmac.com.au

	NAME	SIGN	DATE
DESIGNED BY:	JC		10.07.018
DRAWN BY:	CF		10.07.018
CHECKED BY:	RN		21.11.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda ASSET SERVICES

CITY OF KALAMUNDA
FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD & ASHBY CLOSE

LOCALITY PLAN & DRAWING LIST
SHEET 1 OF 1

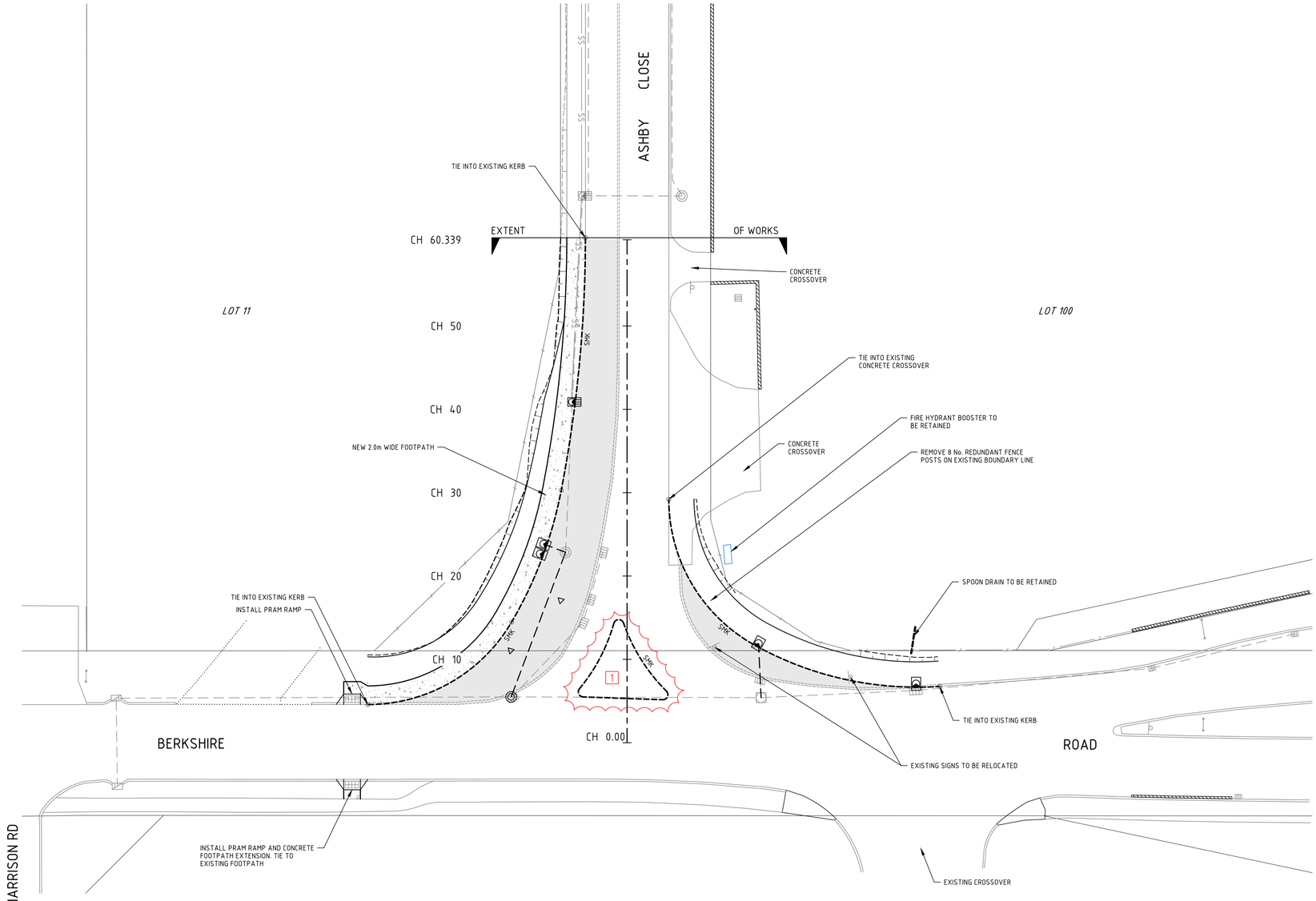
1807009-221

NOTES:

1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH SPECIFICATION AND CITY OF KALAMUNDA REQUIREMENTS
2. FOR DRAINAGE DETAILS REFER TO DRG No. 1807009-522
3. CONTRACTOR TO POTHOLE ALL EXISTING SERVICES UNDER NEW ROAD AREAS PRIOR TO COMMENCEMENT OF WORKS
4. CONTRACTOR TO ARRANGE ALL ADJUSTMENTS, RELOCATIONS AND PROTECTIONS OF EXISTING SERVICES WITH THE RELEVANT UTILITY PROVIDERS
5. REMOVAL OF VEGETATION TO BE LIMITED TO AREAS INSIDE OF NEW ROAD RESERVE BOUNDARY ALIGNMENT.
6. THE LOCATION OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT LOCATION AND LEVEL IS TO BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORKS

HOLDS:

1. SEAGULL ISLAND INSTALLATION SUBJECT TO FUTURE WORKS. CONTRACTOR TO PROVIDE PRICE FOR INSTALLATION OF ISLAND



LEGEND

- CADASTRAL BOUNDARY
- EXISTING FENCE
- EXISTING KERBLINE
- EXISTING DRAINAGE PIPE
- EXISTING SUBSOIL DRAINAGE PIPE
- EXISTING GULLY PIT
- EXISTING COMBINATION GULLY/SEP
- EXISTING DRAINAGE MANHOLE
- DESIGN ALIGNMENT
- CH 20 — DESIGN CHAINAGE
- DESIGN FLUSH KERB
- DESIGN SEMI-MOUNTABLE KERB
- DESIGN CONCRETE FOOTPATH
- DESIGN VERGE
- DESIGN EARTHWORKS INTERFACE
- DESIGN DRAINAGE PIPE
- DESIGN SEP (SIDE ENTRY PIT)
- DESIGN COMBINATION GULLY/SEP
- DESIGN DRAINAGE MANHOLE
- DESIGN CARRIAGEWAY WIDENING
- 100mm THICK 2m WIDE CONCRETE FOOTPATH

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	30.08.18	IB
1	GENERAL MINOR AMENDMENTS, RE-ISSUED FOR TENDER	CRF	21.11.18	IB
2	SEAGULL ISLAND RETAINED AS OPTION	CRF	18.12.18	IB
3	MINOR AMENDMENTS	TM	//	//

PLOTTED: Cameron Fare ; 7/7/2019 1:42:29 PM FILE: Y:\JOBS ACTIVE 2019\CE - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE ASHBY INTERSECTION\1807009-221.DWG PRN:----

SCALE: 1:250 — 2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES

DATUM: AHD | GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR

DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE 06.02.19, COORDINATOR PROJECT DESIGN

AUTHORISED: R. KORENHOF 06.02.19, MANAGER ASSET DELIVERY

APPROVED: B. JACKSON 06.02.19, DIRECTOR ASSET SERVICES

Discipline: CI | Structure Code: 420

JOB No. 1807009

DRAWING-No. 1807009-221-1/3 | -SHEET | /REVISION | DRG. SIZE A1

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E admin@shawmac.com.au

CONSULTING CIVIL AND TRAFFIC ENGINEERS

	NAME	SIGN	DATE
DESIGNED BY:	JC		30.08.18
DRAWN BY:	CRF		30.08.18
CHECKED BY:	RN		21.11.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD & ASHBY CLOSE

GENERAL ARRANGEMENT

SHEET 1 OF 1

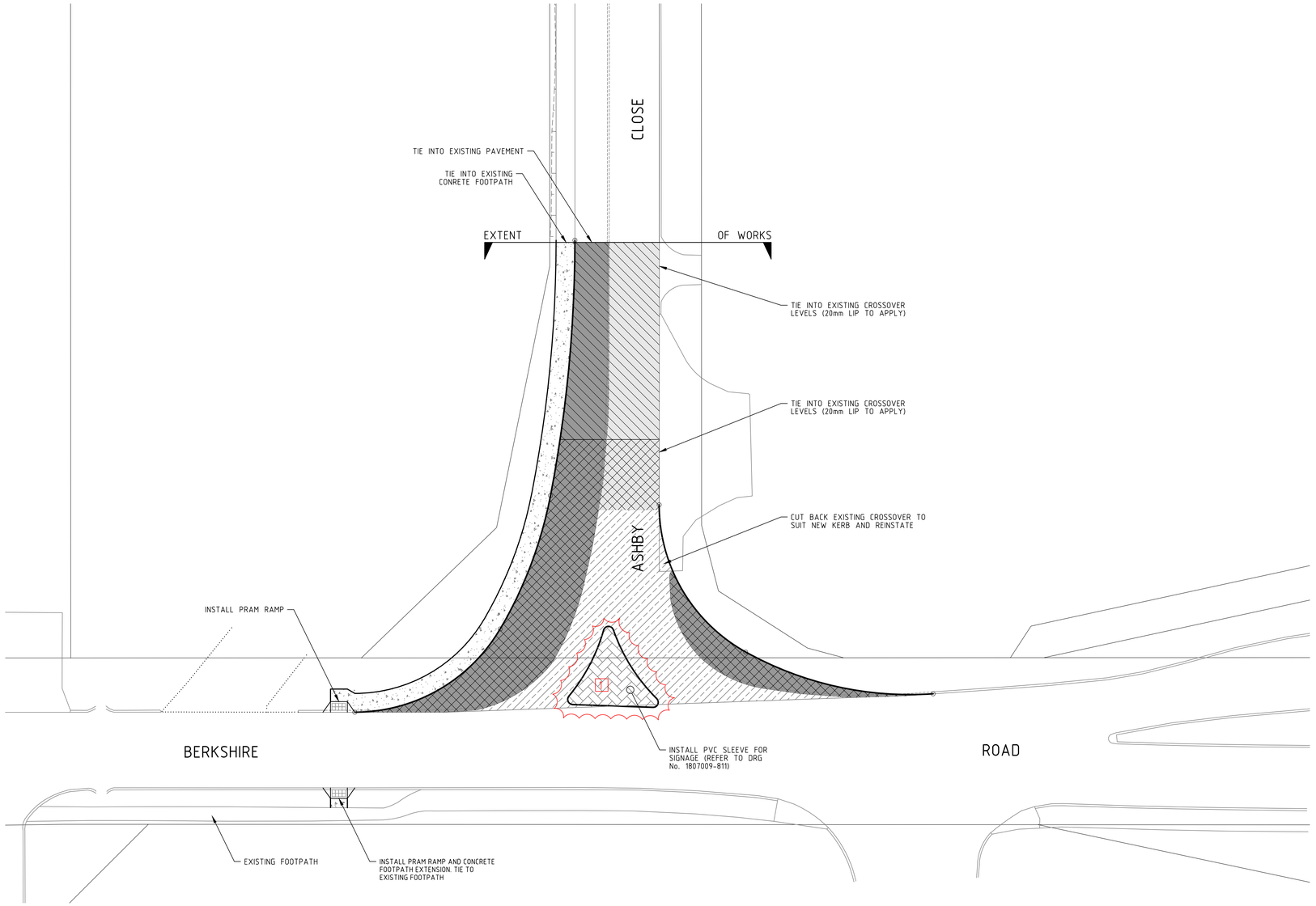
NOTES

1. ALL NEW ASPHALT TO MATCH EXISTING COLOUR

HOLDS:

1. SEAGULL ISLAND INSTALLATION SUBJECT TO FUTURE WORKS

1807009-222



LEGEND

- CADASTRAL BOUNDARY
- EXISTING KERB
- EXISTING KERB TO BE REMOVED
- DESIGN KERB FACE
- REMOVE EXISTING PAVEMENT, RESHAPE SUBGRADE AND INSTALL 100mm BASECOURSE ON 220mm SUB-BASE
- DESIGN CARRIAGEWAY WIDENING, NEW 100mm BASECOURSE ON 220mm SUB-BASE
- 7mm PRIMERSEAL AND 30mm ASPHALT AC10
- 7mm PRIMERSEAL AND 40mm ASPHALT AC14 INTERSECTION MIX
- CONCRETE SLAB WITH FAUX BRICK FINISH
- PROFILE OFF EXISTING ASPHALT, INSTALL TACK COAT AND 40mm AC14
- 100mm THICK 2m WIDE CONCRETE FOOTPATH

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1ST FLOOR, 908 ALBANY HIGHWAY
EAST VICTORIA PARK, WA 6101
P 9355 1300
E admin@shawmac.com.au

	NAME	SIGN	DATE
DESIGNED BY:	JC		10.07.018
DRAWN BY:	CF		10.07.018
CHECKED BY:	RN		21.11.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD & ASHBY CLOSE

PAVEMENT & SURFACING PLAN

SHEET 1 OF 1

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB
1	GENERAL MINOR AMENDMENTS, RE-ISSUED FOR TENDER	CRF	21.11.18	IB
2	SEAGULL ISLAND RETAINED AS OPTION	CRF	18.12.18	IB

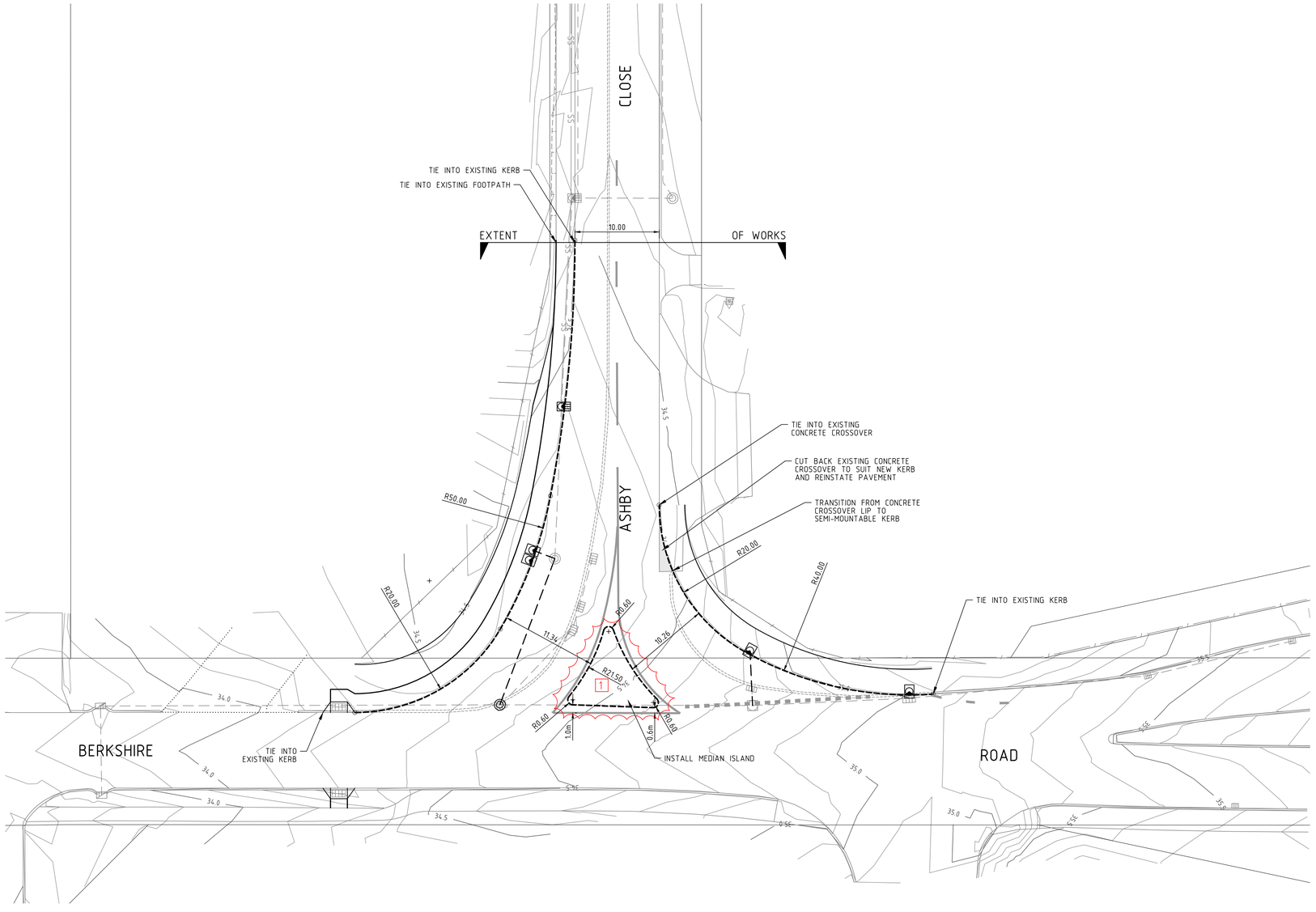
SCALE: 1:250 — 2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES
DATUM: AHD
GRID: PCG94
SURVEYED: ENGINEERING SURVEYOR
DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER
DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER
CHECKED: G. BUDGE, 06.02.19, COORDINATOR PROJECT DESIGN
AUTHORISED: R. KORENHOF, 06.02.19, MANAGER ASSET DELIVERY
APPROVED: B. JACKSON, 06.02.19, DIRECTOR ASSET SERVICES
Discipline: CI
Structure Code: 420
JOB No.: 1807009
DRAWING-No.-SHEET-REVISION: 1807009-222-1/2
DRG. SIZE: A1

PLOTTED: Cameron Fare ; 2/7/2019 1:42:31 PM FILE: Y:\JOBS ACTIVE 2018\LE - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE ASHBY INTERSECTION\1807009-222.DWG PAN:----

1807009-223

HOLDS:

1. SEAGULL ISLAND INSTALLATION SUBJECT TO FUTURE WORKS



LEGEND

- CADASTRAL BOUNDARY
- EXISTING FENCE
- EXISTING KERB
- EXISTING KERB TO BE REMOVED
- EXISTING DRAINAGE PIPE
- EXISTING SUBSOIL DRAINAGE PIPE
- EXISTING DRAINAGE GULLY
- EXISTING COMBINATION GULLY/SEP
- EXISTING DRAINAGE MANHOLE
- DESIGN FLUSH KERB
- DESIGN SEMI-MOUNTABLE KERB
- DESIGN FOOTPATH
- DESIGN VERGE
- DESIGN DRAINAGE PIPE
- DESIGN LINEMARKING
- DESIGN SEP (SIDE ENTRY PIT)
- DESIGN DRAINAGE MANHOLE
- COMBINED CONTOURS

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB
1	GENERAL MINOR AMENDMENTS, RE-ISSUED FOR TENDER	CRF	21.11.18	IB
2	SEAGULL ISLAND RETAINED AS OPTION	CRF	18.12.18	IB

SCALE: 1:250 (2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES)

DATUM: AHD | GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR

DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE, COORDINATOR PROJECT DESIGN, 06.02.19

AUTHORISED: R. KORENHOF, MANAGER ASSET DELIVERY, 06.02.19

APPROVED: B. JACKSON, DIRECTOR ASSET SERVICES, 06.02.19

Discipline: CI | Structure Code: 420

JOB No. 1807009

PLOTTED: Cameron Fare ; 2/7/2019 - 1:42:33 PM FILE: Y:\JOBS ACTIVE 2018\LG - ROADS AND DRAINAGE\LGK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE ASHBY INTERSECTION\1807009-223.DWG PRN:----

SHAWMAC

1ST FLOOR, 908 ALBANY HIGHWAY
EAST VICTORIA PARK, WA 6101
P 9355 1300
E admin@shawmac.com.au

CONSULTING CIVIL AND TRAFFIC ENGINEERS

	NAME	SIGN	DATE
DESIGNED BY:	JC		10.07.018
DRAWN BY:	CF		10.07.018
CHECKED BY:	RN		21.11.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD & ASHBY CLOSE

INTERSECTION PLAN

SHEET 1 OF 1

DRAWING-No. 1807009-223-1/2 | -SHEET /REVISION | ORG. SIZE A1

1807009-421

NOTES:

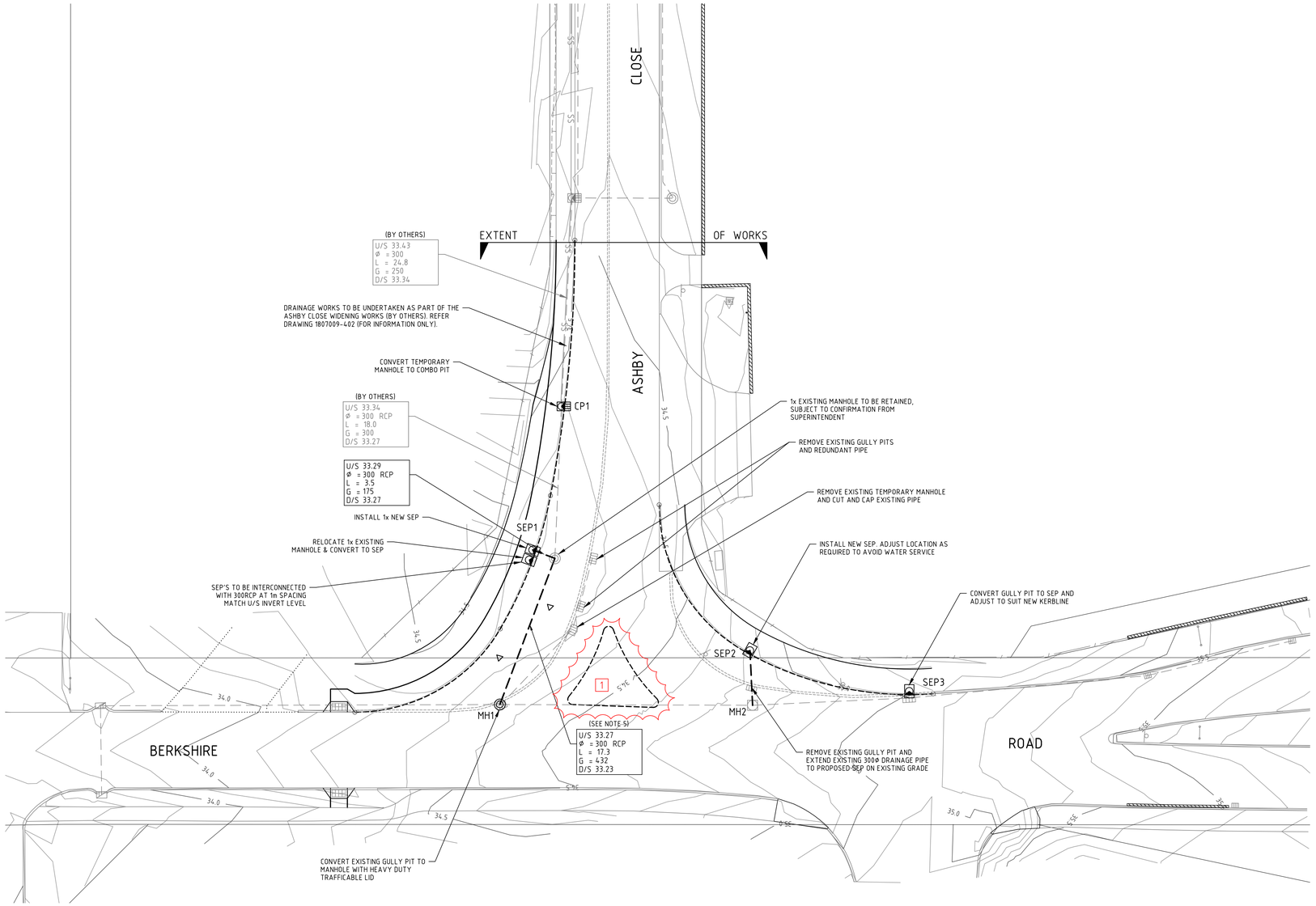
1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH SPECIFICATION AND CITY OF KALAMUNDA REQUIREMENTS
2. ALL DRAINAGE PIPE SIZES 300 RCP CLASS 4 UNLESS OTHERWISE NOTED
3. CONTRACTOR TO POTHOLE ALL EXISTING SERVICES UNDER NEW ROAD AREAS PRIOR TO COMMENCEMENT OF WORKS
4. CONTRACTOR TO ARRANGE ALL ADJUSTMENTS, RELOCATIONS AND PROTECTIONS OF EXISTING SERVICES WITH THE RELEVANT UTILITY PROVIDERS
5. REMOVE EXISTING 150Ø PVC TEMPORARY DRAINAGE PIPE AND INSTALL 300Ø RCP
6. CONTRACTOR TO CONFIRM LOCATION AND LEVEL OF CP1 INLET INVERT PRIOR TO COMMENCEMENT OF WORKS

HOLDS:

1. SEAGULL ISLAND INSTALLATION SUBJECT TO FUTURE WORKS. CONTRACTOR TO PROVIDE PRICE FOR INSTALLATION OF ISLAND

DIAL BEFORE YOU DIG www.1100.com.au

WARNING
SERVICES AND CADASTRAL BOUNDARY LOCATIONS SHOWN ARE INDICATIVE ONLY AND MUST NOT BE USED FOR EXCAVATION.
THE "ONE CALL 1100" SYSTEM SHALL BE USED TO OBTAIN ACCURATE SERVICE LOCATIONS.



LEGEND

- CADASTRAL BOUNDARY
- EXISTING FENCE
- EXISTING WALL
- EXISTING KERB
- EXISTING KERB TO BE REMOVED
- EXISTING DRAINAGE PIPE
- EXISTING SUBSOIL DRAINAGE PIP
- EXISTING GULLY PIT
- EXISTING COMBINATION GULLY/SEP
- EXISTING DRAINAGE MANHOLE
- DESIGN FLUSH KERB
- DESIGN SEMI-MOUNTABLE KERB
- DESIGN VERGE
- DESIGN DRAINAGE PIPE
- DESIGN SEP (SIDE ENTRY PIT)
- DESIGN COMBINATION GULLY/SEP
- DESIGN DRAINAGE MANHOLE
- DESIGN CONTOURS

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB
1	GENERAL MINOR AMENDMENTS, RE-ISSUED FOR TENDER	CRF	21.11.18	IB
2	SEAGULL ISLAND RETAINED AS OPTION	CRF	18.12.18	IB
3	MINOR AMENDMENTS	TM	//	//

PLOTTED: Cameron Fare ; 2/7/2019 1:42:35 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CIK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE ASHBY INTERSECTION\1807009-421.DWG PRN:----

SCALE: 1:250 — 2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES
DATUM: AHD
GRID: PCG94
SURVEYED: ENGINEERING SURVEYOR
DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER
DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER
CHECKED: G. BUDGE, 06.02.19, COORDINATOR PROJECT DESIGN
AUTHORISED: R. KORENHOF, 06.02.19, MANAGER ASSET DELIVERY
APPROVED: B. JACKSON, 06.02.19, DIRECTOR ASSET SERVICES
Discipline: CI
Structure Code: 420
JOB No.: 1807009

SHAWMAC
1ST FLOOR, 908 ALBANY HIGHWAY
EAST VICTORIA PARK, WA 6101
P 9355 1300
E admin@shawmac.com.au

	NAME	SIGN	DATE
DESIGNED BY:	JC		10.07.018
DRAWN BY:	CF		10.07.018
CHECKED BY:	RN		21.11.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

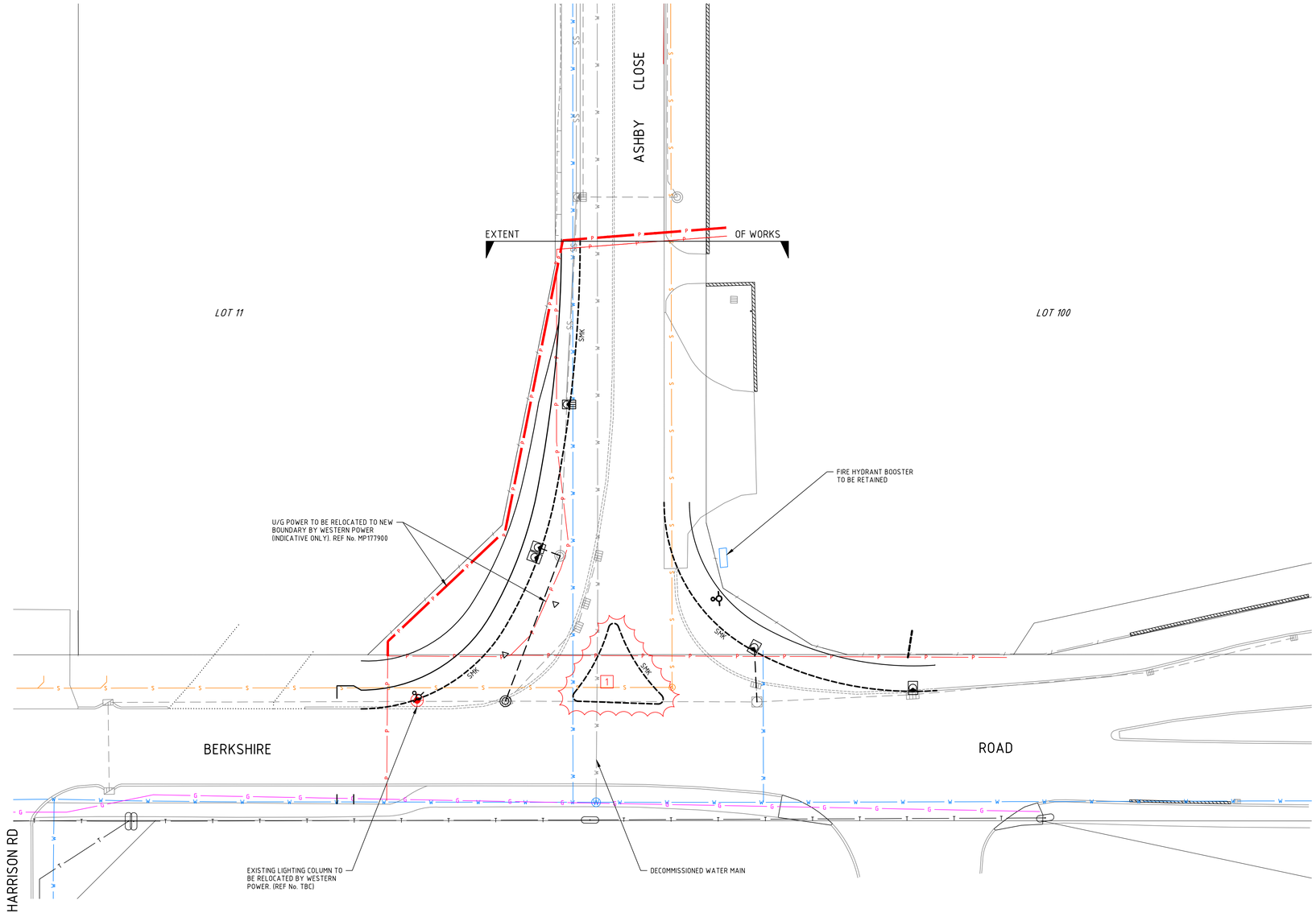
CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD & ASHBY CLOSE

DRAINAGE PLAN

SHEET 1 OF 1

DRAWING-No. 1807009-421-1/3 /REVISION 3 | DRG. SIZE A1



NOTES:

1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH SPECIFICATION AND CITY OF KALAMUNDA REQUIREMENTS
2. FOR DRAINAGE DETAILS REFER TO DRG No. 1610028-401
3. CONTRACTOR TO POTHOLE ALL EXISTING SERVICES UNDER NEW ROAD AREAS PRIOR TO COMMENCEMENT OF WORKS
4. CONTRACTOR TO ARRANGE ALL ADJUSTMENTS, RELOCATIONS AND PROTECTIONS OF EXISTING SERVICES WITH THE RELEVANT UTILITY PROVIDERS
5. REMOVAL OF VEGETATION TO BE LIMITED TO AREAS INSIDE OF NEW ROAD RESERVE BOUNDARY ALIGNMENT.
6. THE LOCATION OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT LOCATION AND LEVEL IS TO BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORKS

HOLDS:

1. SEAGULL ISLAND INSTALLATION SUBJECT TO FUTURE WORKS. CONTRACTOR TO PROVIDE PRICE FOR INSTALLATION OF ISLAND

DIAL BEFORE YOU DIG www.1100.com.au

WARNING
SERVICES AND CADASTRAL BOUNDARY LOCATIONS SHOWN ARE INDICATIVE ONLY AND MUST NOT BE USED FOR EXCAVATION.
THE "ONE CALL 1100" SYSTEM SHALL BE USED TO OBTAIN ACCURATE SERVICE LOCATIONS.

LEGEND

- CADASTRAL BOUNDARY
- EXISTING FENCE
- EXISTING KERB
- EXISTING KERB TO BE REMOVED
- EXISTING SEWER, CONNECTION
- EXISTING GAS
- EXISTING WATER, VALVE, HYDRANT, COVER
- DECOMMISSION WATER MAIN
- EXISTING HV POWER
- EXISTING TELSTRA, SERVICE COVER, CONN.
- EXISTING DRAINAGE PIPE
- EXISTING SUBSOIL DRAINAGE PIPE
- EXISTING GULLY PIT
- EXISTING COMBINATION GULLY/SEP
- EXISTING DRAINAGE MANHOLE
- EXISTING POWER POLE WITH STAY
- DESIGN FLUSH KERB
- DESIGN SEMI-MOUNTABLE KERB
- DESIGN DRAINAGE PIPE
- DESIGN SEP (SIDE ENTRY PIT)
- DESIGN COMBINATION GULLY/SEP
- DESIGN DRAINAGE MANHOLE

1807009-422

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB
1	GENERAL MINOR AMENDMENTS, RE-ISSUED FOR TENDER	CRF	21.11.18	IB
2	SEAGULL ISLAND RETAINED AS OPTION	CRF	18.12.18	IB
3	MINOR AMENDMENTS	TM	//	//

SCALE: 1:250 (2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES)
DATUM: AHD
GRID: PCG94
SURVEYED: ENGINEERING SURVEYOR
DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER
DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER
CHECKED: G. BUDGE, 06.02.19, COORDINATOR PROJECT DESIGN
AUTHORISED: R. KORENHOF, 06.02.19, MANAGER ASSET DELIVERY
APPROVED: B. JACKSON, 06.02.19, DIRECTOR ASSET SERVICES
Discipline: CI
Structure Code: 420
JOB No.: 1807009
DRAWING-No.-SHEET/REVISION: 1807009-422-1/3
ORG. SIZE: A1

PLOTTED: Cameron Fare , 27/2019 1:42:38 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE ASHBY INTERSECTION\1807009-422.DWG PRN:---

SHAWMAC
1ST FLOOR, 908 ALBANY HIGHWAY
EAST VICTORIA PARK, WA 6101
P 9355 1300
E admin@shawmac.com.au
CONSULTING CIVIL AND TRAFFIC ENGINEERS

	NAME	SIGN	DATE
DESIGNED BY:	JC		30.08.18
DRAWN BY:	CRF		30.08.18
CHECKED BY:	RN		21.11.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

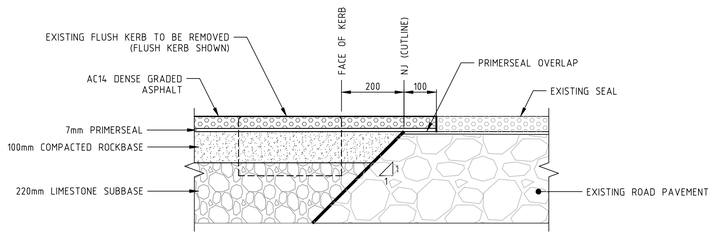
FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD & ASHBY CLOSE

COMBINED SERVICES
SHEET 1 OF 1

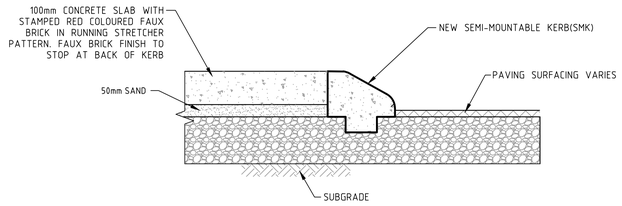
1807009-521

NOTES

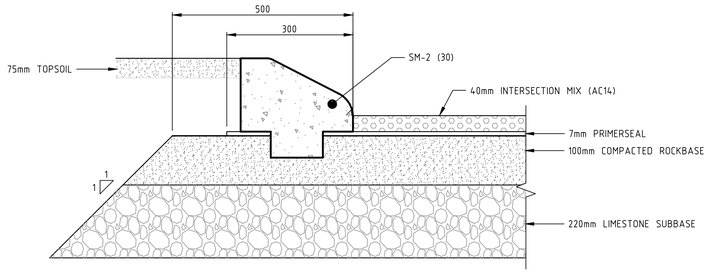
1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS NOTED OTHERWISE
2. DEMOLISH AND DISPOSE OF ALL EXISTING KERBING AND PATHS U.N.O
3. DESIGN LEVELS ARE TO TOP OF SEAL.
5. REFER TO CITY OF KALAMUNDA STANDARD DRAWINGS FOR PRAM RAMP DETAILS (SHEET 12/30)



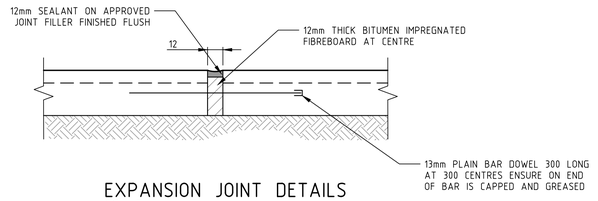
TYPICAL PAVEMENT WIDENING



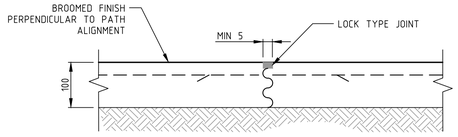
PAVED MEDIAN INFILL DETAILS
SCALE: NTS



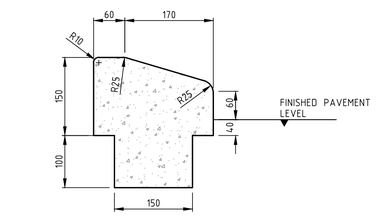
TYPICAL PAVEMENT AND SEMI-MOUNTABLE KERBING DETAIL
NTS



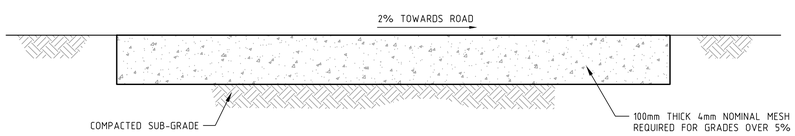
EXPANSION JOINT DETAILS
SCALE 1:4



CONTRACTION JOINT DETAILS
SCALE 1:4



SEMI MOUNTABLE KEYED KERB PROFILE
1:5



TYPICAL PATH DETAILS
NTS

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB
1	GENERAL MINOR AMENDMENTS, RE-ISSUED FOR TENDER	CRF	21.11.18	IB

No.	REVISION	BY	DATE	AUTH

PLOTTED: Cameron Fore ; 2/7/2019 1:42:39 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CW_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1801009\DRAWINGS\BERKSHIRE ASHBY INTERSECTION\1807009-521 & 522.DWG PRN:----

NTS	SURVEYED:	DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER	AUTHORISED: R. KORENHOF, MANAGER ASSET DELIVERY, 06.02.19
DATUM: AHD / GRID: PCG94	DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER	CHECKED: G. BUDGE, COORDINATOR PROJECT DESIGN, 06.02.19	APPROVED: B. JACKSON, DIRECTOR ASSET SERVICES, 06.02.19

Discipline: CI | Structure Code: 420 | JOB No. 1807009

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P 9355 1300
E admin@shawmac.com.au

	NAME	SIGN	DATE
DESIGNED BY:	JC		10.07.018
DRAWN BY:	CF		10.07.018
CHECKED BY:	RN		21.11.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD & ASHBY CLOSE

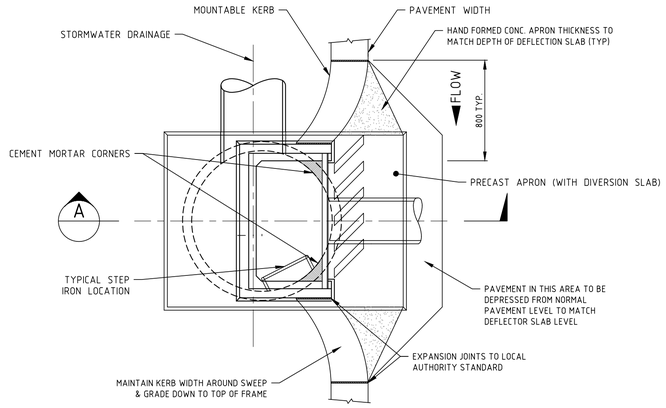
TYPICAL DETAILS
SHEET 1 OF 2

DRAWING-No. 1807009-521/1 | -SHEET /REVISION | DRG. SIZE A1

1807009-522

NOTES

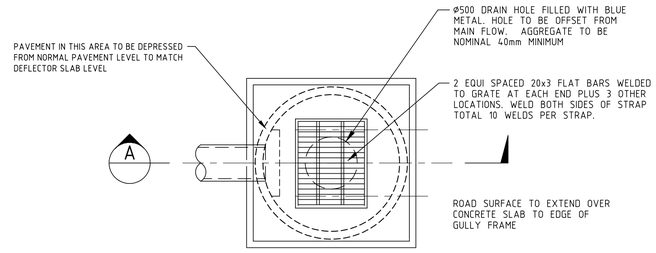
a) THE CLEAR OPENING IS ± 85mm.
b) THE MEAN DEVIATION ACROSS THE FACE OF OPENING ± 2mm.



PLAN - SIDE ENTRY PIT
NTS

NOTES

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS NOTED OTHERWISE



PLAN - COMBINATION SULLY SEP PIT
NTS

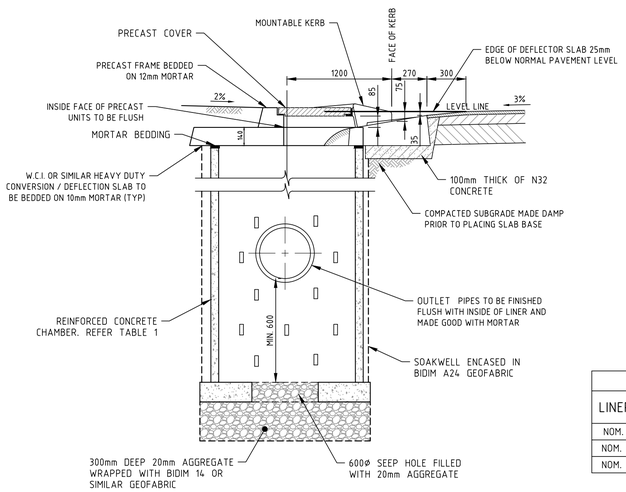
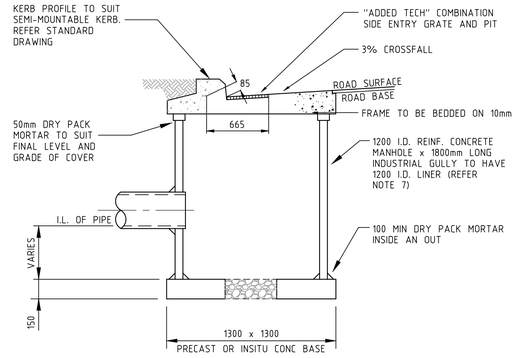


TABLE 1 - LINER DETAILS	
LINER Ø	MAX. Ø PIPE CONNECTING TO LINER
NOM. 900	NOM. 450
NOM. 1050	NOM. 525
NOM. 1200	NOM. 600

SECTION A - TYPICAL SEP WITH SOAKWELL
NTS



SECTION B - COMBINATION GULLY/SEP PIT
NTS

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB
1	GENERAL MINOR AMENDMENTS, RE-ISSUED FOR TENDER	CRF	21.11.18	IB

No.	REVISION	BY	DATE	AUTH

NTS		SURVEYED: ENGINEERING SURVEYOR	DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER	AUTHORISED: R. KORENHOF, MANAGER ASSET DELIVERY, 06.02.19	Discipline: CI / Structure Code: 420
DATUM: AHD	GRID: PCG94	DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER	CHECKED: G. BUDGE, COORDINATOR PROJECT DESIGN, 06.02.19	APPROVED: B. JACKSON, DIRECTOR ASSET SERVICES, 06.02.19	JOB No. 1807009

PLOTTED: Cameron Fare , 27/2019 142:39 PM FILE: Y:\JOBS ACTIVE 2018\22 - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE ASHBY INTERSECTION\1807009-521 & 522.DWG PEN:----

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	NAME	SIGN	DATE
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DRAWN BY:	CF		10.07.018
CHECKED BY:	RN		21.11.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD & ASHBY CLOSE

TYPICAL DETAILS
SHEET 2 OF 2

DRAWING-No. -SHEET /REVISION	ORG. SIZE
1807009-522/1	A1

1807009-721

1.87% -1.9% -2.09%

Datum R.L. 33.000

DESIGN SURFACE R.L. (m)	34.323	34.502	34.436	34.286	34.387	34.408
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.011	0.188	0.109	-0.043	0.000	0.004
NATURAL SURFACE R.L. (m)	34.312	34.314	34.327	34.330	34.387	34.404
OFFSETS (m)	-10.815	-10.093	-6.563	-6.331	-1.033	0.000

CHAINAGE 40.000

1.86% -1.76% -1.41%

Datum R.L. 33.000

DESIGN SURFACE R.L. (m)	34.458	34.422	34.356	34.206	34.312	34.339
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	-0.034	-0.065	-0.213	0.000	0.000
NATURAL SURFACE R.L. (m)	34.458	34.457	34.421	34.419	34.312	34.339
OFFSETS (m)	-11.909	-11.762	-8.188	-7.953	-1.967	0.000

CHAINAGE 30.000

2.07% -0.93% -1.42% 1.93% 2.5%

Datum R.L. 33.000

DESIGN SURFACE R.L. (m)	34.598	34.438	34.358	34.208	34.275	34.33	34.451	34.469	34.62	34.701	34.541
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	-0.159	-0.217	-0.366	0.000	0.000	0.000	-0.066	0.099	0.167	0.000
NATURAL SURFACE R.L. (m)	34.598	34.597	34.575	34.574	34.275	34.330	34.451	34.535	34.521	34.534	34.541
OFFSETS (m)	-15.852	-15.152	-11.311	-11.061	-3.897	0.000	6.260	7.242	7.501	10.740	11.557

CHAINAGE 20.000

0.88% -0.69% -1.46% 1.57% 2.37% 2.05%

Datum R.L. 33.000

DESIGN SURFACE R.L. (m)	34.463	34.467	34.413	34.263	34.327	34.445	34.621	34.8	34.964	35.182
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.003	-0.134	-0.287	-0.000	0.000	-0.000	-0.045	0.115	0.200
NATURAL SURFACE R.L. (m)	34.463	34.464	34.546	34.550	34.328	34.445	34.621	34.845	34.848	34.982
OFFSETS (m)	-23.985	-23.899	-17.764	-17.426	-8.064	0.000	11.175	18.757	19.341	30.024

CHAINAGE 10.000

2% -1.9%

Datum R.L. 33.000

DESIGN SURFACE R.L. (m)	34.833	34.648	34.609	34.459	34.535	34.577
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	-0.191	-0.065	-0.189	0.000	0.024
NATURAL SURFACE R.L. (m)	34.833	34.840	34.673	34.647	34.535	34.553
OFFSETS (m)	-7.971	-7.230	-5.230	-5.000	-0.940	0.000

CHAINAGE 60.339

2% -1.9%

Datum R.L. 33.000

DESIGN SURFACE R.L. (m)	34.836	34.646	34.606	34.456	34.533	34.574
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	-0.189	-0.060	-0.188	0.000	0.024
NATURAL SURFACE R.L. (m)	34.836	34.835	34.666	34.644	34.533	34.550
OFFSETS (m)	-7.992	-7.231	-5.231	-5.001	-0.940	0.000

CHAINAGE 60.000

1.94% -1.89%

Datum R.L. 33.000

DESIGN SURFACE R.L. (m)	34.746	34.562	34.521	34.371	34.454	34.491
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	-0.001	-0.148	-0.067	-0.203	0.000	0.020
NATURAL SURFACE R.L. (m)	34.747	34.710	34.588	34.574	34.454	34.472
OFFSETS (m)	-8.447	-7.701	-5.582	-5.351	-0.953	0.000

CHAINAGE 50.000

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	NAME	SIGN	DATE
DESIGNED BY:	JC		10.07.018
DRAWN BY:	CF		10.07.018
CHECKED BY:	RN		21.11.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda

ASSET SERVICES

CITY OF KALAMUNDA
FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD & ASHBY CLOSE

ASHBY CLOSE CROSS SECTIONS
CH 15.00 TO CH 60.00

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB
1	GENERAL MINOR AMENDMENTS, RE-ISSUED FOR TENDER	CRF	21.11.18	IB

No.	REVISION	BY	DATE	AUTH

NTS

DATUM: AHD | GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR

DESIGNED: J. CURTIS — INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE — INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE — COORDINATOR PROJECT DESIGN 06.02.19

AUTHORISED: R. KORENHOF — MANAGER ASSET DELIVERY 06.02.19

APPROVED: B. JACKSON — DIRECTOR ASSET SERVICES 06.02.19

Discipline: CI | Structure Code: 420

JOB No. 1807009

DRAWING No. 1807009-721-1/1 | SHEET | REVISION | DRG. SIZE A1

PLOTTED: Cameron Fare ; 2/7/2019 1:42:41 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\COK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE ASHBY INTERSECTION\1807009-721.DWG PRN----

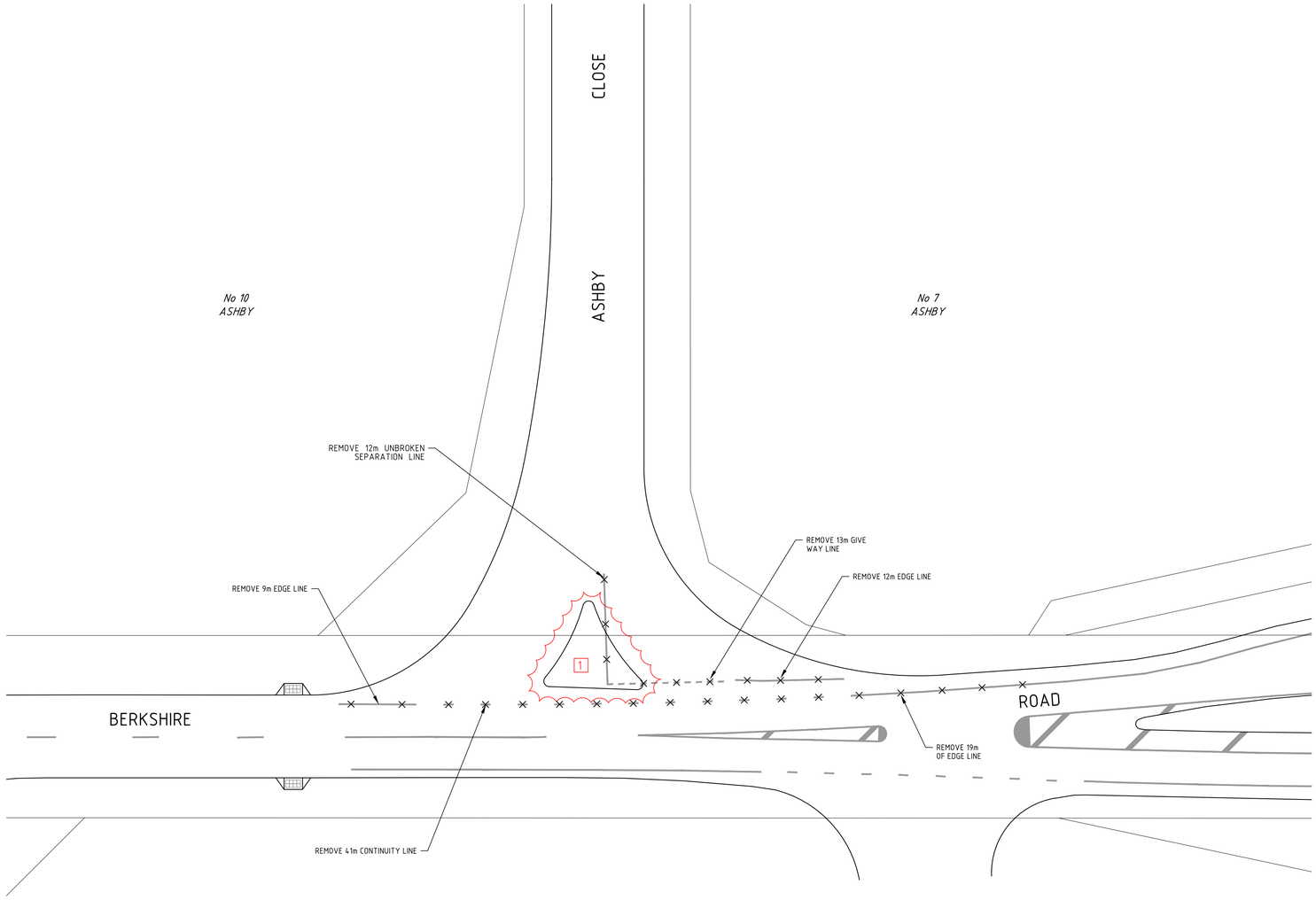
NOTES:

1. FOR ULTIMATE SIGNS AND PAVEMENT MARKINGS REFER TO DRG No. 1807009-822

HOLDS:

1. SEAGULL ISLAND INSTALLATION SUBJECT TO FUTURE WORKS

1807009-821



LEGEND

- CADASTRAL BOUNDARY
- KERBLINE
- EXISTING PAVEMENT MARKING TO BE REMOVED

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB
1	GENERAL MINOR AMENDMENTS, RE-ISSUED FOR TENDER	CRF	21.11.18	IB
2	SEAGULL ISLAND RETAINED AS OPTION	CRF	18.12.18	IB

PLOTTED: Cameron Fare ; 2/7/2019 1:42:42 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CW_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\PW\DRAWINGS\BERKSHIRE ASHBY INTERSECTION\1807009-821 & 822.DWG PRN:----

SCALE: 1:250 (2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES)
DATUM: AHD
GRID: PCG94
SURVEYED: ENGINEERING SURVEYOR
DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER
DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER
CHECKED: G. BUDGE, 06.02.19, COORDINATOR PROJECT DESIGN
AUTHORISED: R. KORENHOF, 06.02.19, MANAGER ASSET DELIVERY
APPROVED: B. JACKSON, 06.02.19, DIRECTOR ASSET SERVICES
Discipline: CI
Structure Code: 420
JOB No. 1807009

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	NAME	SIGN	DATE
DESIGNED BY:	JC		30.08.18
DRAWN BY:	CF		30.08.18
CHECKED BY:	RN		21.11.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda

ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD & ASHBY CLOSE

SIGNS & PAVEMENT MARKINGS

INTERIM

DRAWING-No. 1807009-821-1/2 -SHEET /REVISION
ORG. SIZE A1

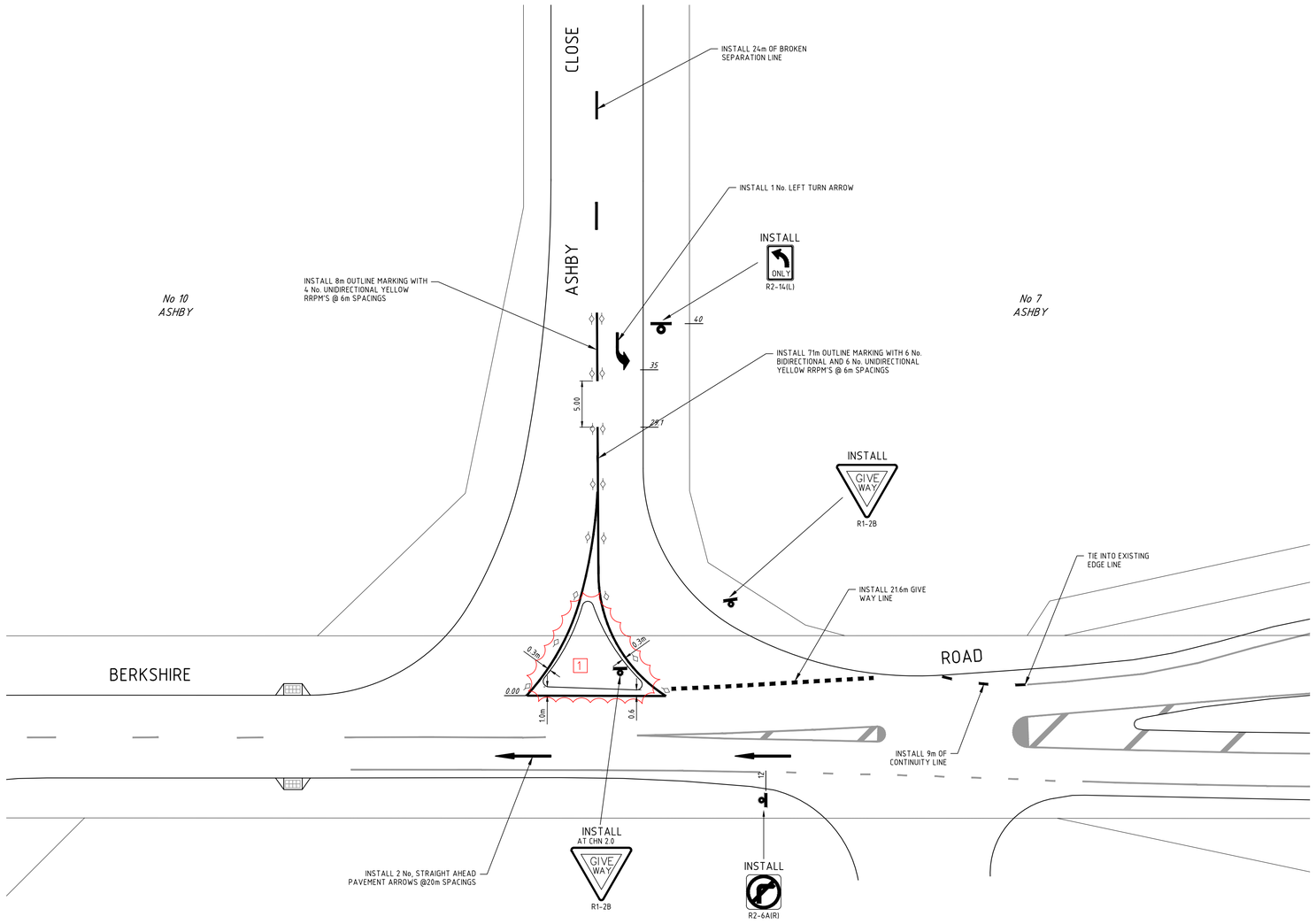
NOTES:

1. TO BE READ IN CONJUNCTION WITH INTERIM SIGNS AND PAVEMENT MARKINGS DRG No. 1807009-821

HOLDS:

1. SEAGULL ISLAND INSTALLATION SUBJECT TO FUTURE WORKS

1807009-822



PAVEMENT MARKING LINE TYPES

- BROKEN LANE LINE (80mm WIDE)
- DOUBLE ONE WAY BARRIER LINE (80mm WIDE LINES, 80mm GAP)
- EDGE LINE (120mm WIDE)
- DOUBLE TWO WAY BARRIER LINE (80mm WIDE LINES, 80mm GAP)
- CONTINUITY LINE (120mm WIDE)
- GIVE WAY LINE (300mm WIDE)
- STOP LINE (300mm WIDE)

LEGEND

- EXISTING LINE TO BE REMOVED
- NEW PAINTED LINE
- NEW PAVEMENT ARROW
- EXISTING ONE POLE SIGN
- EXISTING TWO POLE SIGN
- NEW ONE POLE SIGN
- NEW TWO POLE SIGN
- NEW YELLOW UNIDIRECTIONAL RRPM
- NEW YELLOW BIDIRECTIONAL RRPM
- NEW WHITE UNIDIRECTIONAL RRPM
- NEW RED UNIDIRECTIONAL RRPM
- NEW RED GUIDEPOST

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	18.12.18	IB

SCALE: 1:250 (2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES)
DATUM: AHD
GRID: PCG94
SURVEYED: ENGINEERING SURVEYOR
DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER
DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER
CHECKED: G. BUDGE, 06.02.19, COORDINATOR PROJECT DESIGN
AUTHORISED: R. KORENHOF, 06.02.19, MANAGER ASSET DELIVERY
APPROVED: B. JACKSON, 06.02.19, DIRECTOR ASSET SERVICES
Discipline: CI
Structure Code: 420
JOB No. 1807009

PLOTTED: Cameron Fare ; 2/7/2019 1:42:43 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE ASHBY INTERSECTION\1807009-821 & 822.DWG PRN:----

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	NAME	SIGN	DATE
DESIGNED BY:	JC		30.08.18
DRAWN BY:	CF		30.08.18
CHECKED BY:	RN		21.11.18
APPROVED BY DIRECTOR:	IB		06.02.19

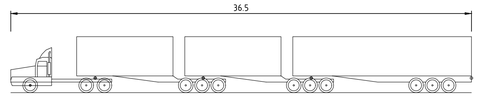
City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD & ASHBY CLOSE

SIGNS & PAVEMENT MARKINGS
ULTIMATE

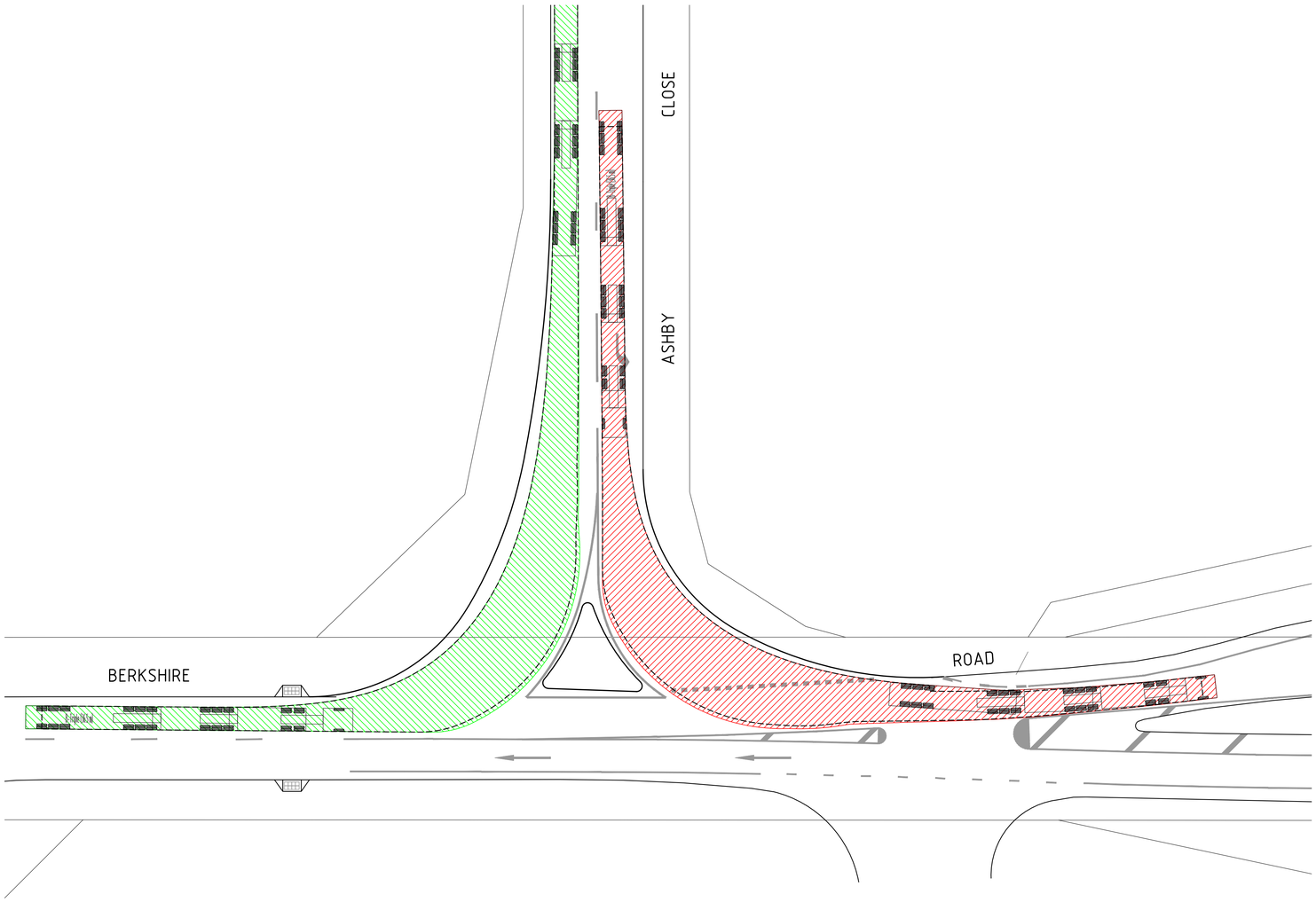
DRAWING-No. 1807009-822-1/0 | -SHEET | /REVISION | DRG. SIZE A1



B-TRIPLE (36.5m) MRWA

OVERALL LENGTH	36.5m
OVERALL WIDTH	2.5m
OVERALL BODY HEIGHT	4.3m
MIN BODY GROUND CLEARANCE	0.54m
TRACK WIDTH	2.5m
LOCK-TO-LOCK TIME	6.00sec
TURNING RADIUS TO OUTSIDE FRONT WHEEL	20.0m

1807009-921



LEGEND

- CADASTRAL BOUNDARY
- KERB LINE
- PAVEMENT MARKING
- 36.5m B-TRIPLE TURNING TEMPLATE LEFT TURN INTO BERKSHIRE ROAD
- 36.5m B-TRIPLE TURNING TEMPLATE LEFT TURN INTO ASHBY CLOSE

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB
1	GENERAL MINOR AMENDMENTS, RE-ISSUED FOR TENDER	CRF	21.11.18	IB

SCALE: 1:250 (2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES)

DATUM: AHD | GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR

DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE, 06.02.19, COORDINATOR PROJECT DESIGN

AUTHORISED: R. KORENHOF, 06.02.19, MANAGER ASSET DELIVERY

APPROVED: B. JACKSON, 06.02.19, DIRECTOR ASSET SERVICES

Discipline: CI | Structure Code: 420

JOB No. 1807009

DRAWING-No. 1807009-921-1/1 | -SHEET | /REVISION | DRG. SIZE A1

PLOTTED: Cameron Fare , 27/2019 1:42:44 PM FILE: Y:\JOBS ACTIVE 2018\LE - ROADS AND DRAINAGE\LCR_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE ASHBY INTERSECTION\1807009-921.DWG PRN:----

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	NAME	SIGN	DATE
DESIGNED BY:	JC		08.06.18
DRAWN BY:	CF		27.08.18
CHECKED BY:	RN		21.11.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD & ASHBY CLOSE

TURNING TEMPLATES

36.5m B-TRIPLE ROAD TRAIN

Attachment 12:
Dundas Road, Berkshire Road and Milner Road Intersection Drawings

1807009-131

CITY OF KALAMUNDA
FORRESTFIELD INDUSTRIAL AREA
DUNDAS ROAD/BERKSHIRE ROAD/MILNER ROAD INTERSECTION

FORRESTFIELD DRAWING LIST	
DRAWING TITLE	DRAWING No.
LOCALITY PLAN & DRAWING LIST	1807009-131
GENERAL ARRANGEMENT	1807009-231
PAVEMENT & SURFACING PLAN	1807009-232
COMBINED SERVICES PLAN	1807009-233
DRAINAGE PLAN	1807009-431
TYPICAL DETAILS - SHEET 1 OF 2	1807009-531
TYPICAL DETAILS - SHEET 2 OF 2	1807009-532
DUNDAS ROAD CROSS SECTIONS - CH 100.00 TO CH 230.00	1807009-731
BERKSHIRE ROAD CROSS SECTIONS - CH 10.00 TO CH 100.00	1807009-732
MILNER ROAD CROSS SECTIONS - CH 20.00 TO CH 90.00	1807009-733
MILNER ROAD CROSS SECTIONS - CH 100.00 TO CH 145.00	1807009-734
SIGNS & PAVEMENT MARKING	1807009-831
TURNING TEMPLATES - SHEET 1 OF 3	1807009-931
TURNING TEMPLATES - SHEET 2 OF 3	1807009-932
TURNING TEMPLATES - SHEET 3 OF 3	1807009-933

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB

No.	REVISION	BY	DATE	AUTH

NTS	SURVEYED: ENGINEERING SURVEYOR	DRAWN: C. FARE INFRASTRUCTURE DESIGN OFFICER	AUTHORISED: R. KORENHOF MANAGER ASSET DELIVERY 06.02.19	Discipline: CI	Structure Code: 420	DRAWING-No. -SHEET /REVISION	ORG. SIZE
DATUM: AHD / GRID: PCG94	DESIGNED: J. CURTIS INFRASTRUCTURE DESIGN OFFICER	CHECKED: G. BUDGE COORDINATOR PROJECT DESIGN 06.02.19	APPROVED: B. JACKSON DIRECTOR ASSET SERVICES 06.02.19	JOB No. 1807009		1807009-131-1/0	A1

PLOTTED: Cameron Fare ; 2/7/2019 1:50:36 PM FILE: Y:\JOBS ACTIVE 2018\JCE - ROADS AND DRAINAGE\CSK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE DUNDAS MILNER INTERSECTION\1807009-131DWG PSN:----

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	NAME	SIGN	DATE
DESIGNED BY:	JC		31.08.18
DRAWN BY:	CRF		31.08.18
CHECKED BY:	WC		06.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda

ASSET SERVICES

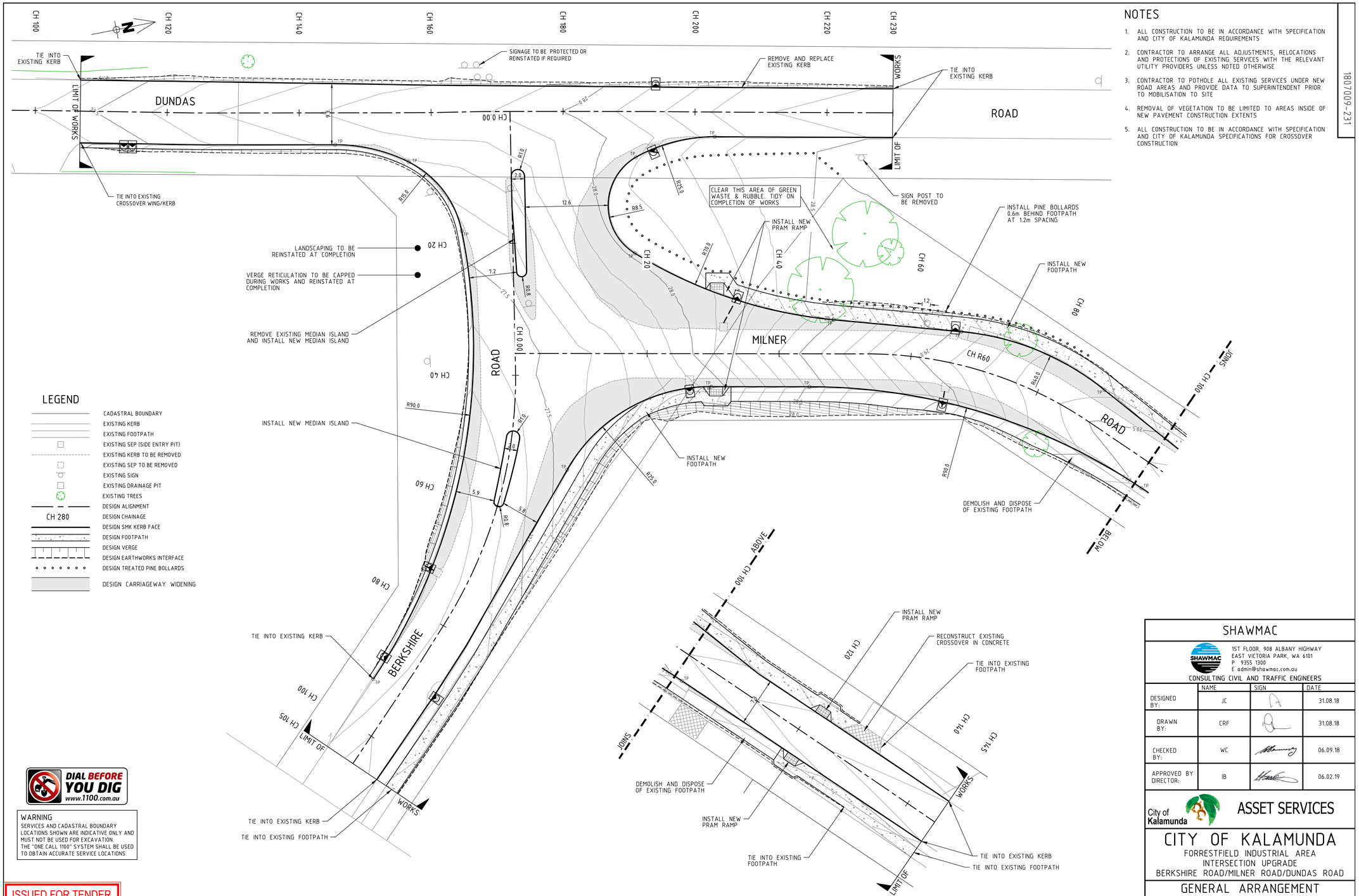
CITY OF KALAMUNDA
FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD/MILNER ROAD/DUNDAS ROAD

LOCALITY & DRAWING LIST
SHEET 1 OF 1

1807009-231

NOTES

1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH SPECIFICATION AND CITY OF KALAMUNDA REQUIREMENTS
2. CONTRACTOR TO ARRANGE ALL ADJUSTMENTS, RELOCATIONS AND PROTECTIONS OF EXISTING SERVICES WITH THE RELEVANT UTILITY PROVIDERS UNLESS NOTED OTHERWISE
3. CONTRACTOR TO POTHOLE ALL EXISTING SERVICES UNDER NEW ROAD AREAS AND PROVIDE DATA TO SUPERINTENDENT PRIOR TO MOBILISATION TO SITE
4. REMOVAL OF VEGETATION TO BE LIMITED TO AREAS INSIDE OF NEW PAVEMENT CONSTRUCTION EXTENTS
5. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH SPECIFICATION AND CITY OF KALAMUNDA SPECIFICATIONS FOR CROSSOVER CONSTRUCTION



LEGEND

- CADASTRAL BOUNDARY
- EXISTING KERB
- EXISTING FOOTPATH
- EXISTING SEP (SIDE ENTRY PIT)
- EXISTING KERB TO BE REMOVED
- EXISTING SEP TO BE REMOVED
- EXISTING SIGN
- EXISTING DRAINAGE PIT
- EXISTING TREES
- DESIGN ALIGNMENT
- CH 280 DESIGN CHAINAGE
- DESIGN SMK KERB FACE
- DESIGN FOOTPATH
- DESIGN VERGE
- DESIGN EARTHWORKS INTERFACE
- DESIGN TREATED PINE BOLLARDS
- DESIGN CARRIAGEWAY WIDENING

DIAL BEFORE YOU DIG www.1100.com.au

WARNING
SERVICES AND CADASTRAL BOUNDARY LOCATIONS SHOWN ARE INDICATIVE ONLY AND MUST NOT BE USED FOR EXCAVATION. THE "ONE CALL 1100" SYSTEM SHALL BE USED TO OBTAIN ACCURATE SERVICE LOCATIONS.

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No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB

SCALE: 1:250 — 2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES
DATUM: AHD — GRID: PCG94

SURVEYED:	ENGINEERING SURVEYOR	
DESIGNED: J. CURTIS	INFRASTRUCTURE DESIGN OFFICER	
DRAWN: C. FARE 13.02.18	INFRASTRUCTURE DESIGN OFFICER	
CHECKED: G. BUDGE 06.02.19	COORDINATOR PROJECT DESIGN	
AUTHORISED: R. KORENHOF 06.02.19	MANAGER ASSET DELIVERY	
APPROVED: B. JACKSON 06.02.19	DIRECTOR ASSET SERVICES	

Discipline: CI — Structure Code: 420
JOB No. 1807009

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	NAME	SIGN	DATE
DESIGNED BY:	JC		31.08.18
DRAWN BY:	CRF		31.08.18
CHECKED BY:	WC		06.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

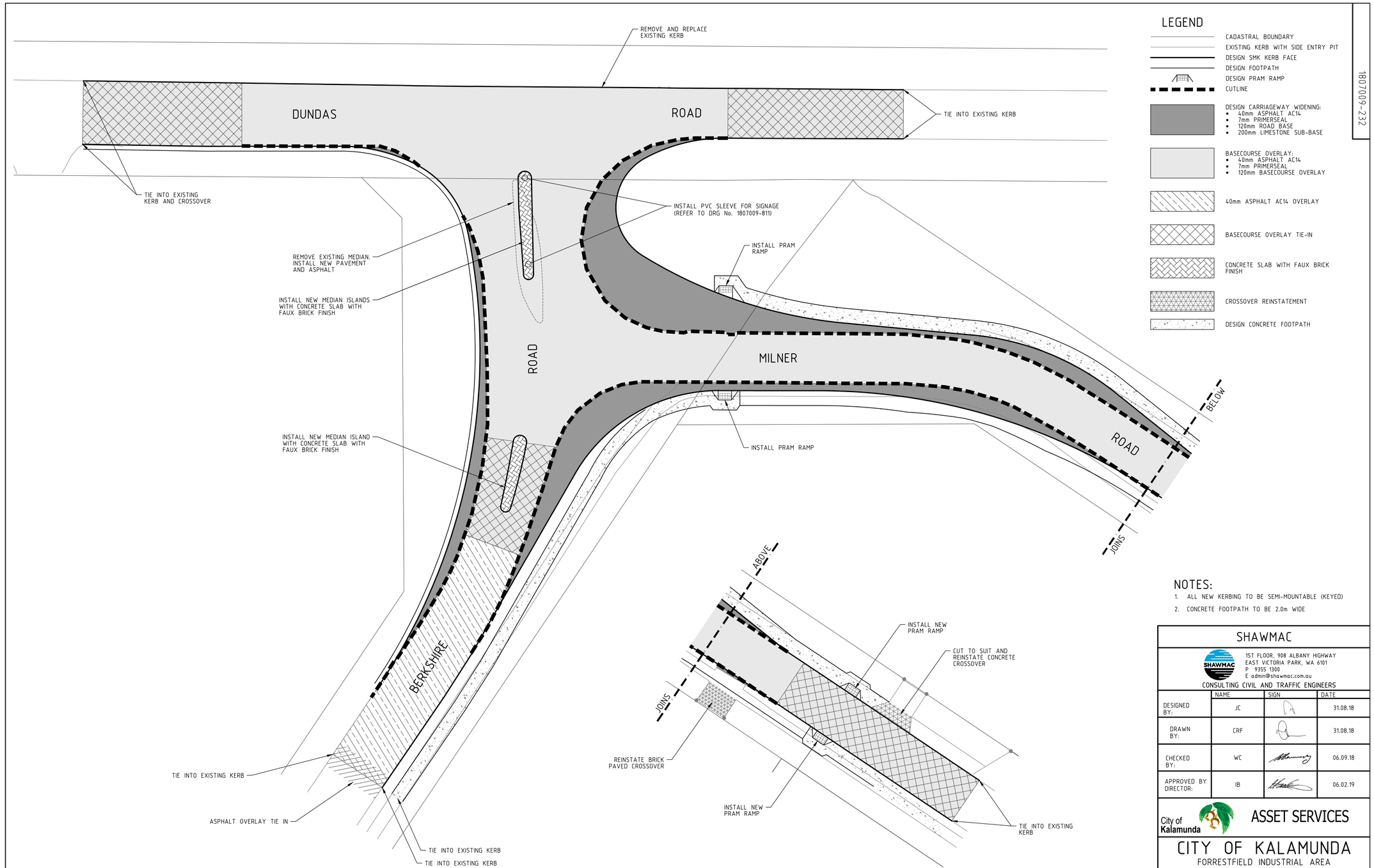
CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD/MILNER ROAD/DUNDAS ROAD

GENERAL ARRANGEMENT

SHEET 1 OF 1

DRAWING-No. 1807009-231-1/0 — -SHEET — /REVISION — ORG. SIZE A1



NOTES:

1. ALL NEW KERBING TO BE SEMI-MOUNTABLE (KEYED)
2. CONCRETE FOOTPATH TO BE 2.0m WIDE

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB

SCALE: 1:250 (2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES)

DATUM: AHD | GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR

DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE, 06.02.19, COORDINATOR PROJECT DESIGN

AUTHORISED: R. KORENHOF, 06.02.19, MANAGER ASSET DELIVERY

APPROVED: B. JACKSON, 06.02.19, DIRECTOR ASSET SERVICES

Discipline: CI | Structure Code: 420 | JOB No. 1807009

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	NAME	SIGN	DATE
DESIGNED BY:	JC		31.08.18
DRAWN BY:	CRF		31.08.18
CHECKED BY:	WC		06.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD/MILNER ROAD/DUNDAS ROAD

PAVEMENT & SURFACING PLAN

SHEET 1 OF 1

DRAWING-No. 1807009-232-1/0 | -SHEET | /REVISION | ORG. SIZE A1

1807009-233

NOTES

1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH SPECIFICATION AND CITY OF KALAMUNDA REQUIREMENTS
2. CONTRACTOR TO ARRANGE ALL ADJUSTMENTS, RELOCATIONS AND PROTECTIONS OF EXISTING SERVICES WITH THE RELEVANT UTILITY PROVIDERS UNLESS NOTED OTHERWISE
3. CONTRACTOR TO POTHOLE ALL EXISTING SERVICES UNDER NEW ROAD AREAS AND PROVIDE DATA TO SUPERINTENDENT PRIOR TO MOBILISATION TO SITE
4. WESTERN POWER POLE RELOCATION WORKS TO BE ARRANGED BY CITY OF KALAMUNDA REF No. MP173050
5. THE LOCATION OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT LOCATION AND LEVEL IS TO BE CHECKED PRIOR TO COMMENCEMENT OF WORKS.

LEGEND

- CADASTRAL BOUNDARY
- EXISTING KERB
- EXISTING FOOTPATH
- EXISTING SEP (SIDE ENTRY PIT)
- EXISTING KERB TO BE REMOVED
- EXISTING SEP TO BE REMOVED
- EXISTING SIGN
- EXISTING TREE
- EXISTING POWER
- EXISTING OVERHEAD POWER & POLE
- EXISTING SEWER, SEWER MANHOLE
- EXISTING GAS MAIN
- EXISTING OPTIC FIBRE
- EXISTING WATER, VALVE, HYDRANT, COVER
- EXISTING TELSTRA & COVERS
- EXISTING NBN
- DESIGN KERB
- DESIGN VERGE
- DESIGN DRAINAGE PIPE
- DESIGN SIDE ENTRY PIT
- DESIGN STREET LIGHT

DUNDAS ROAD

CAUTION!! HP GAS.
CONTRACTOR TO UNDERTAKE POTHOLING & ARRANGE APPROVALS PRIOR TO MOBILISATION TO SITE

EXISTING COMMUNICATION PIT TO BE RETAINED. MATCH VERGE LEVEL TO PIT

INSTALL 4 WP PILLAR BOLLARDS AROUND PROPOSED LOCATION TBC

HV POWER

CONFIRM DETAIL OF EXISTING SERVICES & ARRANGE RELOCATION IF REQUIRED (SEE NOTE 3)

MILNER ROAD

CONFIRM DEPTH OF COMMUNICATION SERVICES AND ARRANGE RELOCATION IF REQUIRED (SEE NOTE 3)

BERKSHIRE ROAD

JOINS ABOVE

JOINS BELOW

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WARNING
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No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB
1	ADDENDUM - REVISED UNDERGROUND POWER SERVICES	TM	15.01.19	WC

SCALE: 1:250 (2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES)
DATUM: AHD
GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR
DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER
DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER
CHECKED: G. BUDGE 06.02.19, COORDINATOR PROJECT DESIGN
AUTHORISED: R. KORENHOF 06.02.19, MANAGER ASSET DELIVERY
APPROVED: B. JACKSON 06.02.19, DIRECTOR ASSET SERVICES
Discipline: CI
Structure Code: 420
JOB No. 1807009

PLOTTED: Cameron Fare - 2/7/2019 1:50:42 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CAD\FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE DUNDAS MILNER INTERSECTION\1807009-233DWG PSN:----

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	NAME	SIGN	DATE
DESIGNED BY:	JC		10.07.18
DRAWN BY:	CRF		10.07.18
CHECKED BY:	WC		06.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD/MILNER ROAD/DUNDAS ROAD

COMBINED SERVICES

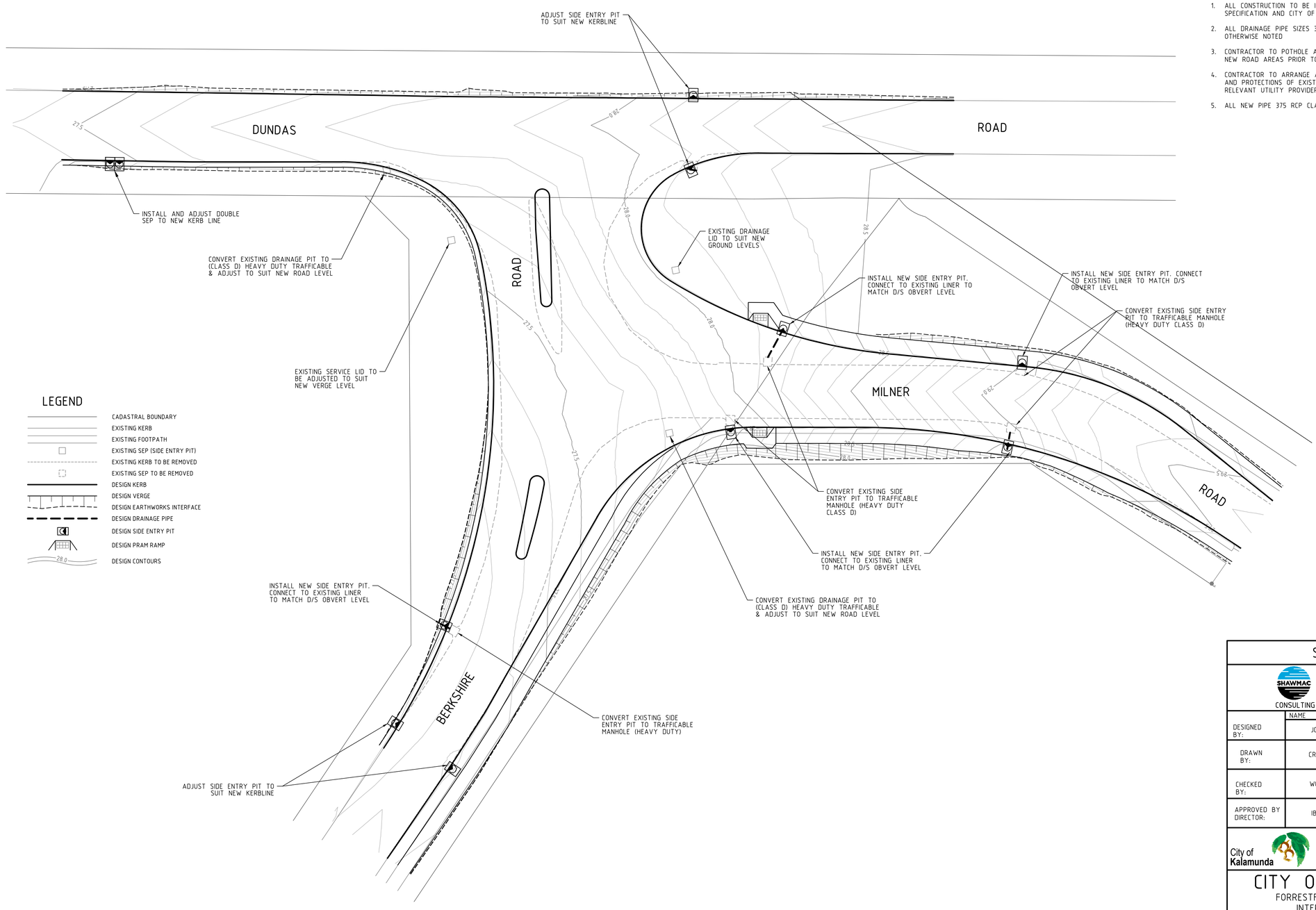
SHEET 1 OF 1

DRAWING-No. 1807009-233-1/1 | -SHEET | /REVISION | DRG. SIZE A1

1807009-431

NOTES

1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH SPECIFICATION AND CITY OF KALAMUNDA REQUIREMENTS
2. ALL DRAINAGE PIPE SIZES 300 RCP CLASS 4 UNLESS OTHERWISE NOTED
3. CONTRACTOR TO POTHOLE ALL EXISTING SERVICES UNDER NEW ROAD AREAS PRIOR TO COMMENCEMENT OF WORKS
4. CONTRACTOR TO ARRANGE ALL ADJUSTMENTS, RELOCATIONS AND PROTECTIONS OF EXISTING SERVICES WITH THE RELEVANT UTILITY PROVIDERS
5. ALL NEW PIPE 375 RCP CLASS 4 U.O.N



LEGEND

- CADASTRAL BOUNDARY
- EXISTING KERB
- EXISTING FOOTPATH
- EXISTING SEP (SIDE ENTRY PIT)
- EXISTING KERB TO BE REMOVED
- EXISTING SEP TO BE REMOVED
- DESIGN KERB
- DESIGN VERGE
- DESIGN EARTHWORKS INTERFACE
- DESIGN DRAINAGE PIPE
- DESIGN SIDE ENTRY PIT
- DESIGN PRAM RAMP
- DESIGN CONTOURS

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB

SCALE: 1:250 (2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES)

SURVEYED: ENGINEERING SURVEYOR

DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER

AUTHORISED: R. KORENHOF, MANAGER ASSET DELIVERY, 06.02.19

Discipline: CI

Structure Code: 420

DATUM: AHD

GRID: PCG94

DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE, COORDINATOR PROJECT DESIGN, 06.02.19

APPROVED: B. JACKSON, DIRECTOR ASSET SERVICES, 06.02.19

JOB No. 1807009

DRAWING-No. 1807009-431-1/0

ORG. SIZE A1

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DESIGNED BY:	JC		31.08.18
DRAWN BY:	CRF		31.08.18
CHECKED BY:	WC		06.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

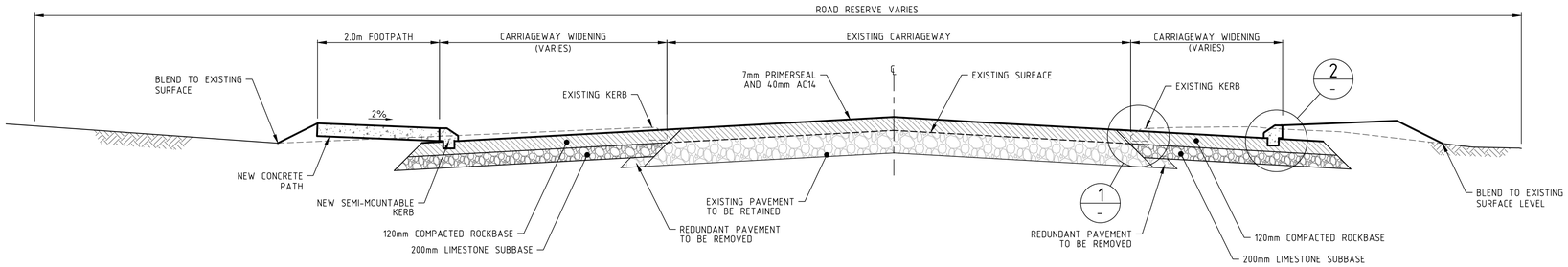
City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD/MILNER ROAD/DUNDAS ROAD

DRAINAGE PLAN

SHEET 1 OF 1

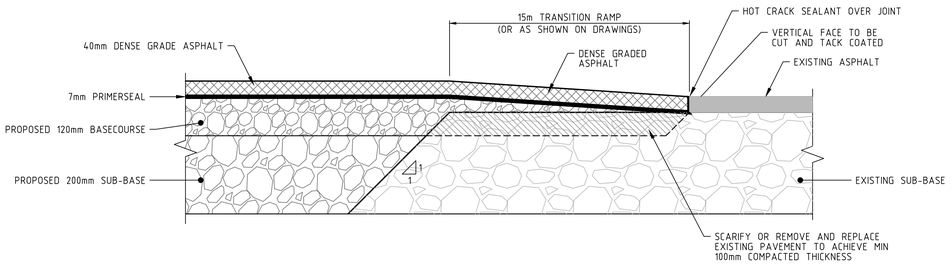


TYPICAL CROSS SECTION - PAVEMENT WIDENING & OVERLAY
NTS

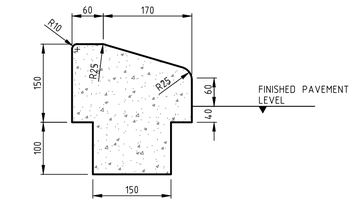
NOTES

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS NOTED OTHERWISE
2. DEMOLISH AND DISPOSE OF ALL EXISTING KERBING AND PATHS UNLESS NOTED OTHERWISE
3. DESIGN LEVELS ARE TO TOP OF SEAL.
4. REFER TO CITY OF KALAMUNDA STANDARD DRAWINGS FOR PRAM RAMP DETAILS.
5. REFER TO CITY OF KALAMUNDA STANDARD DRAWINGS FOR BOLLARD INSTALLATION
6. ALL PRAM RAMPS TO HAVE TACTILE PAVERS

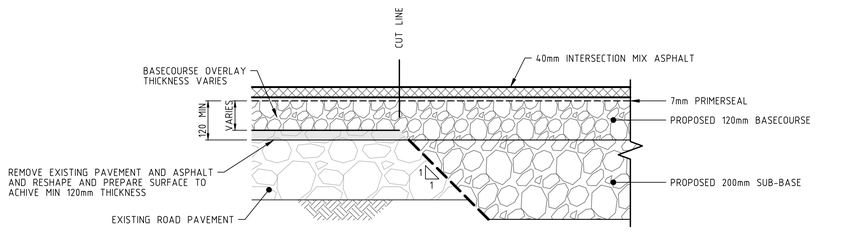
1807009-531



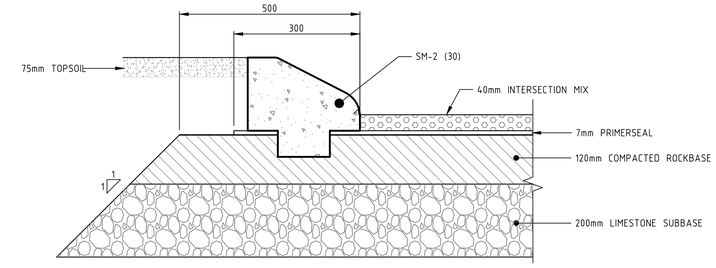
PAVEMENT OVERLAY TIE-IN DETAIL
NTS



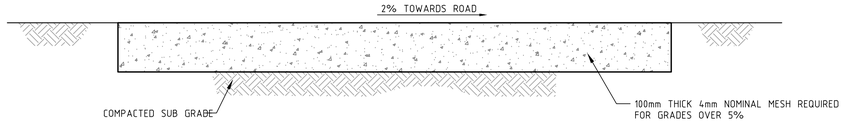
SEMI MOUNTABLE KEYED KERB PROFILE
1:5



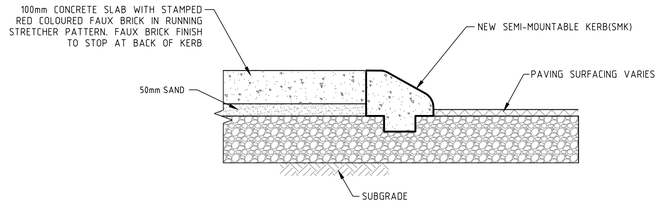
DETAIL 1 - PAVEMENT WIDENING DETAIL - OVERLAY & 40mm ASPHALT
NTS



DETAIL 2 - TYPICAL PAVEMENT AND SEMI-MOUNTABLE KERBING DETAIL
NTS



TYPICAL PATH DETAILS
NTS



PAVED MEDIAN INFILL DETAILS
SCALE: NTS

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB

No.	REVISION	BY	DATE	AUTH

NTS	SURVEYED: ENGINEERING SURVEYOR	DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER	AUTHORISED: R. KORENHOF, MANAGER ASSET DELIVERY, 06.02.19
DATUM: AHD / GRID: PCG94	DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER	CHECKED: G. BUDGE, COORDINATOR PROJECT DESIGN, 06.02.19	APPROVED: B. JACKSON, DIRECTOR ASSET SERVICES, 06.02.19

Discipline: CI | Structure Code: 420 | JOB No. 1807009

DRAWING-No. 1807009-531-1/0 | -SHEET /REVISION | DRG. SIZE A1

PLOTTED: Cameron Fare , 27/7/2019 1:50:45 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1801609\DRAWINGS\BERKSHIRE DUNDAS MILNER INTERSECTION\1807009-531 & 532.DWG PAN:----

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DRAWN BY:	CRF		31.08.18
CHECKED BY:	WC		06.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA
FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD/MILNER ROAD/DUNDAS ROAD

TYPICAL DETAILS
SHEET 1 OF 1

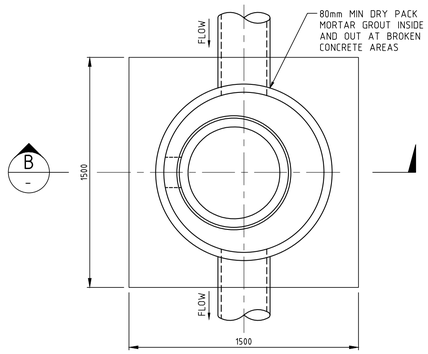
NOTES

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS NOTED OTHERWISE
2. DEMOLISH AND DISPOSE OF ALL EXISTING KERBING AND PATHS U.N.O
3. DESIGN LEVELS ARE TO TOP OF SEAL.

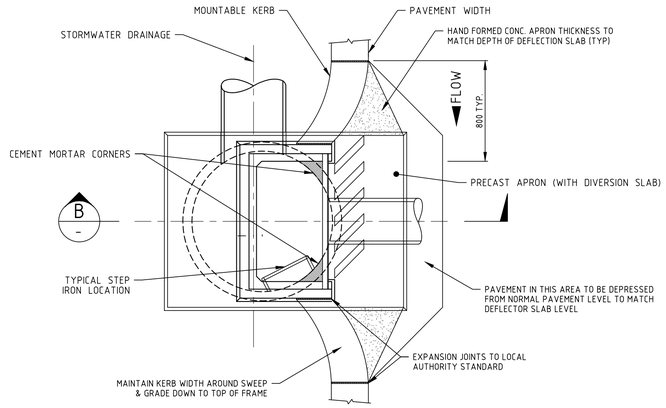
1807009-532

NOTES

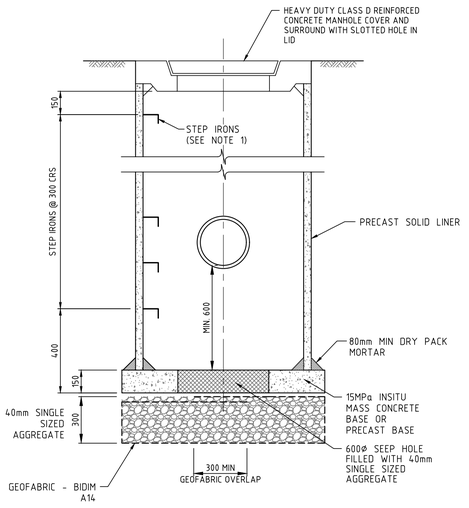
a) THE CLEAR OPENING IS ± 85mm.
b) THE MEAN DEVIATION ACROSS THE FACE OF OPENING ± 2mm.



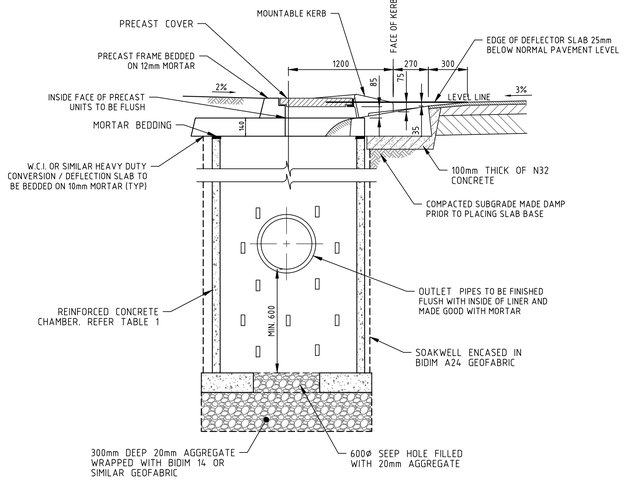
PLAN - MANHOLE
NTS



PLAN - SIDE ENTRY PIT
NTS



SECTION C
NTS



SECTION B
NTS

TYPICAL SEP WITH SOAKWELL

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB

No.	REVISION	BY	DATE	AUTH

NTS	SURVEYED: ENGINEERING SURVEYOR	DRAWN: C. FARE 13.02.18 INFRASTRUCTURE DESIGN OFFICER	AUTHORISED: R. KORENHOF 06.02.19 MANAGER ASSET DELIVERY	Discipline: CI / Structure Code: 420
DATUM: AHD / GRID: PCG94	DESIGNED: J. CURTIS INFRASTRUCTURE DESIGN OFFICER	CHECKED: G. BUDGE 06.02.19 COORDINATOR PROJECT DESIGN	APPROVED: B. JACKSON 06.02.19 DIRECTOR ASSET SERVICES	JOB No. 1807009

PLOTTED: Cameron Fore ; 2/7/2019 1:50:46 PM FILE: Y:\JOBS ACTIVE 2018\LCE - ROADS AND DRAINAGE\LCK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE DUNDAS MILNER INTERSECTION\1807009-531 & 532.DWG PRN----

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DRAWN BY:	CRF		31.08.18
CHECKED BY:	WC		06.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda

ASSET SERVICES

CITY OF KALAMUNDA

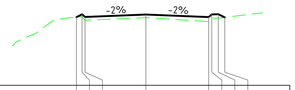
FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD/MILNER ROAD/DUNDAS ROAD

DRAINAGE DETAILS

SHEET 1 OF 1

DRAWING-No. -SHEET /REVISION	ORG. SIZE
1807009-532-1/0	A1

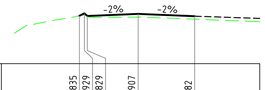
1807009-731



Datum R.L. 25.000

DESIGN SURFACE R.L. (m)	27.614	27.723	27.623	27.717	27.62	27.72	27.73	27.605
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.103	0.125	0.120	0.155	0.152	0.149	0.000
NATURAL SURFACE R.L. (m)	27.614	27.620	27.498	27.597	27.465	27.568	27.581	27.605
OFFSETS (m)	-5.340	-4.905	-4.675	0.000	4.827	5.057	5.557	6.058

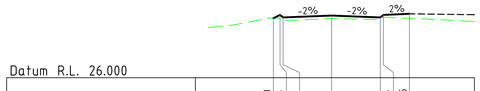
CHAINAGE 130.000



Datum R.L. 26.000

DESIGN SURFACE R.L. (m)	27.835	27.929	27.829	27.907	27.82
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.055	0.058	0.120	0.113
NATURAL SURFACE R.L. (m)	27.835	27.874	27.771	27.787	27.707
OFFSETS (m)	-4.508	-4.133	-3.903	0.000	4.343

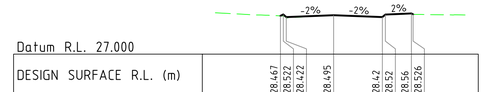
CHAINAGE 170.000



Datum R.L. 26.000

DESIGN SURFACE R.L. (m)	28.288	28.415	28.315	28.39	28.315	28.415	28.455
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.129	0.121	0.109	0.078	0.092	0.174
NATURAL SURFACE R.L. (m)	28.288	28.287	28.194	28.282	28.237	28.323	28.281
OFFSETS (m)	-4.472	-3.963	-3.733	0.000	3.742	3.972	5.972

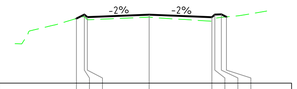
CHAINAGE 210.000



Datum R.L. 27.000

DESIGN SURFACE R.L. (m)	28.467	28.522	28.422	28.495	28.42	28.52	28.56	28.526
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.060	0.034	-0.000	-0.021	0.003	0.023	0.000
NATURAL SURFACE R.L. (m)	28.467	28.462	28.388	28.495	28.441	28.518	28.527	28.526
OFFSETS (m)	-4.086	-3.866	-3.636	0.000	3.742	3.972	5.972	6.109

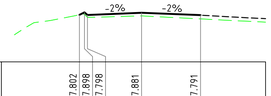
CHAINAGE 230.000



Datum R.L. 25.000

DESIGN SURFACE R.L. (m)	27.479	27.633	27.533	27.628	27.531	27.631	27.641	27.544
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.080	0.101	0.095	0.145	0.159	0.171	0.000
NATURAL SURFACE R.L. (m)	27.479	27.553	27.432	27.533	27.386	27.472	27.470	27.544
OFFSETS (m)	-5.589	-4.974	-4.744	0.000	4.818	5.048	5.548	5.938

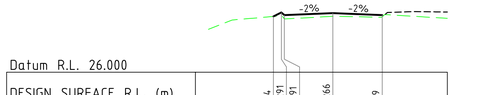
CHAINAGE 120.000



Datum R.L. 26.000

DESIGN SURFACE R.L. (m)	27.802	27.898	27.798	27.881	27.791
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.080	0.096	0.120	0.144
NATURAL SURFACE R.L. (m)	27.802	27.818	27.702	27.761	27.647
OFFSETS (m)	-4.772	-4.385	-4.155	0.000	4.526

CHAINAGE 160.000



Datum R.L. 26.000

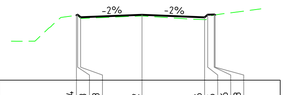
DESIGN SURFACE R.L. (m)	28.14	28.291	28.191	28.266	28.19	
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.125	0.146	0.120	0.065	
NATURAL SURFACE R.L. (m)	28.140	28.167	28.045	28.146	28.125	
OFFSETS (m)	-4.559	-3.952	-3.722	0.000	3.797	

CHAINAGE 200.000

Datum R.L. 27.000

DESIGN SURFACE R.L. (m)	28.375	28.469	28.369	28.443	28.368	28.468	28.508
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.096	0.075	0.050	0.024	0.042	0.103
NATURAL SURFACE R.L. (m)	28.375	28.373	28.294	28.393	28.343	28.426	28.404
OFFSETS (m)	-4.281	-3.905	-3.675	0.000	3.742	3.972	5.972

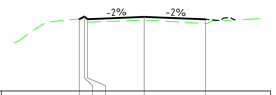
CHAINAGE 220.000



Datum R.L. 25.000

DESIGN SURFACE R.L. (m)	27.494	27.518	27.418	27.512	27.416	27.516	27.526	27.508
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.027	0.047	0.044	0.087	0.112	0.024	0.000
NATURAL SURFACE R.L. (m)	27.494	27.491	27.371	27.468	27.328	27.404	27.502	27.508
OFFSETS (m)	-5.044	-4.949	-4.719	0.000	4.809	5.039	5.539	5.612

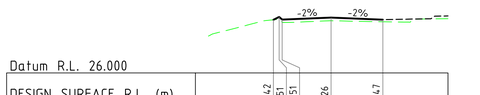
CHAINAGE 110.000



Datum R.L. 25.000

DESIGN SURFACE R.L. (m)	27.759	27.856	27.756	27.843	27.749
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.090	0.114	0.120	0.159
NATURAL SURFACE R.L. (m)	27.759	27.766	27.642	27.723	27.590
OFFSETS (m)	-4.972	-4.586	-4.356	0.000	4.708

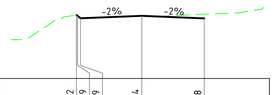
CHAINAGE 150.000



Datum R.L. 26.000

DESIGN SURFACE R.L. (m)	28.042	28.151	28.126	28.047
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.086	0.112	0.120	0.082
NATURAL SURFACE R.L. (m)	28.042	28.066	27.939	28.086	27.965
OFFSETS (m)	-4.426	-3.990	-3.760	0.000	3.979

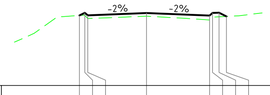
CHAINAGE 190.000



Datum R.L. 25.000

DESIGN SURFACE R.L. (m)	27.432	27.409	27.404	27.308
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	-0.019	0.000	-0.160
NATURAL SURFACE R.L. (m)	27.432	27.429	27.404	27.467
OFFSETS (m)	-5.025	-4.936	0.000	4.800

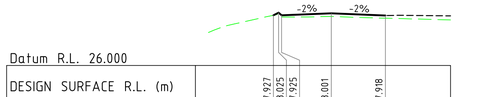
CHAINAGE 100.000



Datum R.L. 25.000

DESIGN SURFACE R.L. (m)	27.687	27.79	27.69	27.78	27.683	27.783	27.793	27.651
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.097	0.120	0.120	0.164	0.164	0.156	0.000
NATURAL SURFACE R.L. (m)	27.687	27.693	27.570	27.660	27.519	27.619	27.637	27.651
OFFSETS (m)	-5.156	-4.745	-4.515	0.000	4.836	5.066	5.566	6.135

CHAINAGE 140.000



Datum R.L. 26.000

DESIGN SURFACE R.L. (m)	27.927	28.025	27.925	28.001	27.918
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.058	0.069	0.120	0.104
NATURAL SURFACE R.L. (m)	27.927	27.967	27.855	27.881	27.814
OFFSETS (m)	-4.440	-4.048	-3.818	0.000	4.161

CHAINAGE 180.000

ISSUED FOR TENDER

0 2 4 6 8 10m
1 : 400 (A3) 1 : 200 (A1)

0 1 2 3 4 5m
1 : 200 (A3) 1 : 100 (A1)

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB

1:200H 1:100V

DATUM: AHD

GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR

DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE, 06.02.19, COORDINATOR PROJECT DESIGN

AUTHORISED: R. KORENHOF, 06.02.19, MANAGER ASSET DELIVERY

APPROVED: B. JACKSON, 06.02.19, DIRECTOR ASSET SERVICES

Discipline: CI

Structure Code: 420

JOB No. 1807009

DRAWING-No.-SHEET/REVISION: 1807009-731-1/0

DRG. SIZE: A1

PLOTTED: Cameron Fare , 2/7/2019 1:50:47 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CDC_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1801009\DRAWINGS\BERKSHIRE DUNDAS MILNER INTERSECTION\1807009-731 TO 734.DWG PRN----

SHAWMAC

1ST FLOOR, 908 ALBANY HIGHWAY
EAST VICTORIA PARK, WA 6101
P 9355 1300
E admin@shawmac.com.au

	NAME	SIGN	DATE
DESIGNED BY:	JC		31.08.18
DRAWN BY:	CRF		31.08.18
CHECKED BY:	WC		06.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda

ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
DUNDAS ROAD

CROSS SECTIONS

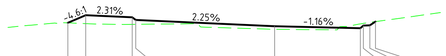
CH 100.00 TO CH 230.00

1807009-732

Datum R.L. 26.000

DESIGN SURFACE R.L. (m)		27.429	27.429	27.429			27.348	27.448	27.458	27.474			
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)		0.120	0.120	0.120			-0.067	0.016	-0.013	0.000			
NATURAL SURFACE R.L. (m)		27.309	27.309	27.309			27.415	27.432	27.470	27.474			
OFFSETS (m)		0.000	0.002	0.003			6.441	6.671	7.171	7.221			

CHAINAGE 40.000



Datum R.L. 26.000

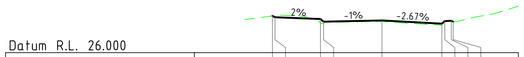
DESIGN SURFACE R.L. (m)		27.475	27.77			27.688	27.586			27.347		27.27	27.37	27.525
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)		0.000	0.325			0.270	0.167			0.120		-0.164	-0.083	0.000
NATURAL SURFACE R.L. (m)		27.475	27.446			27.418	27.419			27.227		27.435	27.454	27.525
OFFSETS (m)	-15.885	-14.518			-10.940	-10.674				0.000		6.580	6.810	7.310	7.743

CHAINAGE 50.000

Datum R.L. 26.000

DESIGN SURFACE R.L. (m)		27.458	27.413			27.343	27.243			27.302		27.165	27.265	27.247
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)		0.000	-0.057			-0.009	0.016			0.040		0.027	0.003	0.000
NATURAL SURFACE R.L. (m)		27.458	27.470			27.352	27.227			27.262		27.138	27.262	27.247
OFFSETS (m)		-8.312	-8.134			-4.634	-4.404			0.000		4.560	4.790	5.290	5.402

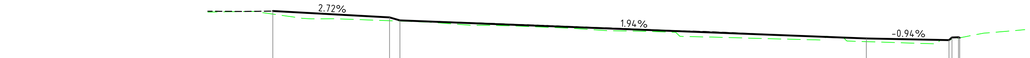
CHAINAGE 100.000



Datum R.L. 26.000

DESIGN SURFACE R.L. (m)		27.411	27.361			27.291	27.191			27.236		27.113	27.213	27.187
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)		0.000	-0.063			0.164	0.058			0.040		0.042	0.017	0.036	0.000
NATURAL SURFACE R.L. (m)		27.411	27.424			27.128	27.133			27.196		27.071	27.196	27.187	
OFFSETS (m)		-8.415	-8.217			-4.717	-4.487			0.000		4.598	4.828	5.328	5.475

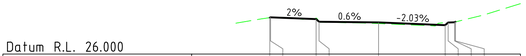
CHAINAGE 90.000



Datum R.L. 26.000

DESIGN SURFACE R.L. (m)		28.547			28.303	28.489				27.492		27.432	27.532	27.542	27.518
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)		0.116			0.127	0.028				0.120		-0.003	0.074	0.034	-0.000
NATURAL SURFACE R.L. (m)		28.430			28.175	28.161				27.372		27.435	27.458	27.508	27.518
OFFSETS (m)	-45.589				-36.626	-35.831				0.000		6.347	6.578	7.078	7.175

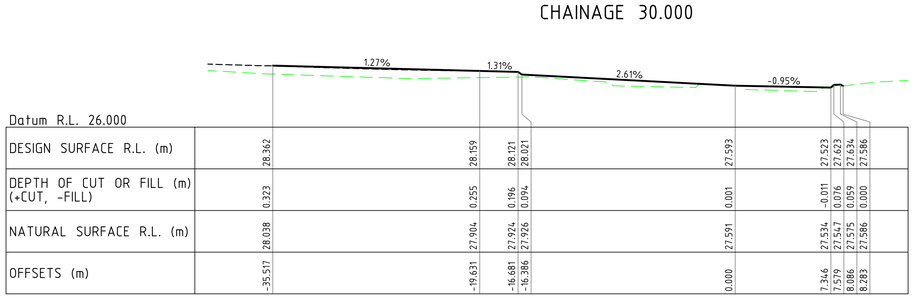
CHAINAGE 30.000



Datum R.L. 26.000

DESIGN SURFACE R.L. (m)		27.395	27.41			27.34	27.24			27.212		27.109	27.209	27.219	27.237
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)		0.000	0.011			-0.034	-0.016			0.040		-0.094	-0.004	-0.015	0.001
NATURAL SURFACE R.L. (m)		27.395	27.399			27.374	27.255			27.172		27.203	27.212	27.233	27.236
OFFSETS (m)	-8.361	-8.301			-4.801	-4.571				0.000		5.110	5.340	5.841	5.896

CHAINAGE 80.000



Datum R.L. 26.000

DESIGN SURFACE R.L. (m)		28.362			28.159	28.121	28.021			27.593		27.523	27.623	27.634	27.586
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)		0.323			0.255	0.196	0.094			0.001		-0.011	0.076	0.059	0.000
NATURAL SURFACE R.L. (m)		28.038			27.904	27.924	27.926			27.591		27.534	27.547	27.575	27.586
OFFSETS (m)	-35.517				-19.631	-16.681	-16.386			0.000		7.346	7.579	8.086	8.283

CHAINAGE 20.000

Datum R.L. 26.000

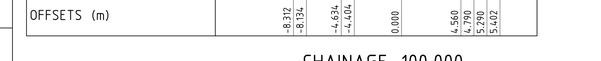
DESIGN SURFACE R.L. (m)		27.367	27.517			27.443	27.342			27.229		27.134	27.234	27.244	27.537
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)		0.000	0.153			0.072	-0.034			0.040		-0.212	-0.140	-0.190	-0.002
NATURAL SURFACE R.L. (m)		27.367	27.365			27.370	27.377			27.189		27.346	27.374	27.434	27.539
OFFSETS (m)	-9.398	-8.746			-5.217	-4.985				0.000		5.881	6.111	6.611	7.492

CHAINAGE 70.000

Datum R.L. 26.000

DESIGN SURFACE R.L. (m)		28.423			28.218	28.163	28.062			27.745		27.632	27.735	27.752	27.718
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)		0.270			0.144	0.126	0.032			0.121		-0.047	0.040	0.038	0.001
NATURAL SURFACE R.L. (m)		28.153			28.074	28.037	28.030			27.624		27.679	27.696	27.713	27.718
OFFSETS (m)	-35.693				-19.010	-16.326	-16.046			0.000		13.482	13.862	14.710	14.960

CHAINAGE 10.000



Datum R.L. 26.000

DESIGN SURFACE R.L. (m)		27.341	27.64			27.56	27.459			27.275		27.193	27.293	27.343	27.554
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)		0.000	0.297			0.215	0.111			0.071		-0.210	-0.174	-0.179	0.000
NATURAL SURFACE R.L. (m)		27.341	27.343			27.345	27.348			27.204		27.403	27.467	27.522	
OFFSETS (m)	-12.035	-10.790			-7.177	-6.940				0.000		6.307	6.538	7.038	7.790

CHAINAGE 60.000

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB

1:200H 1:100V

DATUM: AHD

GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR

DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE, 06.02.19, COORDINATOR PROJECT DESIGN

AUTHORISED: R. KORENHOF, 06.02.19, MANAGER ASSET DELIVERY

APPROVED: B. JACKSON, 06.02.19, DIRECTOR ASSET SERVICES

Discipline: CI

Structure Code: 420

JOB No. 1807009

0 2 4 6 8 10m
1 : 400 (A3) 1 : 200 (A1)

0 1 2 3 4 5m
1 : 200 (A3) 1 : 100 (A1)

SHAWMAC

SHAWMAC
1ST FLOOR, 908 ALBANY HIGHWAY
EAST VICTORIA PARK, WA 6101
P 9355 1300
E admin@shawmac.com.au

	NAME	SIGN	DATE
DESIGNED BY:	JC		31.08.18
DRAWN BY:	CRF		31.08.18
CHECKED BY:	WC		06.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD

CROSS SECTIONS
CH 10.00 TO CH 100.00

DRAWING-No. 1807009-732-2/0

-SHEET /REVISION

ORG. SIZE A1

PLOTTED: Cameron Fare , 27/7/2019 1:50:48 PM FILE: Y:\JOBS ACTIVE 2018\22 - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE DUNDAS MILNER INTERSECTION\1807009-731 TO 734.DWG PRN=----

1807009-733

Datum R.L. 27.000

DESIGN SURFACE R.L. (m)	28.522	28.516	28.511	28.69	28.65	28.55	28.595	28.705	28.614	28.584	28.684	28.724	28.242
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.080	0.086	0.000	0.185	0.103	-0.005	0.120	0.120	0.120	-0.048	0.051	0.261	0.000
NATURAL SURFACE R.L. (m)	28.442	28.430	28.511	28.506	28.547	28.555	28.475	28.585	28.494	28.631	28.633	28.463	28.242
OFFSETS (m)	-30.602	-15.535	-7.950	-7.232	-5.232	-5.002	-3.569	0.000	3.890	5.151	5.381	7.381	9.307

CHAINAGE 50.000

Datum R.L. 26.000

DESIGN SURFACE R.L. (m)	28.47	28.407	28.377	28.278	28.406	28.302	28.269	28.369	28.409	27.837
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.160	0.227	0.104	-0.004	0.120	0.120	-0.050	0.051	0.321	0.000
NATURAL SURFACE R.L. (m)	28.310	28.181	28.274	28.282	28.286	28.182	28.319	28.318	28.088	27.837
OFFSETS (m)	-30.625	-8.718	-6.670	-6.435	0.000	3.810	4.998	5.228	7.228	9.515

CHAINAGE 40.000

Datum R.L. 26.000

DESIGN SURFACE R.L. (m)	28.231	28.331	28.37	28.228	28.197	28.098	28.095	27.979	27.941	28.041	28.081	27.633
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.078	0.082	0.183	0.228	0.197	0.098	0.120	0.120	-0.049	0.051	0.200	0.000
NATURAL SURFACE R.L. (m)	28.152	28.248	28.188	28.000	28.000	28.000	27.975	27.859	27.990	27.990	27.881	27.633
OFFSETS (m)	-32.893	-32.663	-30.663	-11.776	-9.632	-9.386	0.000	3.744	4.998	5.228	7.228	9.018

CHAINAGE 30.000

Datum R.L. 26.000

DESIGN SURFACE R.L. (m)	28.109	28.208	28.238	28.16	28.121	28.021	27.802	27.745	27.844	27.868	27.648
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.016	0.119	0.175	0.268	0.233	0.134	0.120	0.030	0.129	0.180	0.001
NATURAL SURFACE R.L. (m)	28.093	28.089	28.064	27.891	27.887	27.887	27.682	27.715	27.715	27.689	27.646
OFFSETS (m)	-30.655	-30.402	-28.180	-16.684	-14.366	-14.101	0.000	6.930	7.180	9.368	10.084

CHAINAGE 20.000

Datum R.L. 28.000

DESIGN SURFACE R.L. (m)	29.519	29.538	29.498	29.398	29.441	29.52	29.407	29.391	29.491	29.531	29.416
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.019	-0.000	-0.098	0.120	0.120	0.120	-0.036	0.080	0.083	0.000
NATURAL SURFACE R.L. (m)	29.519	29.519	29.498	29.496	29.321	29.400	29.287	29.427	29.411	29.448	29.416
OFFSETS (m)	-7.483	-7.408	-5.408	-5.178	-3.344	0.000	4.019	4.576	4.806	6.806	7.265

CHAINAGE 90.000

Datum R.L. 28.000

DESIGN SURFACE R.L. (m)	29.409	29.447	29.407	29.307	29.323	29.348	29.294	29.271	29.371	29.406	29.237
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.039	0.044	-0.053	0.120	0.120	0.120	-0.048	0.043	0.138	0.000
NATURAL SURFACE R.L. (m)	29.409	29.408	29.363	29.359	29.203	29.228	29.174	29.320	29.328	29.268	29.237
OFFSETS (m)	-8.212	-8.060	-6.060	-5.830	-3.514	0.000	3.946	5.613	5.843	7.563	8.240

CHAINAGE 80.000

Datum R.L. 27.000

DESIGN SURFACE R.L. (m)	29.158	29.244	29.204	29.104	29.125	29.18	29.095	29.032	29.132	29.156	29.147
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.086	0.050	-0.047	0.120	0.120	0.120	-0.097	0.014	0.012	0.000
NATURAL SURFACE R.L. (m)	29.158	29.158	29.154	29.151	29.005	29.060	28.975	29.129	29.119	29.144	29.147
OFFSETS (m)	-7.937	-7.594	-5.594	-5.364	-3.850	0.000	3.453	6.039	6.269	7.469	7.507

CHAINAGE 70.000

Datum R.L. 27.000

DESIGN SURFACE R.L. (m)	28.801	28.992	28.952	28.852	28.874	28.972	28.867	28.808	28.908	28.945	28.7
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.190	0.100	-0.008	0.120	0.120	0.120	-0.076	0.038	0.188	0.000
NATURAL SURFACE R.L. (m)	28.801	28.802	28.852	28.860	28.754	28.852	28.747	28.884	28.869	28.757	28.700
OFFSETS (m)	-7.413	-6.650	-4.650	-4.420	-3.599	0.000	3.755	5.863	6.093	7.973	8.954

CHAINAGE 60.000

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DRAWN BY:	CRF		31.08.18
CHECKED BY:	WC		06.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda

ASSET SERVICES

CITY OF KALAMUNDA
FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
MILNER ROAD

CROSS SECTIONS
CH 20.00 TO CH 90.00

DRAWING-No. -SHEET /REVISION: 1807009-733-3/0
DRG. SIZE: A1

0 2 4 6 8 10m
1 : 400 (A3) 1 : 200 (A1)

0 1 2 3 4 5m
1 : 200 (A3) 1 : 100 (A1)

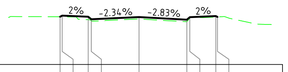
ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH	No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB					

1:200H 1:100V
DATUM: AHD
GRID: PCG94
SURVEYED: ENGINEERING SURVEYOR
DESIGNED: J. CURTIS INFRASTRUCTURE DESIGN OFFICER
DRAWN: C. FARE INFRASTRUCTURE DESIGN OFFICER
CHECKED: G. BUDGE 06.02.19 COORDINATOR PROJECT DESIGN
AUTHORISED: R. KORENHOF 06.02.19 MANAGER ASSET DELIVERY
APPROVED: B. JACKSON 06.02.19 DIRECTOR ASSET SERVICES
Discipline: CI
Structure Code: 420
JOB No. 1807009

PLOTTED: Cameron Fare ; 2/7/2019 1:50:48 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\COK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE DUNDAS MILNER INTERSECTION\1807009-731 TO 734.DWG PRN:----

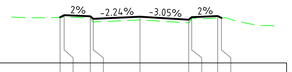
1807009-734



Datum R.L. 28.000

DESIGN SURFACE R.L. (m)	29.833	29.874	29.834	29.734	29.82	29.716	29.816	29.856	29.825	
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.046	0.114	0.064	0.073	0.074	0.028	0.035	0.000	
NATURAL SURFACE R.L. (m)	29.833	29.828	29.719	29.670	29.747	29.642	29.788	29.821	29.825	
OFFSETS (m)	-6.067	-5.902	-3.902	-3.672	0.000	3.668	3.898	5.898	6.023	

CHAINAGE 130.000



Datum R.L. 28.000

DESIGN SURFACE R.L. (m)	29.754	29.834	29.794	29.694	29.774	29.66	29.76	29.8	29.728	
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.072	0.076	0.120	0.120	0.120	0.064	0.078	0.000	
NATURAL SURFACE R.L. (m)	29.754	29.761	29.718	29.574	29.654	29.540	29.696	29.722	29.728	
OFFSETS (m)	-6.137	-5.817	-3.817	-3.587	0.000	3.747	3.977	5.977	6.263	

CHAINAGE 120.000

Datum R.L. 28.000

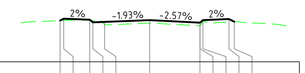
DESIGN SURFACE R.L. (m)	29.683	29.753	29.713	29.613	29.686	29.572	29.672	29.712	29.627	
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.068	0.065	0.100	0.120	0.120	0.190	0.094	0.000	
NATURAL SURFACE R.L. (m)	29.683	29.685	29.649	29.513	29.494	29.566	29.482	29.618	29.627	
OFFSETS (m)	-6.081	-5.800	-3.800	-3.570	-3.539	0.000	3.793	4.023	6.023	6.361

CHAINAGE 110.000

Datum R.L. 28.000

DESIGN SURFACE R.L. (m)	29.863	29.934	29.894	29.794	29.889	29.8	29.9	29.94	29.979	
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.078	0.087	0.005	0.000	0.002	-0.046	-0.035	0.000	
NATURAL SURFACE R.L. (m)	29.863	29.856	29.807	29.789	29.889	29.798	29.946	29.975	29.979	
OFFSETS (m)	-6.313	-6.029	-4.029	-3.799	0.000	3.550	3.780	5.780	5.937	

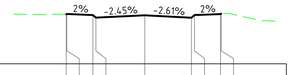
CHAINAGE 145.000



Datum R.L. 28.000

DESIGN SURFACE R.L. (m)	29.587	29.658	29.618	29.536	29.602	29.503	29.593	29.603	29.643	29.541
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.063	0.030	-0.067	0.120	0.120	0.120	0.078	0.113	0.000
NATURAL SURFACE R.L. (m)	29.587	29.595	29.589	29.585	29.416	29.383	29.383	29.525	29.531	29.541
OFFSETS (m)	-6.888	-6.604	-4.604	-4.374	-3.445	0.000	3.856	3.863	4.086	6.086	6.496

CHAINAGE 100.000



Datum R.L. 28.000

DESIGN SURFACE R.L. (m)	29.903	29.914	29.874	29.774	29.866	29.772	29.872	29.912	29.925	
DEPTH OF CUT OR FILL (m) (+CUT, -FILL)	0.000	0.011	-0.014	0.022	0.026	0.027	-0.019	-0.012	0.000	
NATURAL SURFACE R.L. (m)	29.903	29.903	29.888	29.752	29.840	29.745	29.891	29.924	29.925	
OFFSETS (m)	-6.030	-5.987	-3.987	-3.757	0.000	3.589	3.819	5.819	5.872	

CHAINAGE 140.000

ISSUED FOR TENDER

0 2 4 6 8 10m
1 : 400 (A3) 1 : 200 (A1)

0 1 2 3 4 5m
1 : 200 (A3) 1 : 100 (A1)

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	31.08.18	IB

No.	REVISION	BY	DATE	AUTH

1:200H 1:100V

DATUM: AHD GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR

DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE, 06.02.19, COORDINATOR PROJECT DESIGN

AUTHORISED: R. KORENHOF, 06.02.19, MANAGER ASSET DELIVERY

APPROVED: B. JACKSON, 06.02.19, DIRECTOR ASSET SERVICES

Discipline: CI

Structure Code: 420

JOB No. 1807009

DRAWING-No. 1807009-734-4/0

-SHEET /REVISION

DRG. SIZE A1

SHAWMAC

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City of Kalamunda

ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
MILNER ROAD

CROSS SECTIONS
CH 100.00 TO CH 145.00

PLOTTED: Cameron Fare ; 2/7/2019 1:50:49 PM FILE: Y:\JOBS ACTIVE 2018\LE - ROADS AND DRAINAGE\LOK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE DUNDAS MILNER INTERSECTION\1807009-731 TO 734.DWG PRN----

1807009-831

REINSTATE EXISTING
DUNDAS RD
KEWDALE TYRES

REINSTATE EXISTING

RELOCATE EXISTING
GIVE WAY
R1-2B

RETAIN EXISTING
70
R4-1A

TIE INTO EXISTING DOUBLE ONE WAY BARRIER LINE

REINSTATE 58m DOUBLE ONE WAY BARRIER LINE WITH 3 No. DOUBLE YELLOW UNI-DIRECTIONAL RRPM'S AT 12m SPACING

DUNDAS

REINSTATE 25m DOUBLE TWO WAY BIDIRECTION RRPM'S AT 6m SPACING

TIE INTO EXISTING DOUBLE ONE WAY BARRIER LINE

ROAD

REINSTATE 17m DOUBLE ONE WAY BARRIER LINE WITH 2 No. DOUBLE YELLOW UNI-DIRECTIONAL RRPM'S AT 12m SPACING

REINSTATE 36.5m OF EDGE LINE

TIE INTO EXISTING EDGE LINE

REINSTATE 25m DOUBLE TWO WAY BARRIER LINE WITH 5 No. DOUBLE YELLOW BIDIRECTION RRPM'S AT 6m SPACING

INSTALL 20.9m GIVE WAY LINE

INSTALL 9m OF CONTINUITY LINE

RELOCATE EXISTING
KEEP LEFT
R2-3A(L)

INSTALL 57m EDGE LINE WITH DIAGONAL MARKING

RELOCATE EXISTING
70
R4-1A

RELOCATE EXISTING
GIVE WAY
R1-2B

ROAD

MILNER

RELOCATE EXISTING
D4-2-1

INSTALL 79m EDGE LINE WITH DIAGONAL MARKING

ROAD

BELOW

INSTALL 70m SINGLE BARRIER LINE

INSTALL 13.8m GIVE WAY LINE

INSTALL 50m CONTINUITY LINE

JOINS

INSTALL 31m EDGE LINE

INSTALL 9 No. UNI-DIRECTIONAL YELLOW RRPM'S @ 6m SPACING AND 1 No. DOUBLE YELLOW BIDIRECTIONAL RRPM

INSTALL 44m EDGE LINE WITH DIAGONAL MARKING

INSTALL 25m EDGE LINE

BERKSHIRE

TIE INTO EXISTING SINGLE BARRIER LINE

ABOVE

INSTALL 24m BROKEN SEPARATION LINE

JOINS

MILNER

ROAD

NOTES:

1. ALL EXISTING PAVEMENT MARKING WILL BE REMOVED AS PART OF THE PAVEMENT OVERLAY

PAVEMENT MARKING LINE TYPES

- BROKEN LANE LINE (80mm WIDE)
- DOUBLE ONE WAY BARRIER LINE (80mm WIDE LINES, 80mm GAP)
- EDGE LINE (120mm WIDE)
- DOUBLE TWO WAY BARRIER LINE (80mm WIDE LINES, 80mm GAP)
- CONTINUITY LINE (120mm WIDE)
- GIVE WAY LINE (300mm WIDE)
- STOP LINE (300mm WIDE)

LEGEND

- EXISTING LINE TO BE REMOVED
- NEW PAINTED LINE
- NEW PAVEMENT ARROW
- EXISTING ONE POLE SIGN
- EXISTING TWO POLE SIGN
- NEW ONE POLE SIGN
- NEW TWO POLE SIGN
- NEW YELLOW UNIDIRECTIONAL RRPM
- NEW YELLOW BIDIRECTIONAL RRPM

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB

SCALE: 1:250 (2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES)
DATUM: AHD
GRID: PCG94

SURVEYED: . ENGINEERING SURVEYOR .
DESIGNED: J. CURTIS . INFRASTRUCTURE DESIGN OFFICER .
DRAWN: C. FARE . INFRASTRUCTURE DESIGN OFFICER .
CHECKED: G. BUDGE 06.02.19 . COORDINATOR PROJECT DESIGN .
AUTHORISED: R. KORENHOF 06.02.19 . MANAGER ASSET DELIVERY .
APPROVED: B. JACKSON 06.02.19 . DIRECTOR ASSET SERVICES .

Discipline: CI
Structure Code: 420
JOB No. 1807009

DRAWING-No. -SHEET /REVISION: 1807009-831-1/0
ORG. SIZE: A1

PLOTTED: Cameron Fare , 27/2019 1:56:51 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CDC_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_3801007\DRAWINGS\BERKSHIRE DUNDAS MILNER INTERSECTION\1807009-831SWG.PAN----

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City of Kalamunda — ASSET SERVICES

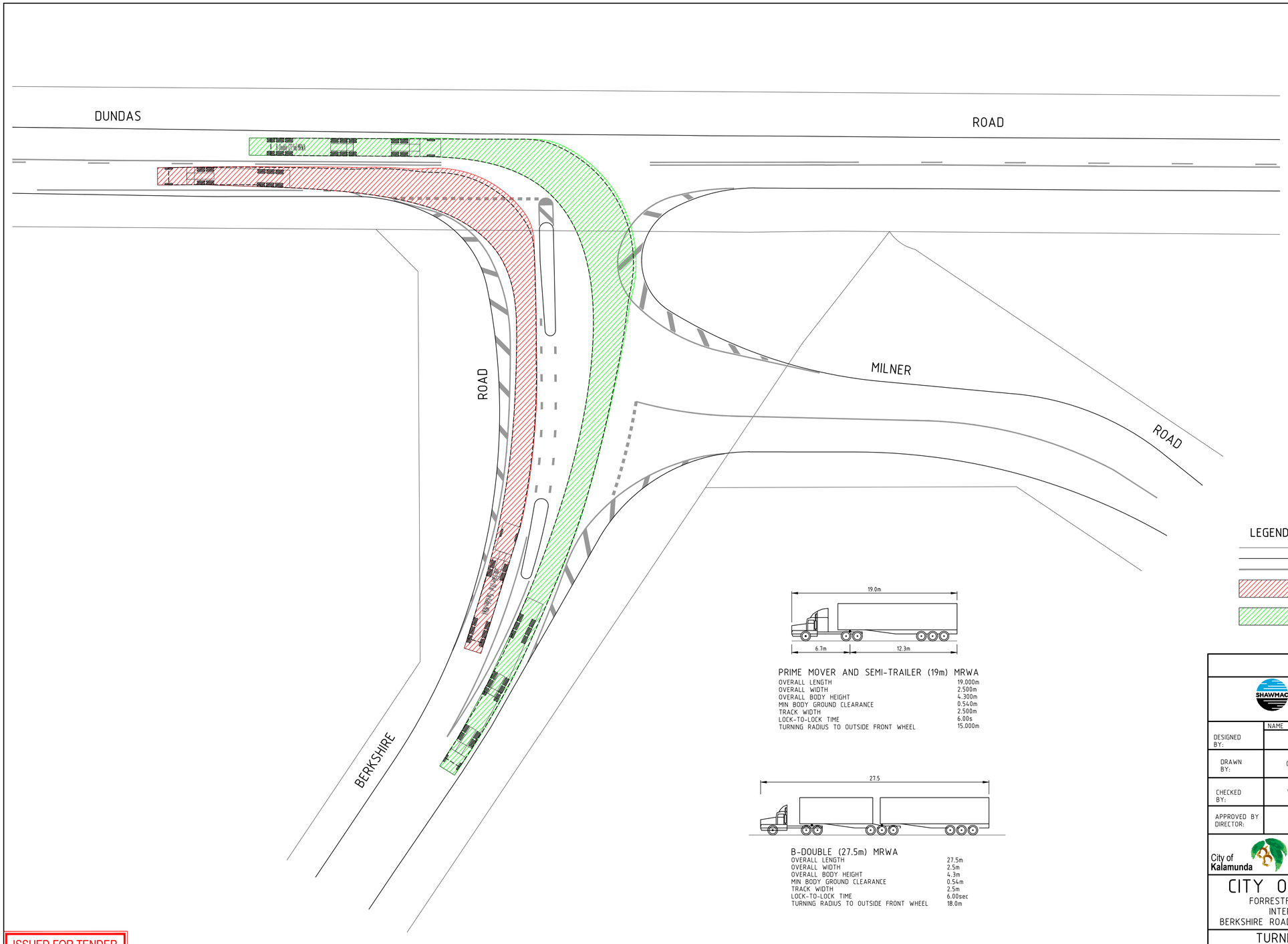
CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD/MILNER ROAD/DUNDAS ROAD

SIGNS & PAVEMENT MARKING

SHEET 1 OF 1

1807009-931



PRIME MOVER AND SEMI-TRAILER (19m) MRWA

OVERALL LENGTH	19.000m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
TURNING RADIUS TO OUTSIDE FRONT WHEEL	15.000m

B-DOUBLE (27.5m) MRWA

OVERALL LENGTH	27.5m
OVERALL WIDTH	2.5m
OVERALL BODY HEIGHT	4.3m
MIN BODY GROUND CLEARANCE	0.54m
TRACK WIDTH	2.5m
LOCK-TO-LOCK TIME	6.00sec
TURNING RADIUS TO OUTSIDE FRONT WHEEL	18.0m

LEGEND

- CADASTRAL BOUNDARY
- KERB LINE
- PAVEMENT MARKING
- 19m SEMI-TRAILER TURNING TEMPLATE LEFT TURN INTO DUNDAS ROAD
- 27.5m B-DOUBLE TURNING TEMPLATE RIGHT TURN INTO BERKSHIRE ROAD

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB

SCALE: 1:250 (2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES)

DATUM: AHD | GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR

DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE 06.02.19, COORDINATOR PROJECT DESIGN

AUTHORISED: R. KORENHOF 06.02.19, MANAGER ASSET DELIVERY

APPROVED: B. JACKSON 06.02.19, DIRECTOR ASSET SERVICES

Discipline: CI | Structure Code: 420

JOB No. 1807009

PLOTTED: Cameron Fare : 2/7/2019 15:53 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CDK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE DUNDAS MILNER INTERSECTION\1807009-931.DWG PRN----

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ASSET SERVICES

CITY OF KALAMUNDA

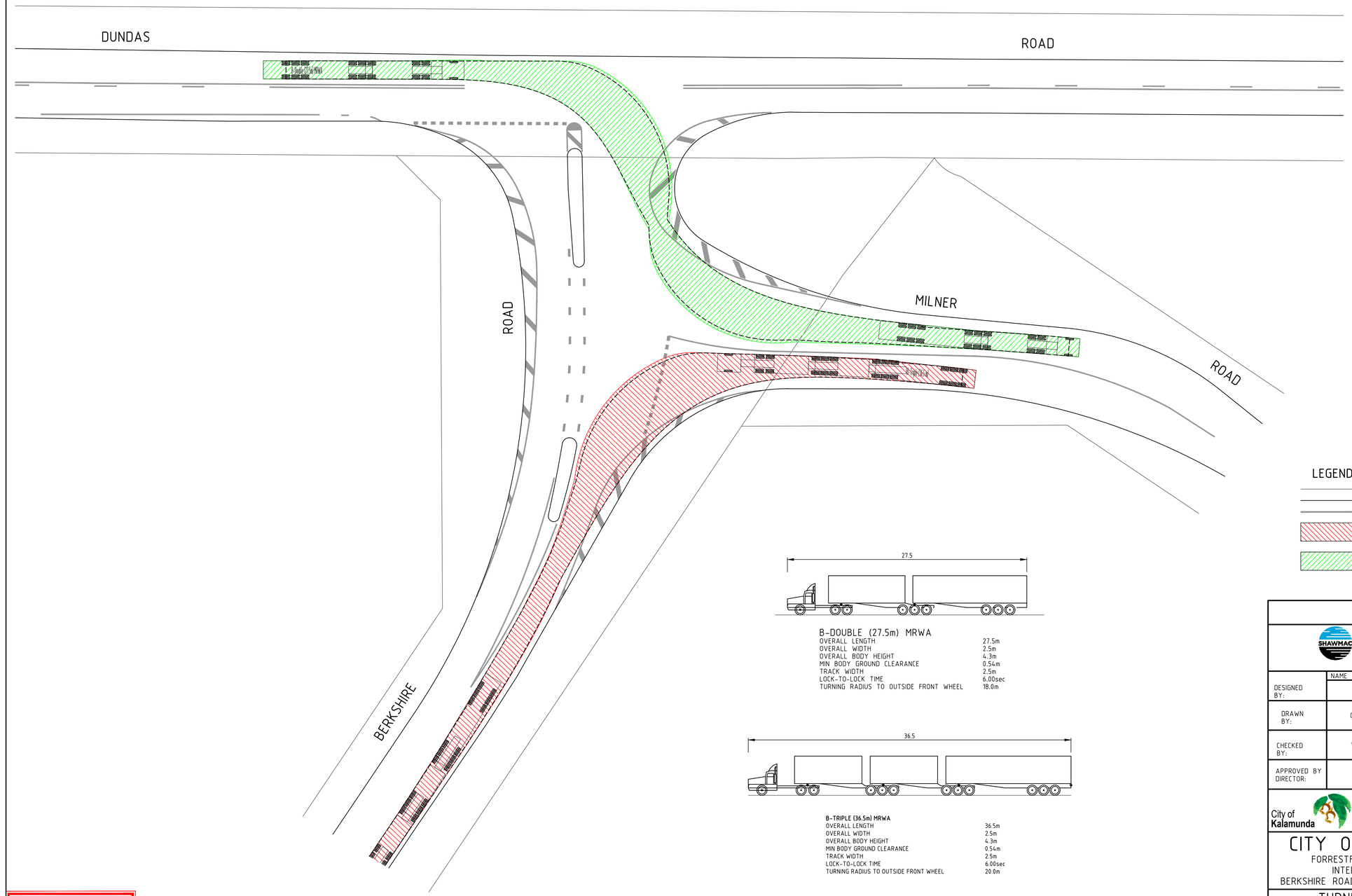
FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD/MILNER ROAD/DUNDAS ROAD

TURNING TEMPLATES

SHEET 1 OF 3

DRAWING-No: 1807009-931-1/0 | -SHEET /REVISION | DRG. SIZE A1

1807009-932



LEGEND

- CADASTRAL BOUNDARY
- KERB LINE
- PAVEMENT MARKING
- 36.5m B-TRIPLE TURNING TEMPLATE LEFT TURN INTO BERKSHIRE ROAD
- 27.5m B-DOUBLE TURNING TEMPLATE LEFT TURN INTO BERKSHIRE/MILNER

B-DOUBLE (27.5m) MRWA

OVERALL LENGTH	27.5m
OVERALL WIDTH	2.5m
OVERALL BODY HEIGHT	4.3m
MIN BODY GROUND CLEARANCE	0.54m
TRACK WIDTH	2.5m
LOCK-TO-LOCK TIME	6.00sec
TURNING RADIUS TO OUTSIDE FRONT WHEEL	18.0m

B-TRIPLE (36.5m) MRWA

OVERALL LENGTH	36.5m
OVERALL WIDTH	2.5m
OVERALL BODY HEIGHT	4.3m
MIN BODY GROUND CLEARANCE	0.54m
TRACK WIDTH	2.5m
LOCK-TO-LOCK TIME	6.00sec
TURNING RADIUS TO OUTSIDE FRONT WHEEL	20.0m

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB

SCALE: 1:250 — 2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES

DATUM: AHD — GRID: PCG94

SURVEYED: — ENGINEERING SURVEYOR

DRAWN: C. FARE — INFRASTRUCTURE DESIGN OFFICER

DESIGNED: J. CURTIS — INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE 06.02.19 — COORDINATOR PROJECT DESIGN

AUTHORISED: R. KORENHOF 06.02.19 — MANAGER ASSET DELIVERY

APPROVED: B. JACKSON 06.02.19 — DIRECTOR ASSET SERVICES

Discipline: CI — Structure Code: 420

JOB No. 1807009

DRAWING-No. -SHEET /REVISION: 1807009-932-1/0 — ORG. SIZE: A1

PLOTTED: Cameron Fare , 27/2019 15:53 FM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\CSK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE DUNDAS MILNER INTERSECTION\1807009-932DWG PAN----

SHAWMAC

SHAWMAC

1ST FLOOR, 908 ALBANY HIGHWAY
EAST VICTORIA PARK, WA 6101
P 9355 1300
E admin@shawmac.com.au

	NAME	SIGN	DATE
DESIGNED BY:	JC		31.08.18
DRAWN BY:	CRF		31.08.18
CHECKED BY:	WC		06.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda — ASSET SERVICES

CITY OF KALAMUNDA

FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD/MILNER ROAD/DUNDAS ROAD

TURNING TEMPLATES

SHEET 2 OF 3

1807009-933

DUNDAS ROAD

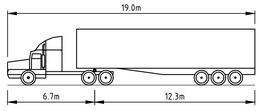
ROAD

MILNER ROAD

BERKSHIRE ROAD

LEGEND

- CADASTRAL BOUNDARY
- KERB LINE
- PAVEMENT MARKING
- 19m SEMI-TRAILER TURNING TEMPLATE LEFT TURN INTO BERKSHIRE/MILNER
- 19m SEMI-TRAILER TURNING TEMPLATE RIGHT TURN INTO DUNDAS ROAD



PRIME MOVER AND SEMI-TRAILER (19m) MRWA

OVERALL LENGTH	19.000m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
TURNING RADIUS TO OUTSIDE FRONT WHEEL	15.000m

ISSUED FOR TENDER

No.	REVISION	BY	DATE	AUTH
0	ISSUED FOR TENDER	CRF	06.09.18	IB

SCALE: 1:250 — 2.5 0 2.5 5.0 7.5 10.0 12.5 SCALE IN METRES

DATUM: AHD | GRID: PCG94

SURVEYED: ENGINEERING SURVEYOR

DESIGNED: J. CURTIS, INFRASTRUCTURE DESIGN OFFICER

DRAWN: C. FARE, INFRASTRUCTURE DESIGN OFFICER

CHECKED: G. BUDGE 06.02.19, COORDINATOR PROJECT DESIGN

AUTHORISED: R. KORENHOF 06.02.19, MANAGER ASSET DELIVERY

APPROVED: B. JACKSON 06.02.19, DIRECTOR ASSET SERVICES

Discipline: CI | Structure Code: 420

JOB No. 1807009

PLOTTED: Cameron Fara , 27/7/2019 1:50:54 PM FILE: Y:\JOBS ACTIVE 2018\CE - ROADS AND DRAINAGE\COK_FORRESTFIELD INDUSTRIAL AREA - INTERSECTION UPGRADES_1807009\DRAWINGS\BERKSHIRE DUNDAS MILNER INTERSECTION\1807009-933.DWG PSN----

SHAWMAC

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P 9355 1300
E admin@shawmac.com.au

	NAME	SIGN	DATE
DESIGNED BY:	JC		31.08.18
DRAWN BY:	CRF		31.08.18
CHECKED BY:	WC		06.09.18
APPROVED BY DIRECTOR:	IB		06.02.19

City of Kalamunda ASSET SERVICES

CITY OF KALAMUNDA

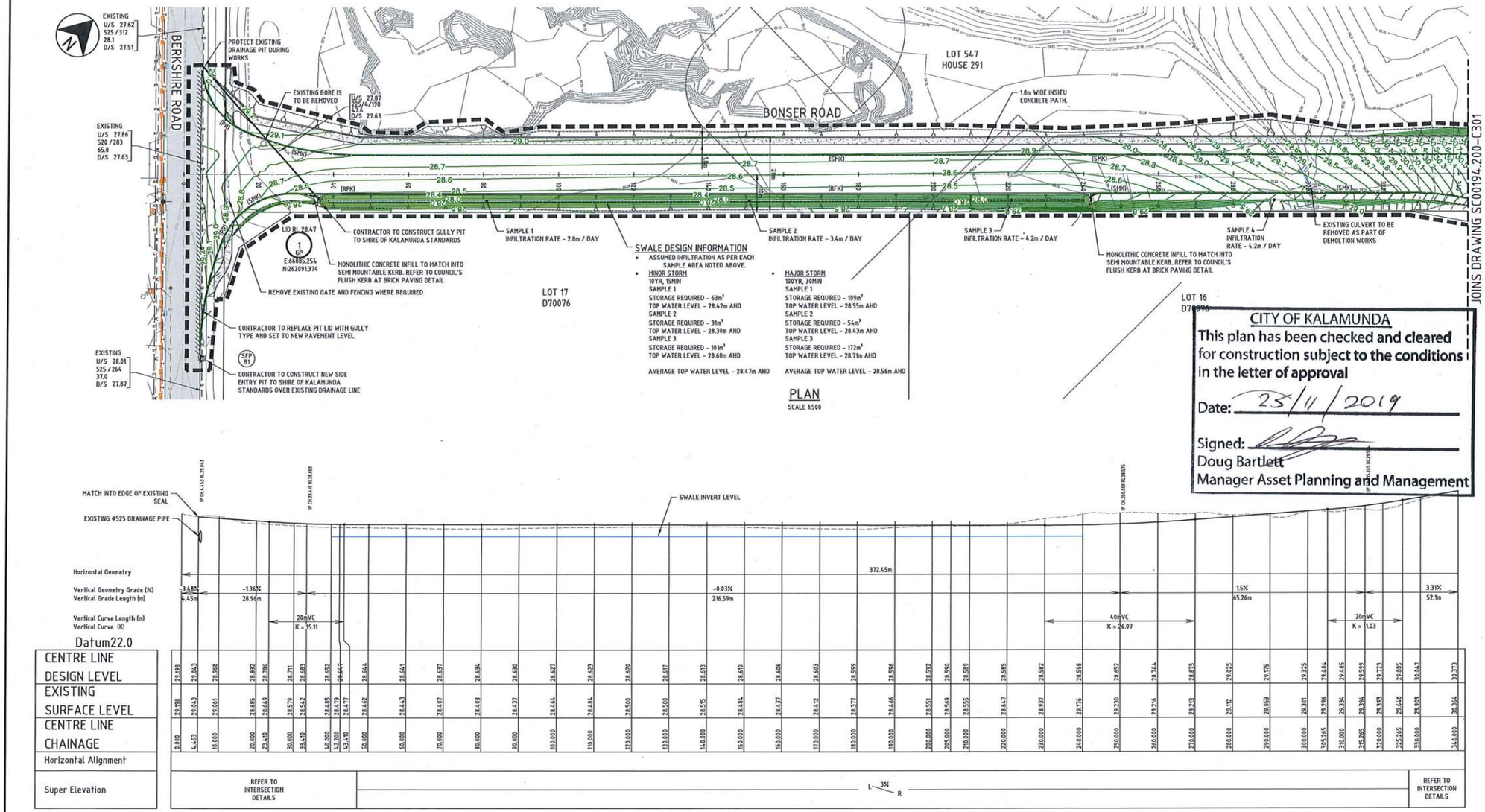
FORRESTFIELD INDUSTRIAL AREA
INTERSECTION UPGRADE
BERKSHIRE ROAD/MILNER ROAD/DUNDAS ROAD

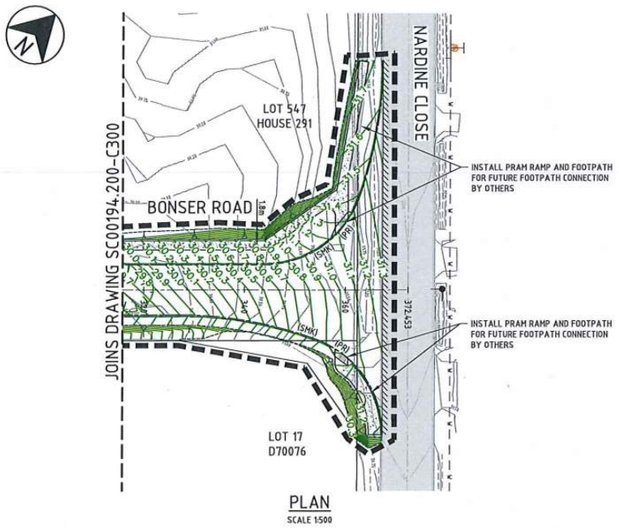
TURNING TEMPLATES

SHEET 3 OF 3

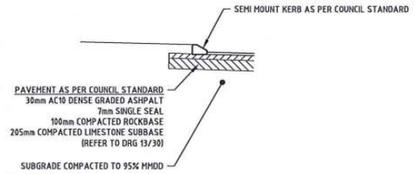
DRAWING-No. 1807009-933-1/0 | -SHEET | /REVISION | ORG. SIZE A1

Attachment 13:
Bonser Road drawings





PLAN
SCALE 1:500



TYPICAL ROAD SECTION AT INTERSECTIONS
SCALE 1:50

LEGEND

- (SMK) — PROPOSED SEMI MOUNTABLE KERB
- (RFK) — PROPOSED REINFORCED FLUSH KERBING
- STREET SIGNS TO BE SUPPLIED & INSTALLED BY CONTRACTOR AS PER COUNCIL STANDARD DRAWING
- EXTENT OF WORKS
- SAW CUT EXISTING PAVEMENT AND MAKE SMOOTH TRANSITION TO EXISTING PAVEMENT.
- PROPOSED 1.8m CONCRETE FOOTPATH
- PR — PROPOSED PRAM RAMP
- PROPOSED 1:3 EARTHWORKS BATTER
- 25.0 — PROPOSED FINISHED CONTOUR
- EXISTING PAVEMENT
- OH — OH — EXISTING OVERHEAD POWER
- 25.15 — EXISTING GROUND CONTOUR
- D — EXISTING DRAINAGE
- S — EXISTING SEWER
- W — EXISTING WATER
- UG — UG — EXISTING POWER (UNDERGROUND)
- OH — OH — EXISTING OVERHEAD POWER
- T — EXISTING TELSTRA
- G — EXISTING GAS
- JP — JUNCTION PIT
- SEP — SIDE ENTRY PIT
- BUP — BUBBLE UP PIT
- U/S 25.00 / 300 / 16.5(4) / 16.5 / D/S 24.00 — UPSTREAM INVERT LEVEL; PIPE DIA / GRADE (CLASS OTHER THAN 2); LENGTH; DOWNSTREAM INVERT LEVEL

NOTES

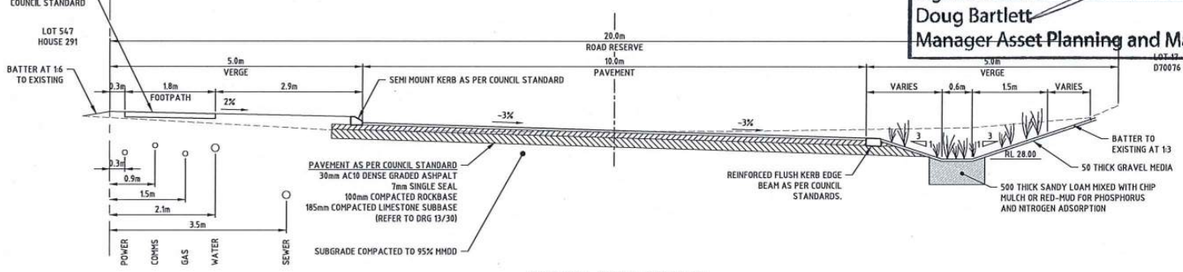
1. GENERAL
   - 1.1. THE CONTRACTOR SHALL LIMIT THE MOVEMENT OF EQUIPMENT AND MANPOWER TO THE MINIMUM AREA NECESSARY AND PROTECT ALL VEGETATION ON SITE.
   - 1.2. CONTRACTOR SHALL OBTAIN A COPY OF ALL RELEVANT COUNCIL STANDARD DRAWINGS FOR ALL SUBDIVISIONAL WORKS. ALL WORKS SHALL BE CARRIED OUT TO THE REQUIREMENTS OF THE LOCAL AUTHORITY.
   - 1.3. REFER TO THE CITY OF KALAMUNDA STANDARD DRAWINGS FOR ROAD AND DRAINAGE DETAILS.
   - 1.4. SITE TO BE CLEARED OF TOPSOIL TO A DEPTH OF 200mm AS RECOMMENDED BY GEOTECHNICAL REPORT.
   - 1.5. DESIGN LEVELS AND SETOUT INFORMATION TO BE PROVIDED DIGITALLY BY SERLING CONSULTING.
2. ROADWORKS
   - 2.1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE INTERSECTION DETAILS.
   - 2.2. THE CONTRACTOR SHALL MAKE ALL ALLOWANCES NECESSARY FOR REINSTATEMENT OF ANY AREAS DISTURBED BY THE WORKS TO ORIGINAL CONDITION TO THE SATISFACTION OF THE LOCAL AUTHORITY AND SITE SUPERINTENDENT.
   - 2.3. ALL ROADS TO BE CENTRALLY LOCATED UNLESS NOTED OTHERWISE ON THE DRAWINGS. ROAD CENTRELINE, KERBS AND DRAINAGE SETOUT IS ELECTRONICALLY AVAILABLE BY CONTACTING SERLING CONSULTING.
   - 2.4. ALL CORNER SWEEPS SHALL BE KEYED UNLESS OTHERWISE SHOWN
   - 2.5. ALL ROAD VERGES & DISTURBED AREAS SHALL BE STABILISED.
   - 2.6. ALL STREET NAME PLATES SHALL BE FIXED TO LIGHTING COLUMNS WHERE PRACTICAL.
   - 2.7. THE CONTRACTOR SHALL ENSURE IRRIGATION DUCTS ARE NOT TERMINATED UNDER FOOTPATHS.
   - 2.8. ALL CONNECTIONS TO EXISTING INFRASTRUCTURE (PAVEMENT, PATHS ETC.) TO BE OF CLEAN AND NEAT APPEARANCE.

CITY OF KALAMUNDA REFERENCE DRAWINGS

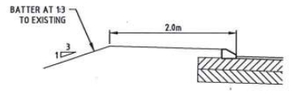
- 4/30 – FOOTPATH DETAIL
- 7A/30 – KERB DETAILS
- 7C/30 – SEMI MOUNTABLE KERB DETAIL
- 7D/30 – BARRIER AND FLUSH KERB DETAIL
- 12/30 – PRAM RAMPS
- 13/30 – TYPICAL ROADWORKS SECTION - URBAN

CITY OF KALAMUNDA
This plan has been checked and cleared for construction subject to the conditions in the letter of approval
Date: 25/11/2019
Signed:
Doug Bartlett
Manager Asset Planning and Management

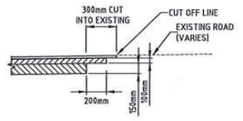
LONGITUDINAL SECTION BONSER ROAD
SCALE HORIZ 1 : 500 metres
VERT 1 : 100 metres



TYPICAL ROAD SECTION
SCALE 1:50

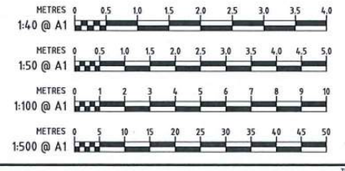


TYPICAL SECTION BEHIND KERB WITHOUT FOOTPATH
SCALE 1:40



TYPICAL PAVEMENT DETAIL – CONNECTION TO EXISTING
NOT TO SCALE

PRELIMINARY DRAWING
NOT TO BE USED FOR CONSTRUCTION PURPOSES



WARNING
BEWARE OF UNDERGROUND SERVICES
The location of underground cables are approximate only and their exact position should be checked on site. No guarantee is given that all existing cables and services are shown. Locate all underground cables and services before commencement of work. Refer to Worksafe Regulation 3.21.
DIAL 1100 BEFORE YOU DIG

REV	DATE	DESCRIPTION
E	05.11.19	PAVEMENT PROFILE REVISED

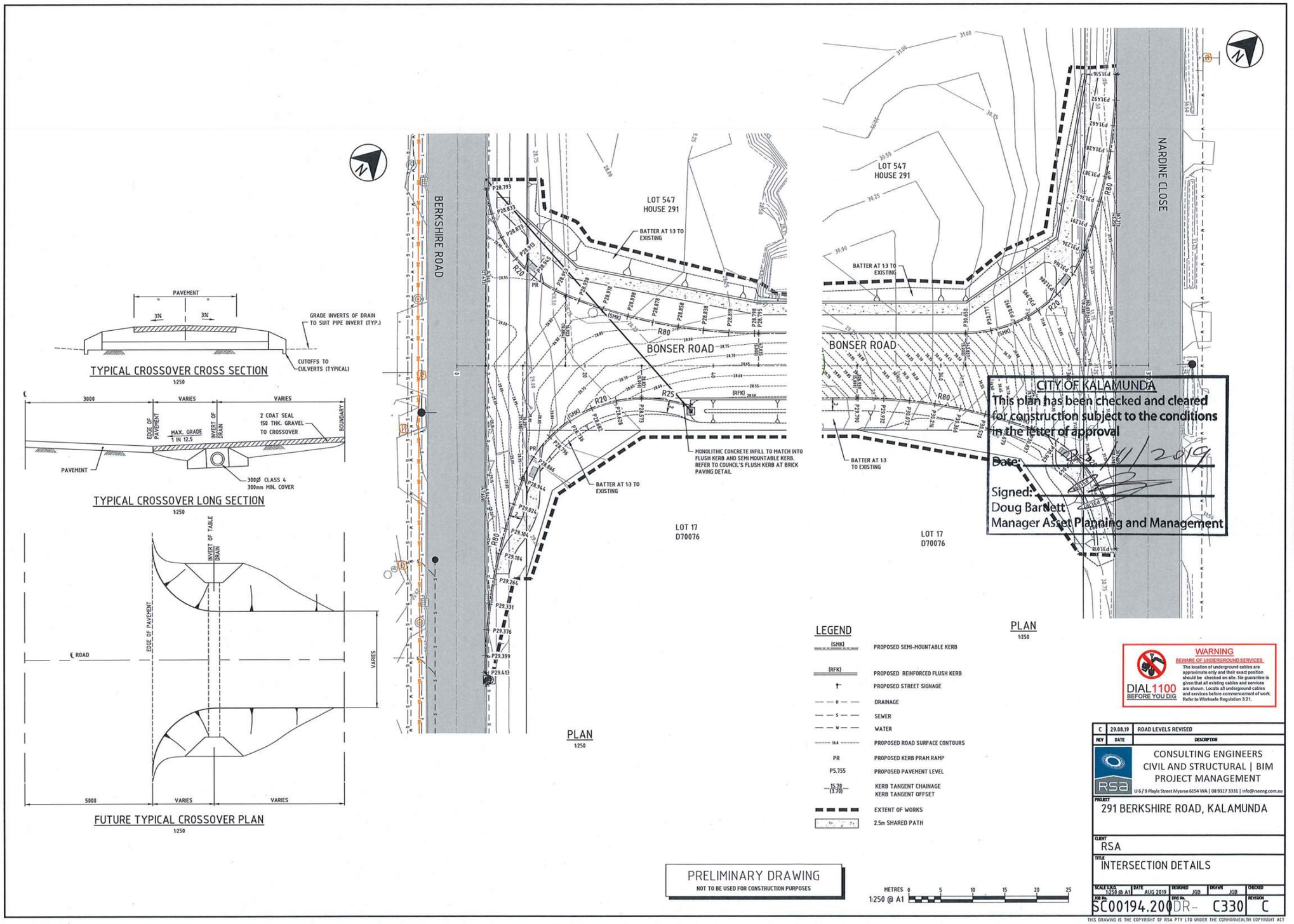
CONSULTING ENGINEERS
CIVIL AND STRUCTURAL | BIM
PROJECT MANAGEMENT
RSA
U 6 / 9 Playle Street Myaree 6154 WA | 08 9317 3331 | info@rsaeng.com.au

PROJECT: 291 BERKSHIRE ROAD, KALAMUNDA
CLIENT: RSA
TITLE: BONSER ROAD PLAN AND PROFILE SHEET 2

SCALE (U.N.O.)	DATE	DESIGNED	DRAWN	CHECKED
1:500 @ A1	AUG 2019	JGB	JGB	

JOB No. SC00194.200 DRG No. DR-C301 REVISION E

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



DESIGNED TO BE CONSTRUCTED DE-ENERGISED

NOTES FOR CONTRACTOR:

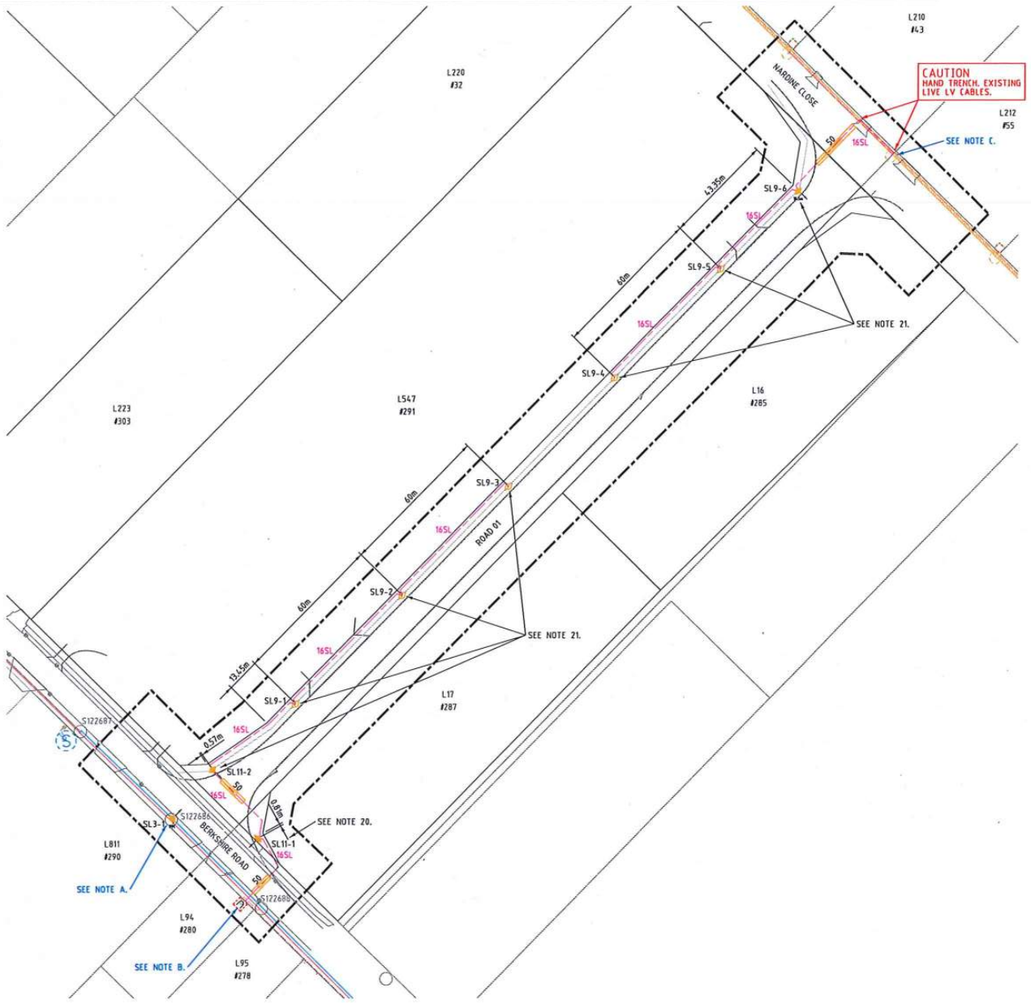
1. FOLLOW ALL PROCEDURES AND INSTALL EQUIPMENT AS PER THE LATEST EDITION OF WESTERN POWER'S UNDERGROUND DISTRIBUTION SCHEMES MANUAL.
2. CABLE TO BE INSTALLED AS PER WESTERN POWER'S NETWORK STANDARD NS 14.2 (UNDERGROUND CABLE INSTALLATION MANUAL).
3. VERIFY ALL MATERIAL QUANTITIES AGAINST SITE CONDITIONS PRIOR TO QUOTATION AND ADVISE ELECTRICAL CONSULTANTS OF ANY VARIATIONS.
4. ORGANISE ON SITE MEETING WITH WP PRIOR TO COMMENCEMENT OF WORK.
5. ALL AS CONSTRUCTED DRAWINGS AND RECORDS TO BE SUBMITTED TO ADMIN@APDENG.COM.AU PRIOR TO HANDOVER BEING SCHEDULED. REFER TO UDS MANUAL SECTION 6.2.2.
6. COMMENCE LAYING CABLES FROM THE TRANSFORMER OR SWITCHGEAR.
7. LOCATE AND PROTECT EXISTING SERVICES DURING CONSTRUCTION.
8. MAKE ALLOWANCE FOR TERRACING OF CABLES WHERE REQUIRED.
9. CONTRACTOR TO CONTACT WESTERN POWER CONSTRUCTION MANAGER TO CONFIRM CABLE TERMINATION DETAILS FOR WESTERN POWER INTERCONNECTION WORKS TO EXISTING NETWORK.
10. PLAN CABLE RUNS TO LIMIT THE NUMBER OF STRAIGHT JOINTS.
11. ALL WORK WITHIN ROAD RESERVE TO BE DONE IN ACCORDANCE WITH THE UTILITY PROVIDER'S CODE OF PRACTICE.
12. CABLE PROTECTOR SLABBINGS REQUIRED WHEN THE CABLE LEAVES THE STANDARD WESTERN POWER ALIGNMENT:
    A. TERMINATE AT STREETLIGHT POLE.
    B. ENTER ROAD CROSSING CONDUIT.
    C. TERMINATE AT CABLE POLE.
13. ALL CABLES LAID NEXT TO RETAINING WALLS TO BE IN CONDUIT.
14. REFER TO WP SUBDIVISION GUIDELINE NUMBER 04 FOR BEDDING SAND BACKFILL AROUND CABLES.
15. INSTALL HEATSHRINK "END CAP" AT ALL CABLE ENDS AND HEATSHRINK GLOVES ON ALL LV CABLE TERMINATION ENDS.
16. STREETLIGHT POLES MUST NOT BE INSTALLED IN FOOTPATHS. CONTACT APD IF ANY CONFLICTS ARE FOUND ON SITE PRIOR TO INSTALLATION.
17. THRUST/BORE UNDER EXISTING ROAD.
18. ALL ABOVE GROUND ASSETS INCLUDING SERVICE PILLARS, STREETLIGHTS AND LOW VOLTAGE (LV) FRAMES ARE TO BE LOCATED ON GROUND LEVEL 300mm ABOVE 100 YEAR FLOOD LEVEL AND NOT IN A PRECARIOUS POSITION. HIGH VOLTAGE EQUIPMENT AND SUBSTATIONS TO BE LOCATED 500mm ABOVE THE 100 YEAR FLOOD LEVEL.
19. ALL STREETLIGHT LOCATIONS TO BE SURVEYED BY CONTRACTOR PRIOR TO INSTALLATION TO ENSURE CORRECT LOCATIONS.
20. STREET LIGHT SL11-1 TO BE INSTALLED ON 2.7m ALIGNMENT AS SHOWN.
21. STREET LIGHTS SL11-2 AND SL9-1 TO SL9-6 TO BE INSTALLED ON 2.9m ALIGNMENT AS SHOWN TO AVOID CLASH WITH PROPOSED NEW FOOTPATH.
22. RETAINING WALLS TO HAVE DEEPER FOOTINGS FOR:
    A. CABLE ROAD CROSSINGS
    B. CABLE BENDS ON TRUNCATIONS
    C. CABLE JOINTS

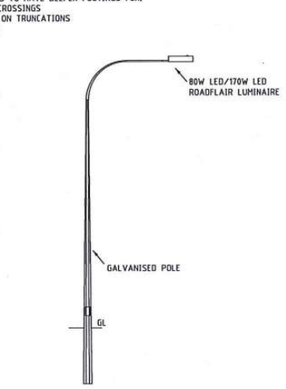
WP SCOPE OF WORKS:

A. WP TO COST TO SUPPLY & INSTALL SL3 250W HPS ARTERIAL ROAD POLE-MOUNTED STREET LIGHT ONTO POLE S122686 AS SHOWN.

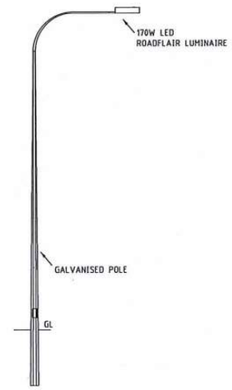
B. WP TO COST TO TERMINATE NEW 16SL CABLE INTO EXISTING LOT 94 (#280) UNI-PILLAR AND SUPPLY & INSTALL RED SPOT FUSE.

C. WP TO COST TO TERMINATE NEW 16SL CABLE INTO EXISTING STREET LIGHT AND SUPPLY & INSTALL RED SPOT FUSE.





10.5m WP STANDARD POLE WITH 3m SOR BRACKET
NOT TO SCALE



12.5m WP STANDARD POLE WITH 3m SOR BRACKET
NOT TO SCALE

STREET LIGHTING FOR BERKSHIRE ROAD INTERSECTION DESIGNED TO BE COMPLIANT WITH CATEGORY "V3" LIGHTING REQUIREMENTS AS PER AS/NZS 1158.1.1:2005.

STREET LIGHTING FOR NARDINE CLOSE INTERSECTION DESIGNED TO BE COMPLIANT WITH CATEGORY "V5" LIGHTING REQUIREMENTS AS PER AS/NZS 1158.1.1:2005.

SPACING BETWEEN STREET LIGHTS ALONG 'ROAD 1' STRAIGHT SECTIONS CALCULATED TO BE MAXIMUM OF 60m TO ENSURE CATEGORY "V5" COMPLIANCE.

NOTE: ALL UNMETERED SUPPLIES (Including CUSTOMER AND WESTERN POWER STREETLIGHTING ASSETS)

TYPE OF EQUIPMENT (GALVANISED POLES & LUMINAIRES)	NO of UNITS	UNIT WATTAGE	TOTAL WATTAGE	DAILY HRS OPERATION	WP Asset Yes / No
10.5m WP STANDARD POLE WITH 3m SOR BRACKET + 80W LED ROADFLAIR LUMINAIRE	5	80W	400W	DUSK/DAWN	YES
10.5m WP STANDARD POLE WITH 3m SOR BRACKET + 170W LED ROADFLAIR LUMINAIRE	1	170W	170W	DUSK/DAWN	YES
12.5m WP STANDARD POLE WITH 3m SOR BRACKET + 170W LED ROADFLAIR LUMINAIRE	2	170W	340W	DUSK/DAWN	YES
EXISTING WP POWER POLE WITH ARTERIAL ROAD SOR BRACKET + 170W LED ROADFLAIR LUMINAIRE	1	170W	170W	DUSK/DAWN	YES
NOTE: ALL UNMETERED SUPPLIES and STREETLIGHTS MUST BE INCLUDED IN DESIGN DRAWING					

10.5m WP STANDARD POLE WITH 3m SOR AND 80W LED ROADFLAIR LUMINAIRE

10.5m WP STANDARD POLE WITH 3m SOR AND 170W LED ROADFLAIR LUMINAIRE

12.5m WP STANDARD POLE WITH 3m SOR AND 170W LED ROADFLAIR LUMINAIRE

WP POLE-MOUNTED ARTERIAL ROAD SOR BRACKET & 170W LED ROADFLAIR LUMINAIRE

ALL STREETLIGHT CABLE TO BE IN CONDUIT IF OUTSIDE WP ALIGNMENT.

WP STREETLIGHTS TO BE LOCATED IN-LINE WITH LOT BOUNDARY ON 2.7m ALIGNMENT OR IN ACCORDANCE WITH AS/NZS1158.1.2:2010.

STREETLIGHT POLE LOCATION

GOLDEN SAFETY RULES ARE INDICATIVE ONLY

ALWAYS PERFORM A DETAILED HAZARD ANALYSIS

LEGEND

SCHEME BDY.
RETAINING WALL
RESTRICTED ZONE
EASEMENT
DEEPER RETAINING WALL FOOTINGS

HV CABLES
CN53 - 400mm2 (3X1c)
CN49 - 240mm2 (3X1c)
CN48 - 185mm2 (3X1c)
CN50 - 95mm2 (3X1c)
CN51 - 50mm2 (3X1c)
CN51 - 50mm2 (1c)
CN46 - 35mm2 (3X1c)
CN47 - 35mm2 (1c)
EXISTING HV CABLES (SIZE AND TYPE INDICATED)

LV-SL CABLES
CN45 - 240mm2 (1x3c)
CN44 - 185mm2 (1x3c)
CN43 - 120mm2 (1x3c)
CN42 - 75mm2 (1x3c)
CN41 - 16mm2 SL (1c)
40 C PILOT
EXISTING LV CABLES (SIZE AND TYPE INDICATED)

STREET LIGHTS — EXISTING
42W CFL, 80W MV, 125W MV, 70W HPS, 150W HPS, 250W HPS, 250W HPS AERODROME, 70W MH, 150W MH, 250W MH
9L LED, 2L LED, 3L LED, 4L LED, 5L LED, 8L LED
LEGEND DEFINES TYPE & WATTAGE - NOT COLOUR

PILLARS / PITS / ETC
MINI (WORKING END), UNIVERSAL, MINI, LINK, CABLE MARKER U/G
UMS PIT, UTILITIES PIT, 100/200AMP CUTOUT, CONDUIT / POLY PIPE, Serviced Un-energised Lot

TRANSFORMER, EXISTING, SWITCHGEAR

AERIAL CONDUCTORS AND POLES
NEW POLE (ANY TYPE AS INDICATED)
EXISTING POLE (ANY TYPE AS INDICATED)
HV, LV — EXISTING AERIAL CONDUCTORS (SIZE AND TYPE INDICATED)

ARROW DENOTES DIRECTION TO PEG WITH WHICH DUCTS ARE TO BE ALIGNED

DUCTS TO BE LAID TO WP SPECIFICATION AS OUTLINED IN UNDERGROUND DISTRIBUTION SCHEMES MANUAL - POLICY AND INSTALLATION OPTIONS

DENOTES PREVIOUSLY REQUESTED DUCTS

WARNING
BEWARE OF EXISTING SERVICES
THE LOCATION OF EXISTING SERVICES IS APPROXIMATE ONLY. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN. ALWAYS REFER TO CURRENT DBYD DRAWINGS. CONFIRM ASSET LOCATIONS ON SITE BEFORE COMMENCEMENT OF WORK. REFER TO 'WORKSAFE' REGULATION 3.21

DIAL1100 BEFORE YOU DIG

WARNING
IF WORKING IN THE VICINITY OF EXISTING OVERHEAD DISTRIBUTION OR TRANSMISSION LINES CONTRACTOR TO COMPLY WITH "WORKSAFE" CLEARANCES DURING CONSTRUCTION

RESTORATION & REINSTATEMENT REQUIREMENTS
RESTORATION & REINSTATEMENT REQUIRED FOR THIS PROJECT TO BE COMPLETED AS PER THE RESTORATION AND REINSTATEMENT SPECIFICATION FOR LOCAL GOV'TS IN WA. THE CONSTRUCTION MANAGER IS RESPONSIBLE FOR ALL RESTORATION AND REINSTATEMENT UNTIL FORMALLY ACCEPTED BY WESTERN POWER OR LOCAL GOV'T AUTHORITY AS APPROPRIATE. SEE FIELD INSTRUCTION 2.21.

INSTRUCTION TO CONSTRUCTION CREWS
IT IS A REQUIREMENT OF WESTERN POWER THAT ALL EXISTING CONDUCTOR / CABLES SIZES ARE CONFIRMED ON SITE TO ENSURE THAT ALL FITTINGS ARE OF THE APPROPRIATE SIZE AND ARE INSTALLED CORRECTLY IN ACCORDANCE TO Distribution Construction Standards Handbook

ALL WORKS ON EXISTING WESTERN POWER ASSETS ARE TO BE UNDERTAKEN BY WESTERN POWER

Dimensions and scales to be checked prior to measuring cable lengths

METRES (SCALE 1:1000)

50 0 50 100

Preliminary
Not For Construction

Rev.	AMENDMENT	DRN	DESIGN	CHKD	ENG	ISSUED BY	ISSUED DATE
B	250W HPS LUMINAIRES CHANGED TO LATEST 170W LED LUMINAIRES AS PER LGA REQUEST	ML	RP/BTL	BTL	-	BTL	22/01/2019
A	PRELIMINARY DESIGN ISSUED TO CLIENT FOR COMMENT & APPROVAL.	ML	RP/BTL	BTL	-	BTL	16/11/2018

A1

APD ENGINEERING
T: 1300 273 797 | E: admin@APDeng.com.au
www.APDeng.com.au

LOT DETAILS
Residential Lots : 0
Group Housing : 0
Commercial : 0
Pumps : 0
Other : 9 NEW WP LIGHTS

SITE LOCATION
Lat : 31° 57' 47.9" S
Long: 115° 59' 47.0" E

STREET SMART
Page : 376
Map Ref : B4

PROJECT NAME
FORRESTFIELD-HIGH WYCOMBE INDUSTRIAL AREA - ROAD 1 LIGHTING
ELECTRICAL LAYOUT

LOCAL AUTHORITY
CITY OF KALAMUNDA

CLIENT/DEVELOPER
JEANETTA PTY LTD

W.A.P.C. REFERENCE No.
TBA

WESTERN POWER REFERENCE No.
ML010486

A1

SCALE: AS NOTED 1 : 1000 @ A1

DATE: 20/08/2018

SHT 1 OF 1

DRAWING No.
W_APD05235

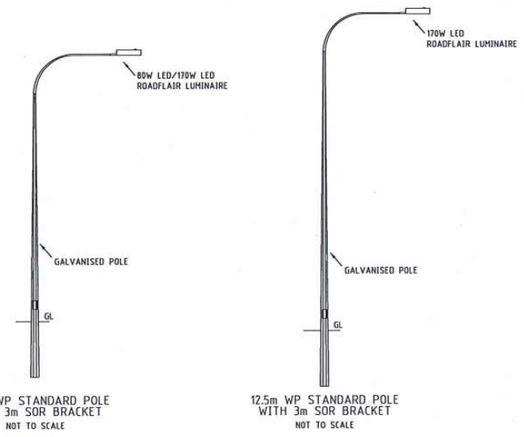
REV
B

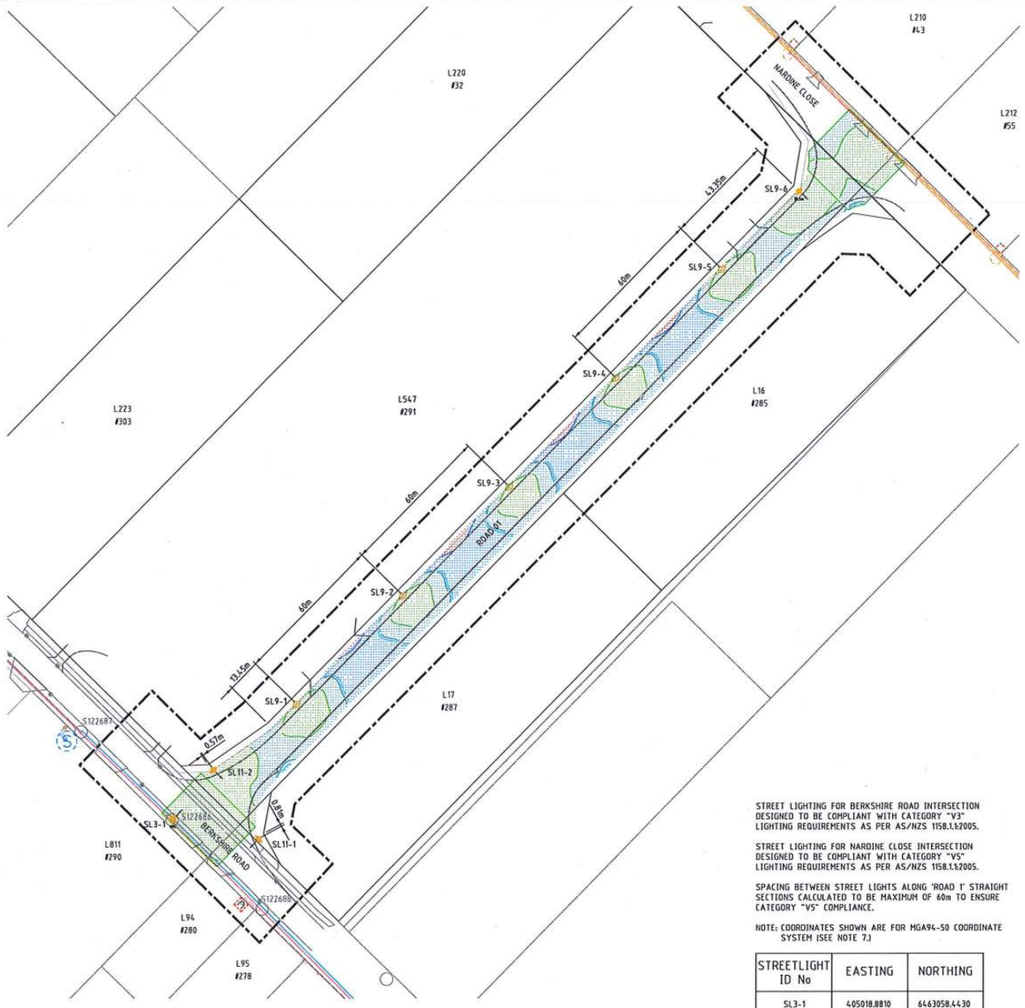
A1

DESIGNED TO BE CONSTRUCTED DE-ENERGISED

NOTES FOR CONTRACTOR:

1. FOLLOW ALL PROCEDURES AND INSTALL EQUIPMENT AS PER THE LATEST EDITION OF WESTERN POWER'S UNDERGROUND DISTRIBUTION SCHEMES MANUAL.
2. LOCATE AND PROTECT EXISTING SERVICES DURING CONSTRUCTION.
3. ALL WORK WITHIN ROAD RESERVE TO BE DONE IN ACCORDANCE WITH THE UTILITY PROVIDER'S CODE OF PRACTICE.
4. REFER TO ML010486-W_APD05235 ELECTRICAL DESIGN DRAWING FOR ELECTRICAL SUPPLY DETAILS OF PROPOSED WP STREET LIGHTS.
5. STREET LIGHT POLES MUST NOT BE INSTALLED IN FOOTPATHS. CONTACT APD IF ANY CONFLICTS ARE FOUND ON SITE PRIOR TO INSTALLATION.
6. ALL STREET LIGHT LOCATIONS TO BE SURVEYED & PEGGED BY CONTRACTOR PRIOR TO INSTALLATION.
7. EASTING AND NORTHING COORDINATES PROVIDED MAY CONTAIN TRANSLATION ERRORS FROM CONVERSION OF CLIENT PRECAL LAYOUT TO MGA94-50 COORDINATE SYSTEM. CONTRACTOR TO VERIFY SURVEYED STREET LIGHT LOCATIONS AGAINST DIMENSIONS & INSTRUCTIONS PROVIDED.
8. ALL SURVEYED STREET LIGHT POLE AND POWER POLE LOCATIONS ARE ASSUMED TO BE TO THE CENTRE OF THE POLE.
9. STREET LIGHT SL11-1 TO BE INSTALLED ON 2.7m ALIGNMENT AS SHOWN.
10. STREET LIGHTS SL11-2 AND SL9-1 TO SL9-6 TO BE INSTALLED ON 2.9m ALIGNMENT AS SHOWN TO AVOID CLASH WITH PROPOSED NEW FOOTPATH.





NOTE: ALL UNMETERED SUPPLIES (Including CUSTOMER AND WESTERN POWER STREETLIGHTING ASSETS)					
TYPE OF EQUIPMENT (GALVANISED POLES & LUMINAIRES)	NO of UNITS	UNIT WATTAGE	TOTAL WATTAGE	DAILY HRS OPERATION	WP Asset Yes / No
10.5m WP STANDARD POLE WITH 3m SOR BRACKET + 80W LED ROADFLAIR LUMINAIRE	5	80W	400W	DUSK/DAWN	YES
10.5m WP STANDARD POLE WITH 3m SOR BRACKET + 170W LED ROADFLAIR LUMINAIRE	1	170W	170W	DUSK/DAWN	YES
12.5m WP STANDARD POLE WITH 3m SOR BRACKET + 170W LED ROADFLAIR LUMINAIRE	2	170W	340W	DUSK/DAWN	YES
EXISTING WP POWER POLE WITH ARTERIAL ROAD SOR BRACKET + 170W LED ROADFLAIR LUMINAIRE	1	170W	170W	DUSK/DAWN	YES
NOTE: ALL UNMETERED SUPPLIES and STREETLIGHTS MUST BE INCLUDED IN DESIGN DRAWING					

10.5m WP STANDARD POLE WITH 3m SOR AND 80W LED ROADFLAIR LUMINAIRE

10.5m WP STANDARD POLE WITH 3m SOR AND 170W LED ROADFLAIR LUMINAIRE

12.5m WP STANDARD POLE WITH 3m SOR AND 170W LED ROADFLAIR LUMINAIRE

WP POLE-MOUNTED ARTERIAL ROAD SOR BRACKET & 170W LED ROADFLAIR LUMINAIRE

ALL STREETLIGHT CABLE TO BE IN CONDUIT IF OUTSIDE WP ALIGNMENT.

WP STREETLIGHTS TO BE LOCATED IN-LINE WITH LOT BOUNDARY ON 2.7m ALIGNMENT OR IN ACCORDANCE WITH AS/NZS1158.1.1:2010.

STREETLIGHT POLE LOCATION

LIGHTING CALCULATION SUMMARY									
STATISTICS AREA ID	STATISTICS AREA LABEL	CALCULATION TYPE	UNITS	AVG	MAX	MIN	MIN/AVG	MAX/MIN	MAX/AVG
1	BERKSHIRE INTERSECTION 3m VERGE (V3)	ILLUMINANCE	LUX	20.50	41.3	5.6	0.27	7.38	2.01
2	BERKSHIRE INTERSECTION (V3)	ILLUMINANCE	LUX	20.31	44.9	7.5	0.37	5.99	2.21
3	NARDINE INTERSECTION 3m VERGE (V5)	ILLUMINANCE	LUX	10.95	22.8	3.6	0.33	6.33	2.08
4	NARDINE INTERSECTION (V5)	ILLUMINANCE	LUX	10.58	26.7	4.3	0.41	6.21	2.52

GOLDEN SAFETY RULES ARE INDICATIVE ONLY

ALWAYS PERFORM A DETAILED HAZARD ANALYSIS

LEGEND

SCHEME BDY.
RETAINING WALL
RESTRICTED ZONE
EASEMENT
DEEPER RETAINING WALL FOOTINGS

HV CABLES
CN53 - 400mm2 (3X1c)
CN49 - 240mm2 (3X1c)
CN48 - 185mm2 (3X1c)
CN50 - 95mm2 (3X1c)
CN51 - 50mm2 (3X1c)
CN51 - 50mm2 (1c)
CN46 - 35mm2 (3X1c)
CN47 - 35mm2 (1c)
EXISTING HV CABLES (SIZE AND TYPE INDICATED)

LV-SL CABLES
CN45 - 240mm2 (3x3c)
CN44 - 185mm2 (3x3c)
CN43 - 120mm2 (3x3c)
CN42 - 35mm2 (3x3c)
CN41 - 16mm2 SL (4c)
4.0 C PILOT
EXISTING LV CABLES (SIZE AND TYPE INDICATED)

STREET LIGHTS — EXISTING
42W CFL · 70W HPS · 70W MH · 9L LED
80W MV · 150W HPS · 150W MH · 2L LED
125W MV · 250W HPS · 250W MH · 3L LED
250W HPS AERODROME · 4L LED · 5L LED · 6L LED
LEGEND DEFINES TYPE & WATTAGE - NOT COLOUR

PILLARS / PITS / ETC
MINI (WORKING END) · UMS PIT
UNIVERSAL · UTILITIES PIT
MINI · 100/200AMP CUTOUT
LINK · CONDUIT / POLY PIPE
CABLE MARKER U/G · Serviced Un-energised Lot

TRANSFORMER · EXISTING · SWITCHGEAR

AERIAL CONDUCTORS AND POLES
NEW POLE (ANY TYPE AS INDICATED)
EXISTING POLE (ANY TYPE AS INDICATED)
HV LV EXISTING AERIAL CONDUCTORS (SIZE AND TYPE INDICATED)

ISOLINES & ILLUMINANCE VALUES
7.5 LUX OR HIGHER
3.75 - 7.5 LUX
3.5 - 3.75 LUX
1.75 - 3.5 LUX
0 - 1.75 LUX

STREET LIGHTING FOR BERKSHIRE ROAD INTERSECTION DESIGNED TO BE COMPLIANT WITH CATEGORY "V3" LIGHTING REQUIREMENTS AS PER AS/NZS 1158.1.1:2005.

STREET LIGHTING FOR NARDINE CLOSE INTERSECTION DESIGNED TO BE COMPLIANT WITH CATEGORY "V5" LIGHTING REQUIREMENTS AS PER AS/NZS 1158.1.1:2005.

SPACING BETWEEN STREET LIGHTS ALONG 'ROAD 1' STRAIGHT SECTIONS CALCULATED TO BE MAXIMUM OF 60m TO ENSURE CATEGORY "V5" COMPLIANCE.

NOTE: COORDINATES SHOWN ARE FOR MGA94-50 COORDINATE SYSTEM (SEE NOTE 7.)

STREETLIGHT ID No	EASTING	NORTHING
SL3-1	405018.8810	6463058.4430
SL11-1	405052.8107	6463050.5888
SL11-2	405034.6839	6463077.7195
SL9-1	405067.7511	6463103.6721
SL9-2	405109.7374	6463146.5342
SL9-3	405151.7236	6463189.3962
SL9-4	405193.7099	6463232.2582
SL9-5	405235.6962	6463275.1202
SL9-6	405266.0332	6463306.0900

WARNING
BEWARE OF EXISTING SERVICES
THE LOCATION OF EXISTING SERVICES IS APPROXIMATE ONLY. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN. ALWAYS REFER TO CURRENT DBYD DRAWINGS. CONFIRM ASSET LOCATIONS ON SITE BEFORE COMMENCEMENT OF WORK. REFER TO "WORKSAFE" REGULATION 3.21

DIAL 1100 BEFORE YOU DIG

WARNING
IF WORKING IN THE VICINITY OF EXISTING OVERHEAD DISTRIBUTION OR TRANSMISSION LINES CONTRACTOR TO COMPLY WITH "WORKSAFE" CLEARANCES DURING CONSTRUCTION

RESTORATION & REINSTATEMENT REQUIREMENTS
RESTORATION & REINSTATEMENT REQUIRED FOR THIS PROJECT TO BE COMPLETED AS PER THE RESTORATION AND REINSTATEMENT SPECIFICATION FOR LOCAL GOV'TS IN WA. THE CONSTRUCTION MANAGER IS RESPONSIBLE FOR ALL RESTORATION AND REINSTATEMENT UNTIL FORMALLY ACCEPTED BY WESTERN POWER OR LOCAL GOV'T AUTHORITY AS APPROPRIATE. SEE FIELD INSTRUCTION 2.21.

INSTRUCTION TO CONSTRUCTION CREWS
IT IS A REQUIREMENT OF WESTERN POWER THAT ALL EXISTING CONDUCTOR / CABLES SIZES ARE CONFIRMED ON SITE TO ENSURE THAT ALL FITTINGS ARE OF THE APPROPRIATE SIZE AND ARE INSTALLED CORRECTLY IN ACCORDANCE TO Distribution Construction Standards Handbook

ALL WORKS ON EXISTING WESTERN POWER ASSETS ARE TO BE UNDERTAKEN BY WESTERN POWER

Dimensions and scales to be checked prior to measuring cable lengths

METRES (SCALE 1:1000)

50 0 50 100

Preliminary
Not For Construction

Rev.	AMENDMENT	DRN	DESIGN	CHKD	ENG	ISSUED BY	ISSUED DATE
B	250W HPS LUMINAIRES CHANGED TO LATEST 170W LED LUMINAIRES AS PER LGA REQUEST	ML	RP/BTL	BTL	-	BTL	22/01/2019
A	PRELIMINARY DESIGN ISSUED TO CLIENT FOR COMMENT & APPROVAL.	ML	RP/BTL	BTL	-	BTL	16/11/2018

A1

APD ENGINEERING
T: 1300 273 797 | E: admin@APDeng.com.au
www.APDeng.com.au

SITE LOCATION
Lat : 31° 57' 47.9" S
Long: 115° 59' 47.0" E

STREET SMART
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LOT DETAILS
Residential Lots : 0
Group Housing : 0
Commercial : 0
Pumps : 0
Other : 9 NEW WP LIGHTS

PROJECT NAME: FORRESTFIELD-HIGH WYCOMBE INDUSTRIAL AREA - ROAD 1 LIGHTING
STREET LIGHTING LAYOUT

LOCAL AUTHORITY: CITY OF KALAMUNDA

CLIENT/DEVELOPER: JEANETTA PTY LTD

W.A.P.C. REFERENCE No.: TBA
WESTERN POWER REFERENCE No.: ML010486
SCALE: AS NOTED 1 : 1000 @ A1
DATE: 20/08/2018
DRAWING No.: W_APD05235-L01
REV: B
A1
SHT 1 OF 1

City of Kalamunda

Our Ref: DA17/0587

25 November 2019

Brendon Scott
RSA Perth
6/9 Playle Street
MYAREE WA 6154

Dear Brendan,

Creation of Bonser Road - Acceptance of Civil Works Drawings

Thank you for submitting your revised engineering design drawings for the above development. The drawings received by the City are approved and signed accordingly.

This approval applies to the following drawings, and is subject to the requirements below:

- SC00194-200-C300 Rev D
- SC00194-200-C330 Rev D
- SC00194-200-C301 Rev D, subject to amending the road base thickness as per MRWA's road note 9.
- For Information only: ML010486-W_APD05235 and ML010486-W_APD05235-L01.

The approval of these drawings does not imply approval of any subsequent designs or revisions.

This approval does not represent or imply approval for costs associated with the work. Separate correspondence will be provided by the City in respect of the cost of work under the Agreement for the Funding and Construction of Bonser Road.

Please ensure the following requirements are met during the delivery of the works:

1. Notify in writing the business operators and residents, who are impacted by the work, advising them of the proposed works, scope of works, route of works and scheduled start and completion dates.
2. A Traffic Management Plan is required for any works in the road reserve.
3. Organize a pre-start meeting prior to start of construction with the City representative.

kalamunda.wa.gov.au
T 9257 9999 F 9293 2715 E enquiries@kalamunda.wa.gov.au
2 Railway Road KALAMUNDA WA 6076 PO Box 42, KALAMUNDA WA 6926
ABN 60 741 095 678

4. Notify the City representative for inspections as specified in the "City of Kalamunda Works inspection Requirements".
5. Control access to the site and manage safety in accordance with the OH&S Act and Regulations.
6. Manage dust and drainage during the works in accordance with the WAPC conditions and the Legal Agreement.
7. Reinstate any damaged public infrastructure to its original condition.
8. The hours of construction work shall be limited to 6.00 am to 8.00 pm. No work is to occur on Sundays and public holidays.
9. Approval is sought and received from Western Power and the Water Corporation for assets covered under their jurisdiction.

The City representative for the works is Partha Deb, Engineering Technical Officer Developments. Please contact Partha on 9257 9929 to arrange inspections.

If you have any queries regarding the above, please contact Raktim Barua, Coordinator of Development Engineering Services on 9257 9630.

Yours sincerely,

Doug Bartlett

Manager Asset Planning

Enc: Approved drawings.

Attachment 14:
Full Mastersheet

- Berkshire Road
- Milner Road
- Bonser Road
- Nardine Close extension (Road 2A) – Stages 1 and 2.
- Sultana Road West

	BERKSHIRE ROAD - ASHBY CLOSE TO MILNER ROAD												
	Revised Cost August 2018 - Based on Curnow Portion B rates, road widening removed												
Item	Description	New Quantity	Unit	Rate	Amount	Heading subtotal	Notes	PCE Quantity	PCE Rate	PCE Amount	PCE Subtotal	PCE comment
								Based on drawings (85% status) prepared by Porter Consulting Engineers 19-11-135/810 Rev C, 19-11-135/811 Rev C, 19-11-135/812 Rev B				
1	**Preliminaries**											
1.1	All Preliminaries (Mobilisation, Supervision, Insurances, Safety etc.)			6%	$3,876.57				6%	$ 7,743		
	Subtotal - Preliminaries					**$3,877**					**$ 7,743**	
2	**Survey Control and Testing**											
2.1	All Survey (Setout, As-Cons, Compaction Testing etc.)			5%	$3,230.48				5%	$ 6,453		
	Subtotal - Survey Control and Testing					**$3,230**					**$ 6,453**	
3	**Clearing and Demolition**											
3.1	Clear Large Trees inc Grubbing	0	ea	$246.00	$0.00			-	$ 246.00	$ -		
3.2	Clear Small Trees inc Grubbing	0	ea	$179.00	$0.00			-	$ 179.00	$ -		
3.3	Clear shrubs/grass	0	m2	$1.82	$0.00			-	$ 1.82	$ -		
3.4	Demolish and Dispose redundant footpaths	0	m2	$20.00	$0.00		Existing footpath to be retained and widened.	80	$ 20.00	$ 1,590		Removed 30m of damaged path from Section 2, and removed 13m of 1.5m wide path from Section 3.
	Subtotal - Clearing and Demolition					**$0**					**$ 1,590**	
4	**Earthworks**											
4.1	Remove 100mm Topsoil to spoil for footpath widening	630	m2	$3.00	$1,890.00		Calculated based on 0.7m stripping for footpath widening for 900m assumed length. 0.7x900=630	364	$ 3.00	$ 1,093		Mainly topsoil stripping will be needed for Section 4 where there is no existing path.
4.2	Cut to spoil for footpath widening		m3					36	$ 25.00	$ 911		From path boxout.
	Subtotal - Earthworks					**$1,890**					**$ 2,004**	
5	**Roadworks**											
5.1	Widen existing concrete footpaths (from 1.8m wide to 2.5m wide)	630	m2	$47.65	$30,019.50		Assumed existing footpath to be retained and widened to 2.5m. New footpath widening of 0.7 m for 900m assumed length. 0.7x900=630		$ 47.65	$ -		
5.2	Install new 100mm thick concrete footpath, 2m wide		m2					424	$ 47.65	$ 20,218		Remove and replace 30m of damaged path from Section 2, and 13m of 1.5m wide path from Section 3.
5.3	Supply and Install Pram Ramps	4	ea	$550.00	$2,200.00		Allowed for 2 road crossings. 2x2=4	6	$ 550.00	$ 3,300		Pram ramps only needed where crossovers have edge kerbing.
5.4	Install diagonal pavement line markings to crossovers		Width of crossover					194	$ 10.00	$ 1,941		The City specified diagonal pavement markings to delinate path through crossovers.
	Subtotal - Roadworks					**$32,220**					**$ 25,459**	
6	**Miscellaneous**											
6.1	Clean up	1	ITEM	$3,500.00	$3,500.00			1	$ 3,500.00	$ 3,500		
6.2	Adjust Telstra Pit	1	ITEM	$3,000.00	$3,000.00		Quantity based on aerial imaoery.	-	$ 3,000.00	$ -		Assessed as not required.
6.3	Adjust stay poles	1	ITEM	$5,000.00	$5,000.00		Quantity based on aerial imagery.	-	$ 5,000.00	$ -		Assessed as not required.
6.4	Adjust hydrant	1	ITEM	$3,000.00	$3,000.00		Quantity based on data from Water Corporation.	-	$ 3,000.00	$ -		Assessed as not required.
6.5	Provision for misc./unidentified service relocations	1	ITEM	$10,000.00	$10,000.00		A conservative allowance for minor works to existing services	1	$ 3,000.00	$ 3,000		Reduce the allowance from $10k to $3k for provision for unidentified servies relocation.
6.6	Crossover adjustments and reinstatements - allow $1500 per crossover.	4	ITEM	$1,500.00	$6,000.00		Although the original Mastersheet notes this $6000 amount, it is not included in the summation amount of $24,500	4	$ 1,500.00	$ 6,000		Although crossover adjustments are likely to be minimal within Section 4, consideration has been had for crossovers needing adjustment where a pram ramp is installed.
6.7	Supply and Install street lighting											City of Kalamunda has confirmed that there is no need for additional street lighting for Berkshire Rd.
	Subtotal - Miscellaneous					**$24,500**					**$ 12,500**	
7	**Conversion of overhead consumer lines to underground lines to provide RAV clearance requriements.**											
7.1	Convert overhead electrical lines (5 consumer lines) that conflict with RAV clearance requirements to underground lines							5	$ 15,000.00	$ 75,000		Refer to 3E's review of the overhead lines to Berkshire Road. (Doc: 3E19102-R01)
7.2	Ancillary works in relation to conversion to overhead to underground within the private property							5	$ 2,500.00	$ 12,500		Private cabling from the new pillars to the customer switchboards may be required.
	Subtotal - Convert overhead consumer lines					**$ -**	The Mastersheet did not allow for conversion of the overhead lines				**$ 87,500**	
8	**Subtotal**											
8.1	Construction Subtotal ex Prelims, Survey				$64,610					$ 129,053		
8.2	**Construction Subtotal**				**$71,717**					**$ 143,248**		
9	**Allowances and Charges**											
9.1	Traffic Management		5%		$3,586			5%		$ 7,162.42		
9.2	BCITF Levy		0.2%		$143			0.2%		$ 286		
9.3	Council Supervision		1.5%		$1,076			1.5%		$ 2,149		
9.4	Design and Superintendence		10%		$7,172			10.0%		$ 14,324.83		
9.5	Contingency		10%		$7,172			5%		$ 7,162.42		
	Subtotal - Allowances and Charges					**$19,148**					**$ 31,085**	
10	**TOTAL**				**$90,865**					**$ 174,333**		
Notes								**Notes**				
1. The estimates are provided as an order of magnitude of cost only and are subject to detailed design and agency approvals (Western Power, Water Corporation, etc.).								1. The estimates are provided as an order of magnitude of cost only and are subject to 100% detailed design status and agency approvals (Western Power, etc.)				
2. It is assumed that there is no requirement for imported fill.								2. All costing exclude GST.				
3. It is assumed that ground conditions do not require improvement for the construction of the footpath.												
4. It is assumed the existing footpath is generally 1800mm. Wide, and is in good condition.												
5. It is noted that communications, gas and gas services are not required consistent with Portions A & B.												
6. The estimate does not include land acquisition costs.												
7. All costing exclude GST.												
Prepared by RM. Reviewed by WC.								Prepared by Michael Cook of Porter Consulting Engineers				

	MILNER ROAD - BERKSHIRE ROAD TO SULTANA ROAD WEST													
	Revised Cost Auoust 2018 - Based on Curnow Portion B rates. total adopoted lenoth 560m													
	Section Dundas - Nardine: 260m approximate length													
	Section Nardine - Sultana West: 300m approximate length													
Item	**Description**	**New Quantity**	**Unit**	**Rate**	**Amount**	**Actual**		**Notes**	**PCE Quantity**	**PCE Rate**	**PCE Amount**	**PCE Subtotal**	**PCE comment**	
									Based on 85% design status drawings prepared by Porter Consulting Engineers. Drawings 19-11-135-M-100 Rev A, 101 Rev A, 400 Rev A, 401 Rev A, 402 Rev A, 403 Rev A, 420 Rev A, 421 Rev A, 440 Rev A, 441 Rev A, 600 Rev A, 3E19102-04 Rev 2 (sheet 1) , 3E19102-04 Rev 2 (sheet 2)						
1	**Preliminaries**													
1.1	All Preliminaries (Mobilisation, Supervision, Insurances, Safety etc.)			6%	$29,039.57					6%	$ 42,400.39			
	Subtotal - Preliminaries						**$29,040**					**$ 42,400**		
2	**Survey Control and Testing**													
2.1	All Survey (Setout, As-Cons, Compaction Testing etc.)			5%	$24,199.64					5%	$ 35,333.66			
	Subtotal - Survey Control and Testing						**$24,200**					**$ 35,334**		
3	**Clearing and Demolition**													
3.1	Clear Large Trees inc Grubbing	9	ea	$246.00	$2,214.00			Quantity based on aerial imagery.		$ 750.00	$ -		No large trees in the roadway. All considered to be small.	
3.2	Clear Small Trees inc Grubbing	6	ea	$179.00	$1,074.00			Quantity based on aerial imagery.	19	$ 500.00	$ 9,500.00		PCE has adopted for a higher rate due to existing services near trees to be removed & grubbed. All trees for removal considered small trees.	
3.3	Clear shrubs	5040	m2	$1.82	$9,172.80			Allowed for clearing from edge of footpath to road reserve boundary. Clearing required is approximately 4.5m on both sides for 560m assumed length. (4.5x2)x560=5040	111	$3.00	$ 333.00		Based on 85% status drawings	
3.4	Demolish and Dispose redundant footpaths (assumed width 2m)	1920	m2	$20.00	$38,400.00			Existing footpath on both sides of the road required to be removed as part of the road widening. Total length of footpath estimated as 960m with an existing width of 2m based on aerial imagery. 960x2=1920	1,494	$20.00	$ 29,874.00		Based on 85% status drawings	
3.5	Demolish and Dispose redundant kerbing	1120	m	$2.73	$3,057.60			Adopted road length 560m, estimated kerb length is double this. Excludes intersection upgrades at Dundas, Nardine and Sultana. 560x2=1120	1,220	$9.00	$ 10,981.80		Based on 85% status drawings	
3.6	Remove and Dispose redundant drainage pits	0	ea	$460.00	$0.00				8	$460.00	$ 3,680.00		Based on 85% status drawings	
3.7	Remove and Dispose redundant pavements	112	m2	$35.65	$3,992.80			100mm allowed on both side of the widening for the cut line.	-	$20.00	$ -		See item 3.8	
3.8	Remove and Dispose existing asphalt offsite. Excavate existing base and subbase for possible reuse as part of pavement reconstruction, basecourse as documented.								4,072	$20.00	$ 81,440.00		For pavements designated "Full depth pavement reconstruction with asphalt intersection mix" & "to be resurfaced"	
	Subtotal - Clearing and Demolition						**$57,911**					**$ 135,809**		
4	**Earthworks**													
4.1	Remove 100mm Topsoil to spoil	5040	m2	$3.00	$15,120.00			Allowed for topsoil stripping from edge of footpath to road reserve boundary. Area is approximately 4.5m on both sides for 560m assumed length. (4.5x2)x560=5040	2,280	$3.00	$ 6,840.00		Based on 85% drawings	
4.2	Form, Shape, Compact Subgrade	1680	m2	$4.00	$6,720.00			Existing 8m wide pavement. Widening to 10m with equal 1m widening on both side. An additional 500mm of widening has been allowed for on both sides to allow for kerbing. Total of 3m widening has been allowed for roadbase construction for estimated length of 560m. 3x560=1680	2,915	$4.00	$ 11,660.16		Based on 85% drawings	
4.4	Import Fill, Shape, Compact	0	m3	$30.00	$0.00				-	$30.00	$ -			
4.5	Cut to spoil	1100	m3	$24.64	$27,104.00			Removal of unsuitable materials based on Portion B rate. Excavate to prepare subgrade to say 600-700mm depth		$24.64	$ -		The pavement investigation did not encounter any clay or unsuitable material. That is not to say unsuitable material wont be encountered.	
4.6	Cut to spoil for boxout formation of widening.		m3						815.40	$24.64	$ 20,091.46		Spoils to be removed & disposed offsite for the widening boxout.	
4.7	Dust Control	1	ITEM	$3,000.00	$3,000.00				1	$3,000.00	$ 3,000.00			
	Subtotal - Earthworks						**$51,944**					**$ 41,592**		
5	**Roadworks**													
5.1	Rip and rework the existing base course to minimum 150mm		m2						2,312	$ 4.00	$ 9,248.00		For pavements designated "To be Resurfaced"	
5.2	Supply and Install 220mm limestone sub-base	370	m3	$50.00	$18,480.00			Sub-base has been calculated for the 3m widening for estimated length of 560m for a depth of 220mm. (3x560)x0.22=370	-	$50.00	$ -			
5.3	Supply and Install 200mm limestone sub-base		m2						2,915	$12.00	$ 34,980.48		For pavements designated "Full depth pavement reconstruction with asphalt intersection mix" & "pavement widening"	
5.4	Supply and Install 100mm road base	168	m3	$65.00	$10,920.00			Basecourse has been calculated for the 3m widening for estimated length of 560m for a depth of 100mm. (3x560)x0.1=168	-		$ -			
5.5	Supply and Install 150mm road base		m3						2,915	$ 12.00	$ 34,980.48		For pavements designated "Full depth pavement reconstruction with asphalt intersection mix" & "pavement widening"	
5.6														
5.7	Supply and Install 7mm Primer Seal	1680	m2	$2.60	$4,368.00			Primer seal has been calculated for the 3m widening for estimated length of 560m. 3x560=1680	5,227.04	$2.60	$ 13,590.30		Porter's design will result in the existing pavement and new pavement areas needing sealing.	
5.8	Supply and Install 30mm AC10 (black)	5600	m2	$12.19	$68,264.00			Allows for full resheet of 10m wide pavement for estimated 560m length. 10x560=5600	3,715	$12.19	$ 45,285.12			
5.9	Supply and Install 40mm AC10 (intersection mix)								1,704	$18.00	$ 30,673.80			
5.10	Supply and Install FK	0	m	$20.00	$0.00						$ -			
5.11	Supply and Install MK (refer note 8)	0	m	$35.00	$0.00						$ -			
5.12	Supply and Install Reinforced Mountable Kerb		m						246	$ 60.00	$ 14,751.00			
5.13	Supply and Install SMK (refer note 8)	1120	m	$20.48	$22,937.60			Semi Mountable Kerb assumed for entire job. Estimated road length of 560m. 2x560=1120	1,133	$20.48	$ 23,203.84			
5.14	Key kerbs		m						265	$17.00	$ 4,511.80			
5.15	Remove existing crossover		m2						795	$20.00	$ 15,906.00			
5.16	Reinstate existing Crossovers	640	m2	$90.00	$57,600.00			Allowing 40m2 reinstated for 16 crossovers. 16x40=640		$90.00	$ -		See below for crossovers being reinstated in varying materials	
5.17	Reinstated Concrete Crossovers for commercial/industrial properties to be: 150mm thick N32MPa concrete with SL62 mesh centrally located with a 100mm limestone basecourse.		m2						430	$110.00	$ 47,267.00		Based on 85% designs	
5.18	Reinstate Asphalt crossovers for commercial/industrial properties to be: 150mm thick rock roadbase, 7mm primer seal with 30mm asphalt wearing course.		m2						126	$18.79	$ 2,373.18		Based on 85% designs	
5.19	Reinstate concrete crossovers to residential properties to be: 100mm thick N32MPa with 150mm limestone base.		m2						93	$100.00	$ 9,320.00		Based on 85% designs	
5.20	Reinstate Asphalt crossovers to residential properties to be: 100mm thick rock roadbase, primer seal with 30mm asphalt wearing course.		m2						35	$18.79	$ 661.41		Based on 85% designs	
5.21	Reinstate Existing block paving crossovers is to have the existing bricks retained for reuse towards reinstating the crossover on a 150mm limestone base.		m2						30	$54.00	$ 1,614.60		Based on 85% designs	
5.22	Reinstate industrial and commerciallaterite gravel crossover 150mm thick		m2						93	$16.00	$ 1,494.40		Based on 85% designs	
5.23	Supply and Install new concrete shared path(2.5m wide)	1400	m2	$38.12	$53,368.00			Assumed only reinstating footpath on one side of the road with a width of 2.5m for estimated length of 560m. 2.5x560=1400	1,565	$38.12	$ 59,648.27		Based on 85% designs	
5.24	Supply and Install new concrete footpaths (1.8m wide)								1,185	$38.12	$ 45,163.05		Based on 85% designs	
5.25	Supply and Install Pram Ramps	2	ea	$550.00	$1,100.00			Allowed for one road crossing at Eureka Street.	7	$550.00	$ 3,850.00			
	Subtotal - Roadworks						**$237,038**					**$ 398,523**		
6	**Drainage**													
6.1	Supply and Install new 300dia culverts	0	ea	$2,000.00	$0.00				-	$2,000.00	$ -			
6.2	Remove and Replace existing culverts	0	ea	$1,120.00	$0.00					$500.00	$ -			
6.3	Convert Existing SEP's to Gully's	14	ea	$2,500.00	$35,000.00			Quantity based on aerial imagery.		$2,500.00	$ -			
6.4	Convert Existing SEP's to Manholes	0	ea	$2,000.00	$0.00				-	$2,000.00	$ -			
6.5	Remove existing drainage pit								7	$500.00	$ 3,500.00		Based on 85% designs	
6.6	Supply and Install new SEP or Gully pit.	0	ea	$3,000.00	$0.00				8	$3,000.00	$ 24,000.00		Based on 85% designs	
6.7	Supply and Install 300 dia. RCP	0	ea						-		$ -		Based on 85% designs	
6.8	Supply and Install 375 dia. RCP	15	m	$400.00	$6,000.00			Factor $200/m x 2 given small piecing/connections.	-	$400.00	$ -			
	Subtotal - Drainage						**$41,000**					**$ 27,500**		
7	**Miscellaneous**													
7.1	Supply and Install misc linemarking and Signage	1	ITEM	$5,000.00	$5,000.00				1	$5,000.00	$ 5,000.00		Milner Road and the intersections are currently not linemarked. But linemarking and stencils are required on the 2.5m shared path.	
7.2	Supply and Install street lighting	560	m	$110.00	$61,600.00			Based on adopted road length of 560m and Portion A & B pricing.		$110.00	$ -			
7.3	Supply and install street lighting including cabling		ea pole						5	$3,000.00	$ 15,000.00		New luminaires and outreaches on existing timber poles	
7.4	Remove light poles		ea pole						2	$2,500.00	$ 5,000.00			
7.5	Relocate gas marker post								4	$500.00	$ 2,000.00			
7.6	Supply and Install trees	0	ea	$450.00	$0.00				-	$450.00	$ -			
7.7	Maintenance of trees and verges for a 2 year period	0	Year	$11,353.75	$0.00				-	$11,353.75	$ -			
7.8	Supply and Install select fill for swales	0	m3	$30.00	$0.00				-	$30.00	$ -			
7.9	Supply and Install gravel for swales	0	m2	$33.00	$0.00				-	$33.00	$ -			
7.10	Clean up	1	ITEM	$2,500.00	$2,500.00				1	$2,500.00	$ 2,500.00			
7.11	Adjust access chamber (sewer manhole) in road	1	ea	$7,000.00	$7,000.00			Estimate based on data from Water Corporation. 1 Manhole observed.	1	$3,000.00	$ 3,000.00		The Mastersheet amount of $7k seems high.	
7.12	Adjust hydrant lids		ea						1	$750.00	$ 750.00			
7.13	Provision for misc./unidentified service relocations	1	ITEM	$20,000.00	$20,000.00				1	$10,000.00	$ 10,000.00		Provisional allowance should it arise other services need adiusting	
7.14	Provisional: High Pressure gas spotter		item						1	$ 50,000.00	$ 50,000.00		Atco Gas will require a spotter on-site when there is works occurring in the vicinity of the HP gas which is in the northern verge.	
7.15	DCVG coating survey on HP gas main (**Provisional**)		item						1	$ 5,000.00	$ 5,000.00		When working near HP Gas, ATCO has in the past required testing of the surface coating on HP gas mains. A provisional allowance has been made.	
7.16	Western Power quote for interfacing works (**Provisional**)								1	$ 5,000.00	$ 5,000.00		A nominal provisional allowance has been made for any Western Power interfacing works between the existing assets and proposed works which may arise to avoid the underground pits, and new street lighting.	
	Subtotal - Miscellaneous						**$96,100**					**$ 103,250**		
8	**Subtotal**													
8.1	Construction Subtotal ex Prelims, Survey				$483,992.80						$ 706,673			
	Construction Subtotal				**$537,232.91**						**$ 784,497**			

9	**Allowances and Charges**												
9.1	Traffic Management		5%	$26,862				5%	$	39,220		
9.2	BCITF Levy		0.2%	$1,074				0.2%	$	1,569		
9.3	Council Supervision		1.5%	$8,058				1.5%	$	11,766		
9.4	Design and Superintendence		10%	$53,723				5.0%	$	39,220		Design and superintendence fee reduced from 10% to 5% which is reflective of the likely remaining designs to achieve 100% status
9.5	Contingency		20%	$107,446			Refer Note 9 below	5.0%	$	39,220		The design development has progressed to an 85% status, supporting the contingency can be further reduced from 10% (Rev B of DCP), to ~~5%~~
	Subtotal - Allowances and Charges					$197,164					$	**130,996**	
10	**TOTAL**			**$734,396**						######## ######			
Notes								**Notes**					
1. This estimate is based on current project information and is preliminary only.								1. This estimate is based on the 85% design status drawings					
2. The estimates are provided as an order of magnitude of cost only and are subject to detailed design and agency approvals (Western Power, Water Corporation, etc.).								2. The design and estimates are subject toAuthority approvals.					
3. It is assumed that there is no requirement for imported fill.								3. The estimate does not include land acquisition costs.					
4. It is assumed that ground conditions do not require improvement for the construction of road pavement.								4. All costing exclude GST.					
5. It is assumed that communications, gas and gas services are not required as per Portions A & B.													
6. The estimate does not include land acquisition costs.													
7. All costing exclude GST.													
8. No allowance for key of kerbing (add $17 to linear rate)													
9. A contingency of 20% has been applied. The added contingency recognises the unknown condition of the pavement, and the need for a geotechnical assesssment of the pavement condition prior to the preparation of design drawings.													
Prepared by RM. Reviewed by WC.								Prepared by Michael Cook of Porter Consulting Engineers					

	BONSER ROAD (LOCATED BETWEEN BERKSHIRE ROAD AND NARDINE CLOSE)								BONSER ROAD (LOCATED BETWEEN BERKSHIRE ROAD AND NARDINE CLOSE)					
	Revised Cost August 2018 - Based on Curnow Portion B rates								Costs as advised by Chris Lodge (CoKalamunda), email 24 June 2020					
	Approximate Length 350m								Approximate Length 350m					
Item	Description	New Quantity	Unit	Rate	Amount	Actual		Notes	Quantity	Rate	Amount	Subtotal	Comments	Drawing reference
1	**Preliminaries**													
1.1	All Preliminaries (Mobilisation, Supervision, Insurances. Safetiv etc.)			6%	$20,706.47									
	Subtotal - Preliminaries						$ 20,706					$ 44,974	Includes mobilisation, demobilisation, site establishment, supervision and management, survey and set out, construction water, traffic management, insurances, BCITF levy	
2	**Survey Control and Testing**													
2.1	All Survey (Setout, As-Cons, Compaction Testing etc.)			5%	$17,255.39									
	Subtotal - Survey Control and Testing						$ 17,255					$ -	Survey Control and Testing considered to be included in the Preliminaries section	
3	**Clearing and Demolition**													
3.1	Clear Large Trees inc Grubbing	0	ea	$246.00	$0.00									
3.2	Clear Small Trees inc Grubbing	20	ea	$179.00	$3,580.00			Quantity based on aerial imagery.						
3.3	Clear shrubs/grass	4725	m2	$1.82	$8,599.50			Allowed for 13.5m clearing for the assumed length of 350m. 13.5x350=4725						
3.4	Demolish and Dispose redundant footpaths	0	m2	$20.00	$0.00									
3.5	Demolish and Dispose redundant kerbing	0	m	$20.24	$0.00									
3.6	Remove and Dispose redundant drainage pits	0	ea	$460.00	$0.00									
3.7	Remove and Dispose redundant pavements	0	m2	$35.65	$0.00									
3.8	Existing drainage culvert to be removed & disposed		m											
	Subtotal - clearing and demolition						$ 12,180					$ -	Clearing and Demolition considered to be included in the Preliminaries section	
4	**Earthworks**													
4.1	Remove 100mm Topsoil to spoil	4725	m2	$3.00	$14,175.00			Allowed for 13.5m wide of topsoil stripping for the assumed length of 350m. 13.5x350=4725						
4.2	Form, Shape, Compact Subgrade	3850	m2	$4.00	$15,400.00			Allowed for 11m wide for the assumed length of 350m. 11x350=3850						
4.3	Form and Compact Embankment Foundation	3850	m2	$2.70	$10,395.00			Allowed for 11m wide for the assumed length of 350m. 11x350=3850						
4.4	Import Fill, Shape, Compact	0	m3	$30.00	$0.00									
4.5	Cut to spoil	385	m3	$24.64	$9,486.40			Allowed for 100mm of cut for topsoil area. (13.5x350)x0.1=385						
4.6	Dust Control	1	ITEM	$3,000.00	$3,000.00									
	Subtotal - Earthworks						$ 52,456					$ -	Earthworks included in the Roadworks section	
5	**Roadworks**													
5.1	Supply and Install 220mm limestone sub-base	847	m3	$50.00	$42,350.00			Allowed for a 220mm depth for an area of 11m wide for the assumed length of 350m. 11x350=3850. (11x350)x0.22=847						
5.2	Supply and Install 150mm limestone sub-base		m2											
5.3	Supply and Install 100mm road base	385	m3	$65.00	$25,025.00			Allowed for a 100mm depth for an area of 11m wide for the assumed length of 350m. 11x350=3850. (11x350)x0.1=847						
5.4	Supply and Install 7mm Primer Seal	3950	m2	$2.60	$10,270.00			Allowed for 11m wide for the assumed length of 350m plus 100m for contingency. 11x350+100=3950						
5.5	Supply and Install 30mm AC10	3600	m2	$12.19	$43,884.00			Allowed for 10m wide for the assumed length of 350m plus 100m for contingency. 10x350=3600						
5.6	Supply and Install FK	625	m	$55.20	$34,500.00			Flush kerbing assumed for road length minus the intersections which will have semi mountable kerbing. Estimated road length of 350m. 2x350-SMK value=2x350-75=625						
5.7	Supply and Install MK (refer note 8)	0	m	$35.00	$0.00									
5.8	Supply and Install SMK (refer note 8)	75	m	$20.48	$1,536.00			Allowed for semi mountable kerbing at the intersections. Assuming 12m radius at intersections for 4 corners approximate kerb length is the circumference of a circle with a radius of 12. 2xpi()x12=75.39 rounded down to 75.						
5.9	key kerbs													
5.10	Reinstate existing Crossovers	0	m2	$90.00	$0.00									
5.11	Supply and Install new concrete footpaths (2.5m wide)	875	m2	$38.12	$33,355.00			Assumed footpath will only be on one side of the road. Estimated lenoth of new footoath 350m with a width of 2.5m.						
5.12	Supply and Install Pram Ramps	2	ea	$550.00	$1,100.00			Allowed for one road crossing.						
	Subtotal - roadworks						$ 192,020					$ 312,248		
6	**Stormwater Drainage**													
6.1	Supply and Install new 300dia culverts	0	ea	$2,000.00	$0.00									
6.2	Remove and Replace existing culverts	0	ea	$1,120.00	$0.00									
6.3	Convert Existing SEP's to Gully's	0	ea	$2,500.00	$0.00									
6.4	Covert Existing SEP's to Manholes	0	ea	$2,000.00	$0.00									
6.5	Supply and Install new SEP's	0	ea	$3,000.00	$0.00									
	Subtotal - drainage						$ -					$ 30,792		
7	**Miscellaneous**													
7.1	Supply and Install street lighting	350	m	$110.00	$38,500.00			Based on adopted road length of 350m and Portion A & B pricing.			$ 42,822.86		From the Bonser Road schedule based on Tender Price	
7.2	Supply and Install misc linemarking and Signage	1	ITEM	$5,000.00	$5,000.00								-	
7.3	Supply and Install vegetation for swales	700	m2	$10.00	$7,000.00			Assumed swale running down one side of the road. Allowed for a width of 2m. 2x350=700.						
7.4	Supply and Install trees	24	ea	$450.00	$10,800.00			Allowed for trees at 15m spacing for the entire road length. 350/15=23.33 rounded up.						
7.5	Maintenance of trees and verges for a 2 year period	2	Year	$7,975.94	$15,951.88									
7.6	Supply and Install select fill for swales	140	m3	$30.00	$4,200.00			Assumed swale running down one side of the road. Allowed for a width of 2m and 200mm fill depth. (2x350)x0.2=140.						
7.7	Supply & install sandy loam mixed with chip mulch or red-mud for chosphorus & nitrogen absorption													
7.8	Supply and Install gravel for swales	0	m2	$33.00	$0.00									
7.9	Clean up	1	ITEM	$2,000.00	$2,000.00									
7.10	Provision for misc./unidentified service relocations	1	ITEM	$5,000.00	$5,000.00									
	Subtotal - Miscellaneous						$ 88,452					$ 42,823		
XX	For construction of truncations once land is acquired from Lots 16 and 17 Berkshire Road (Stage 2)											$ 70,038		
8	**Subtotal**													
8.1	Construction Subtotal ex Prelims, Survey				$345,108						$ 455,900			
8.2	Construction Subtotal				$383,070						$ 500,874			
9	**Allowances and Charges**													
9.1	Traffic Management		5%		$19,153.48				0.0%		$ -		Traffic management is noted to be included in the Preliminaries costs	
9.2	BCITF Levy		0.2%		$766.14						$ -		Assumed to be included in the overall costs	
9.3	Council Supervision		1.5%		$5,746.04				1.5%		$ 7,513		1.5% of subtotal 2 which includes Stage 2 separable portion	
9.4	Design and Superintendence		10%		$38,306.96				3%		$ 39,200		includes $39,200 of design costs to date	
	Superintendence								3%		$ 15,026		3% of subtotal 2	
9.5	Contingency		10%		$38,306.96				5%		$ 25,044		5% of subtotal 2	
	Subtotal - Allowances and Charges											$ 86,783		
10	**Total**				**$485,349**						$ 587,657			
	Notes								**Notes**					
	1. This estimate is based on current project information and is preliminary only.								1. Based on the Serling Consulting drawings provided.					
	2. The estimates are provided as an order of magnitude of cost only and are subject to detailed design and agency approvals (Western Power, Water Corporation, etc.).								2. The estimates are provided as an order of magnitude of cost only and are subject to detailed design and agency approvals (Western Power, Water Co					
	3. It is assumed that there is no requirement for imported fill.								3. It is assumed that ground conditions do not require improvement for the construction of road pavement.					
	4. It is assumed that ground conditions do not require improvement for the construction of road pavement.								4. Assumes there is no need for water, gas or communication installation works.					
	5. It is assumed that communications, gas and gas services are not required as per Portions A & B.								5. The estimate does not include land acquisition costs.					
	6. The estimate does not include land acquisition costs.								6. All costing exclude GST.					
	7. All costing exclude GST.													
	8. No allowance for key of kerbing (add $17 to linear rate)								Prepared by Michael Cook of Porter Consulting Engineers					

	BONSER ROAD (LOCATED BETWEEN BERKSHIRE ROAD AND NARDINE CLOSE)			
	Costs as advised by Chris Lodge (CoKalamunda), email 24 June 2020			
	Approximate Length 350m			
Item	**Description**			**Notes**
1	**Preliminaries**	**$**	**44,974**	Includes mobilisation, demobilisation, site establishment, supervision and management, survey and set out, construction water, traffic management, insurances, BCITF levy
2	**Road Construction**	**$**	**312,248**	
2.1	Clearing and Earthworks	$	21,398	Includes clearing and grubbing, topsoil removal, cut to fill, cut to spoil
2.2	Roadwworks	$	213,625	Includes subgrade preparation, subbbase 150mm limestone, basecourse roadbase, primer seal and asphalt
2.3	Kerbing and Footpath	$	71,053	Includes semi mountable kerb, flush edge beam, backifill behind kerbs, concrete footpath, pram ramps
2.4	Miscellaneous	$	6,171	includes pavement testing, kerb removal, footpath removal (Nardine), saw cut and remove asphalt
3	**Stormwater**	**$**	**30,792**	
3.1	Excavation and Pipework	$	4,460	Includes excavation and backfill
3.2	Concrete Pits	$	6,003	Includes gully pit, side entry pit over existing drainage line, replace existing pit cover with gully lid
3.3	Swale Drain	$	19,243	Includes excavation and trimming of swale, supply and install chip mulch, supply and install gravel media, plantings
3.4	Miscellaneous	$	1,085	Includes the removal of existing culvert
4	**Street Lighting**	**$**	**42,823**	
4.1	Excavation and Cabling	$	12,294	Includes excavation, supply, install and backfiull for cable
4.2	Conduit	$	552	Includes supply and install of conduit, misc caps, nuts, bolts etc.
4.3	Street Lights	$	14,677	Supply and install street light poles
4.4	Miscellaneous	$	13,325	Liaison with Western Power, transport materials, testing and commissioning, under road boring.
4.5	Additional Electrical Design Costs due to Staging	$	1,975	Refer to RSA Engineering email 7.2.2020
Subtotal 1		**$**	**430,837**	**Excludes Stage 2 separable portion**
5	**Stage 2 - Separable Portion**	**$**	**70,038**	**For construction of truncations once land is acquired from Lots 16 and 17 Berkshire Road (Stage 2)**
5.1	Preliminaries	$	12,825	Includes mobilisation and demobilisation, site establishment, supervision, management, survey and setout, construction water, traffic management
5.2	Clearing and Earthworks	$	1,737	Includes clearing and grubbing, topsoil removal.
5.3	Roadworks	$	28,840	Includes subgrade preparation, subbase limestone, basecourse roadbase, primer seal and asphalt.
5.4	Kerbing and Footpath	$	6,670	Includes semi mountable kerb, backfill behind kerbs, concrete footpath, pram ramps.
5.5	Concrete Pits	$	3,730	Includes site entry pit over existing drainage line, replace existing pit cover with gully type lid.
5.6	Power Reticulation	$	9,688	
5.7	Miscellaneous	$	5,049	Includes pavement testing, removal of kerbs, removal of existing crossover, saw cut and remove asphalt.
5.8	Additional Electrical Design Costs due to Staging	$	1,500	Refer to RSA Engineering email 7.2.2020
Subtotal 2		**$**	**500,874**	**Includes Stage 2 separable portion**
6	**Allowances and Charges**			
6.1	**Council Supervision**	$	7,513	1.5% of subtotal 2
6.2	**Design and Superintendence**	$	39,200	includes $39,200 of design costs to date
6.3	**Superintendence**	$	15,026	3% of subtotal 2
6.4	**Contingency**	$	25,044	5% of subtotal 2
Total		**$**	**587,657**	**Includes Stage 2 and allowances/charges**
Notes				
1. Costs based on tender prices and design costs incurred to date as advised by the City of Kalamunda. Refer C.Lodge email 24-6-2020				
2. The estimate does not include land acquisition costs.				
3. All costing exclude GST.				
4. Construction of Bonser Road subject to prefunding agreement witih landowner				

Forrestfield Industrial Area - August 2018 Version J

Road 2A
Revised Cost August 2018 - Based on Curnow Portion B rates
Approximate Length 440m. Refer to Porter Consulting Engineers drawings set 16-09-116 Stage 1 and Stage 2.
Section End of Portion B CH1030 - Lot 50 Sultana W Road

Item	Description	Quantity	Unit	Rate	Amount	Subtotals	Notes	STAGE 1 - BASED ON CONSTRUCTION CONTRACT AMOUNTS PCE Quantity	PCE Rate	PCE Amount	PCE Subtotal	PCE comment	Drawing reference Stage 1	STAGE 2 PCE Quantity	PCE Rate	PCE Amount	PCE Subtotal	PCE comment	STAGE 1 & 2 COMBINED PCE Amount	PCE Subtotal	PCE comment
								Refer to Porter Consulting Engineers drawings job 16-09-116-Road 2A-Stage 1						Refer to Porter Consulting Engineers drawings job 16-09-116-Road 2A-Stage 2							
1	**Preliminaries**																				
1.1	All Preliminaries (Mobilisation, Supervision, Insurances, Safety etc.)			6%	$39,399										8%	$ 30,022			$ 30,021.55		
	Subtotal - Preliminaries					**$39,398.86**					**$ 97,326.03**	Based on Construction contract amounts					**$ 30,022**			**$ 127,348**	
2	**Survey Control and Testing**																				
2.1	All Survey (Setout, As-Cons, Compaction Testing etc.)			5%	$32,832										8%	$ 30,022			$ 30,021.55		
	Subtotal - Survey Control and Testing					**$32,832.39**				Included in Preliminaries		Based on Construction contract amounts					**$ 30,022**			**$ 30,022**	
3	**Clearing and Demolition**																				
3.1	Clear all vegetation and inc Grubbing of trees	1	Item	$25,000.00	$25,000									1	$15,000.00	$ 15,000			$ 15,000.00		
3.2	Demolition and Reinstatement of Garage	1	ITEM	$100,000.00	$100,000		$100,000 assumes demolition of approximately $70,000 and reinstatement of approximately $30,000.							1	$100,000.00	$ 100,000		Assumed for the removal of existing garage to the residence within lot 51 in Stage 2. The City has a quantity surveyor provide an estimate for demolition & replacement of the garage	$ 100,000.00		
3.3	Demolish and Dispose redundant footpaths	0	m2	$20.00	$0											$ -			$ -		
3.4	Demolish and Dispose redundant kerbing	0	m	$20.24	$0											$ -			$ -		
3.5	Remove and Dispose redundant drainage pits	0	ea	$460.00	$0											$ -			$ -		
3.6	Remove and Dispose redundant pavements	0	m2	$35.65	$0									654	$20.00	$ 13,080		Removal of existing tempoary turnaround constructed in Stage 1. The mastersheet notes a rate of $35.65/m2 which is towards the higher end of the range. PCE has noted a rate of $20/m2 for use.	$ 13,080.00		
3.7	Demolition works within lot 5 (shed)															$ -			$ -		
3.8	Demolition works within Lot 52 (mainly brick paving & small wall & make good)															$ -			$ -		
3.9	Remove existing garden limestone retaining wall within lot 52 (1c to 2c exposed)															$ -			$ -		
3.10	Demolition works within Lot 51 (shed, bitumen driveway, and carport to house and make good)													0	$60,000.00	$ -		included in item 3.2 above with the $100,000 allowance.	$ -		
3.11	Demolition works within Lot 51 at CH 38(sheds, slabs, lean to's)													0	$20,000.00	$ -		Recent Structure Plan modifications removes dogleg of battle axe.	$ -		
	Subtotal - Clearing and Demolition					**$125,000.00**					**$ 25,461.87**	Based on Construction contract amounts					**$ 128,080**			**$ 153,542**	
4	**Earthworks & Retaining**																				
4.1	Remove 100mm Topsoil, stockpile and respread	9200	m2	$4.00	$36,800		Area measured from design drawing							3340	$4.00	$ 13,360			$ 13,360.00		
4.2	Form, Shape, Compact Subgrade	5678	m2	$4.00	$22,712		Area measured from design drawing. Road area (measured 5150m2) + 0.6 m box out each side. 5150+(0.6x2)x450							2231	$4.00	$ 8,924			$ 8,924.00		
4.3	Form and Compact Embankment Foundation	3520	m2	$2.70	$9,504		Area measured from design drawing. Trimming of verges. Verge width 4m on both side. (4x2)x440=3520							1,109	$2.70	$ 2,994			$ 2,994.30		
4.4	Import Fill, Shape, Compact	0	m3	$30.00	$0									0	$30.00	$ -			$ -		
4.5	Cut to spoil (cart offsite)	0	m3	$24.64	$0									530	$25.00	$ 13,250		PCE assesses there is likely to be excess spoil material, based on cut/fill/balance DTM calculation available to Porter's being the design consultant	$ 13,250.00		
4.6	Cut to fill	1000	m3	$5.00	$5,000		Based on Porter's figures.							265	$5.00	$ 1,325		PCE assesses there is likely to be excess spoil material, based on cut/fill/balance DTM calculation available to Porter's being the design consultant	$ 1,325.00		
4.7	Excavate, Form and Compact Swales	375	m	$8.00	$3,000		Area measured from design drawing							422	$8.00	$ 3,376			$ 3,376.00		
4.8	Dust Control	1	ITEM	$9,000.00	$9,000									1	$4,500.00	$ 4,500			$ 4,500.00		
4.9	Post and Panel Wall 0 - 0.5m high																		$ -		
4.10	Reinstate brick paving by the home of lot 52 following completion of new retaining wall																		$ -		
	Subtotal - Earthworks & Retaining					**$86,016.00**					**$ 29,047.50**	Based on Construction contract amounts					**$ 47,729**			**$ 76,777**	
5	**Roadworks**																				
5.1	Supply and Install 200mm limestone sub-base	1136	m3	$50.00	$56,800		Road area with 200mm depth. Road area measured from design drawing. 5678x0.2=1135.6 rounded up.							446	$50.00	$ 22,310		The mastersheet notes a cubic metre rate, when usually this item is costed as a square meter rate. A rate of $50/m3 equates to $10/m2 for 200mm subbase, within the expected range	$ 22,310.00		
5.2	Supply and Install 100mm road base	568	m3	$65.00	$36,920		Road area with 100mm depth. Road area measured from design drawing. 5678x0.1=567.8 rounded up.							223	$85.00	$ 18,964		The mastersheet notes a cubic metre rate, when usually this item is costed as a square meter rate. A rate of $65/m3 equates to $6.5/m2 of 100mm of base course, which PCE consider too low. PCE suggest using a rate of $85/m3 that equates to $8.5/m2 which is the same rate used for the Berkshire/Ashby portion of the works	$ 18,963.50		
5.3	Supply and Install 7mm Primer Seal	5678	m2	$2.60	$14,763		Area measured from design drawing. Road area (measured 5150m2) + 0.6 m box out each side. 5150+(0.6x2)x450							2,231	$2.60	$ 5,801			$ 5,800.60		
5.4	Supply and Install 30mm AC10	5150	m2	$12.19	$62,779		Area measured from design drawing							2,231	$12.19	$ 27,196			$ 27,195.89		
5.5	Supply and Install FK	382	m	$55.20	$21,086		Length measured from design drawing							127	$55.20	$ 7,027			$ 7,026.96		
5.6	Supply and Install MK (refer note 8)	515	m	$35.00	$18,025		Length measured from design drawing							97	$20.00	$ 1,946			$ 1,946.00		
5.7	Supply and Install SMK (refer note 8)	123	m	$20.48	$2,519		Length measured from design drawing							119	$20.48	$ 2,445			$ 2,445.31		
5.8	Reinstate existing Crossovers	120	m2	$92.00	$11,040		Allowing 40m2 reinstated for 3 crossovers. 3x40=120							25	$92.00	$ 2,300		Although not explicitly shown on drawing 401 Rev G, a crossover will need to be provided/reinstated for lot 52 following removal of the temporary turnaround	$ 2,300.00		
5.9	Gravel driveway to lot 52		m2											60	$50.00	$ 3,000		Although not explicitly shown on drawing 401 Rev G, the gravel drivewy to lot 52 will need to be extended to the new kerbline following removal of the temporary turnaround	$ 3,000.00		
5.10	Emergency vehicle crossover to lot 50		m2											50	$90.00	$ 4,500					
	Swing gate to lot 50		item											1	$1,000.00	$ 1,000					
5.11	Supply and Install new concrete footpaths (2.5m wide)	1100	m2	$40.00	$44,000		Allowed for footpath on one side of the road with a width of 2.5m for estimated length of 440m. 2.5x440=1100							531	$40.00	$ 21,252		The mastersheet notes a 2.5m wide footpath. But Porter's drawing notes 2.1m wide path. PCE has assessed a 2.1m wide path	$ 21,252.00		
5.12	Supply and Install Pram Ramps	2	ea	$550.00	$1,100		Allowed for one road crossing.							2	$550.00	$ 1,100			$ 1,100.00		
5.13	Key kerbs		m											119	$17.00	$ 2,030			$ 2,029.80		
	Subtotal - Roadworks					**$269,031.74**					**$ 193,864.36**	Based on Construction contract amounts					**$ 120,870**			**$ 314,734**	
6	**Drainage**																				
6.1	Supply and Install Rock Pitching - Weirs	3	item	$1,000.00	$3,000		Quantity based on design drawing.							3	$1,000.00	$ 3,000		The mastersheet uses a rate of $1000 for each weir, which is considered acceptable although probably at the higher end of the expected range	$ 3,000.00		
	Stone Pitching		m2											4	$180.00	$ 720			$ 720.00		
6.2	Supply and Install new 300dia culverts	0	ea	$2,000.00	$0											$ -			$ -		
6.2	Remove and Replace existing culverts	0	ea	$1,120.00	$0											$ -			$ -		
6.4	Convert Existing SEP's to Gully's	0	ea	$2,500.00	$0											$ -			$ -		
6.5	Covert Existing SEP's to Manholes	0	ea	$2,000.00	$0											$ -			$ -		
6.6	Supply and Install new SEP's	0	ea	$3,000.00	$0											$ -			$ -		
	Subtotal - Drainage					**$3,000.00**					**$ 3,246.29**	Based on Construction contract amounts					**$ 3,720**			**$ 6,966**	
7	**Miscellaneous**																				
7.1	Supply and Install street lighting	440	m	$110.00	$48,400		Based on adopted road length of 440m and Portion A & B pricing							165	$110.00	$ 18,150			$ 18,150.00		
7.2	Supply and Install misc linemarking and Signage	1	ITEM	$2,000.00	$2,000									1	$1,000.00	$ 1,000		Although chevron signs are not shown on 16-9-116/400 Rev G, it is expected that at least one chevron is required to be installed for the culdesac	$ 1,000.00		
7.3	Supply and Install vegetation for swales	0	m2	$10.00	$0											$ -			$ -		
7.4	Supply and Install trees	0	ea	$450.00	$0											$ -			$ -		
7.5	Maintenance of trees and verges for a 2 year period	0	Year	$6,228.75	$0											$ -			$ -		
7.6	Supply and Install select fill for swales		N/A	$30.00	$0											$ -			$ -		
7.7	Supply and Install gravel for swales		N/A	$33.00	$0											$ -			$ -		
7.8	Clean up	1	ITEM	$10,000.00	$10,000									1	$5,000.00	$ 5,000			$ 5,000.00		
7.9	Provision for misc./unidentified service relocations	1	ITEM		$10,000									1	$5,000.00	$ 5,000			$ 5,000.00		
7.10	Fencing on Western Boundary of Lot 499 - Adjustments		ALLOW		$5,000											$ -		Does not appear lot 499 fencing needs adjusting within stage 2	$ -		
7.11	Relocate leach drain for home in lot 52 if encountered (Provisional)															$ -			$ -		
7.12	Adjust domestic services to lot 52 if encountered (Provisional)															$ -			$ -		
	Subtotal - Miscellaneous					**$75,400.00**					**$ 48,212.85**	Based on Construction contract amounts					**$ 29,150**			**$ 77,363**	
8	**Services**																				
8.1	Underground Power (inc. in item 7.1)	440	m	$0.00	$0		Included in item 7.1, Based on adopted road length of 440m														
8.2	Western Power Energisation Fees	1	ITEM	$50,000.00	$50,000									1	$10,000.00	$ 10,000		Estimate only. Expected to be a comparable value to MS017351	$ 10,000.00		
8.3	Communications		N/A		$0														$ -		
8.4	Gas Servicing		N/A		$0														$ -		
8.5	Landscaping		N/A		$0														$ -		
8.6	Water Reticulation (150 P-12)	720	m	$60.00	$43,200		Length measured from design drawing. Subject to Water Corporation approvals.							250	$130.00	$ 32,500		PCE's rate includes hydrants, valves, bends, fittings. The mastersheet rate of $60 would be considered simply for the pipe, and not include fittings like valves and hydrants	$ 32,500.00		
8.7	Bore watermain under Ashby Close (12m PE section)																		$ -		
8.8	Reinstate footpath along Ashby Close as part of water retic works																		$ -		
8.9	Reinstate the road pavement at Sultana Road west for the water main works		m2											7	$100.00	$ 720			$ 720.00		
8.10	Water Corporation Connection Fees	1	ITEM	$5,000.00	$5,000									1	$2,500.00	$ 2,500			$ 2,500.00		
	Subtotal - Services					**$98,200.00**					**$ 99,119.28**	Based on Construction contract amounts					**$ 45,720**			**$ 144,839**	
9	**Subtotal**																				
9.1	Construction Subtotal ex Prelims, Survey				$656,648					$ 398,952.15						$ 375,269			$ 774,221.51		
9.2	**Construction Subtotal**				**$728,879**					**$ 496,278.18**						**$ 435,312**			**$ 931,591**		
10	**Allowances and Charges**																				
10.1	Traffic Management		5%		$36,444					included				2.5%		$ 10,883		PCE is of the opinion minimal traffic management would be required as only traffic is for one property			
10.2	BCITF Levy		0.2%		$1,458					included				0.2%		$ 871					
10.3	Council Supervision		1.5%		$10,933					included				1.5%		$ 6,530					
10.4	Design and Superintendence		10%		$72,888					included				10%		$ 43,531					
10.5	Contingency		10%		$72,888					included				10%		$ 43,531					
	Subtotal - Allowances and Charges					**$194,610.69**					**$ 66,413.00**						**$ 105,346**			**$ 171,759**	
11	**TOTAL**				**$923,490**					**$ 562,691**		As of 11 June 2020				**$ 540,658**			**$ 1,103,349**		
12	**Staging**																				
12.1	Staging Contingency		20%		$184,698														0%		
13	**TOTAL with Staging**				**$1,108,188**														**$ 1,103,349**		

Notes

1. This estimate is based on current project information and is preliminary only.
2. The estimates are provided as an order of magnitude of cost only and are subject to detailed design and agency approvals (Western Power, Water Corporation, etc.).
3. It is assumed that there is no requirement for imported fill.
4. It is assumed that ground conditions do not require improvement for the construction of road pavement.
5. It is assumed that communications, gas and gas services are not required as per Portions A & B.
6. The estimate does not include land acquisition costs.
7. All costing exclude GST.
8. No allowance for key of kerbing (add $17 to linear rate)

Prepared by RM. Reviewed by WC.

Prepared by Michael Cook of Porter Consulting Engineers (Stage 1)

Prepared by Michael Cook of Porter Consulting Engineers (Stage 2)

Notes (Stage 1 & 2 Combined)

1. The estimate does not include land acquisition costs.
2. All costing exclude GST.
3. Subject to agency approvals.
4. All costing exclude GST.
5. Porter's has undertaken an assessment for each respective stage, and is of the opinion that a further 20% contingency amount is not necessary.

Prepared by Michael Cook of Porter Consulting Engineers

	SULTANA ROAD WEST (MILNER ROAD TO BRAND ROAD)										
	Revised Cost August 2018 - Based on Curnow Portion B rates										
	Approximate Length 800m										
Item	**Description**	**New Quantity**	**Unit**	**Rate**	**Amount**	**Notes**	**PCE Quantity**	**PCE Rate**	**PCE Amount**	**PCE Subtotal**	**PCE comment**
							Based on 85% design status drawings prepared by Porter Consulting Engineers. 19-11-138/800 Rev C, 801 Rev C, 802 Rev C, 803 Rev B, 804 Rev A, 3E19102-03 Rev 2 (sheet 1), 3E19102-03 Rev 2 (sheet 2)				
1	**Preliminaries**										
1.1	All Preliminaries (Mobilization, Supervision, Insurances, Safety etc.)			6%	$59,630.61			6%	$ 74,414.46		
	Subtotal - Preliminaries									**$ 74,414**	
2	**Survey Control and Testing**										
2.1	All Survey (Setout, As-Cons, Compaction Testing etc.)			5%	$49,692.18			5%	$ 62,012.05		
	Subtotal - Survey Control and Testing									**$ 62,012**	
3	**Clearing and Demolition**										
3.1	Clear Large Trees inc Grubbing	10	ea	$246.00	$2,460.00	approximate only based on aerial imagery	5	$ 500.00	$ 2,500		PCE has adopted for a higher rate due to likely presence of existing services near trees to be removed & grubbed.
3.2	Clear Small Trees inc Grubbing	27	ea	$179.00	$4,833.00	approximate only based on aerial imagery	8	$ 250.00	$ 2,000		PCE has adopted for a higher rate due to likely presence of existing services near trees to be removed & grubbed. Based on 85% designs
3.3	Clear shrubs/grass	4000	m2	$1.82	$7,280.00	Length of road taken as 800m with 4m road widening (2x 0.5m extra for topsoil stripping). 800x5=4000	0	$ 1.82	$ -		There are very few scrubs along this length. Topsoil removal accounted for in item 4.1
3.4	Trim / lop branches to shrubs.		Item				1	$ 2,000.00	$ 2,000		From a site visit, there is likely to be a need for some overhanging branches to be trimmed/lopped to facilitate the works.
3.5	Demolish and Dispose redundant footpaths	0	m2	$20.00	$0.00		0	$ 20.00	$ -		The Milner Road costings accounts for any paths that need removal by the Sultana Road intersection.
3.6	Demolish and Dispose redundant kerbing	1600	m	$2.73	$4,368.00	Quantity based on assumed length. Removal on both sides of road. 800x2=1600	1565	$ 9.00	$ 14,085		Remove existing flush kerbing along full length.
3.7	Remove and Dispose redundant drainage pits	0	ea	$460.00	$0.00		0	$ 460.00	$ -		Appears no drainage pits along the road.
3.8	Remove and Dispose existing asphalt offsite.		m2				5100	$ 9.50	$ 48,450		For works to existing pavement areas
3.9	Remove and Dispose redundant pavements	0	m2	$97.37	$0.00		480	$24.64	$ 11,827		Redundant pavement between cul-de-sac to Brand St.
	Subtotal - Clearing and Demolition									**$ 80,862**	
4	**Earthworks**										
4.1	Remove 100mm Topsoil to spoil	4000	m2	$3.00	$12,000.00	Length of road taken as 800m with 4m road widening (2x 0.5m extra for topsoil stripping). 800x5=4000	993.9	$3.00	$ 2,982		Based on 85% designs
4.2	Form, Shape, Compact Subgrade	4000	m2	$4.00	$16,000.00	Length of road taken as 800m with 4m road widening (2x 0.5m extra for topsoil stripping). 800x5=4000	8096	$4.00	$ 32,384		Length of road taken as 800m with2m wide pavement extension to both sides, plus a further 0.5m extension beyond the edge of pavement, as shown on the drawings. And the existing pavement being reconstructed.
4.3	Import Fill, Shape, Compact	0	m3	$30.00	$0.00		60	$ 30.00	$ 1,800		Minor fill batter into lot 1563 by Milner Road/Sultana Road West intersection.
4.4	Cut to spoil and disposal	400	m3	$24.64	$9,856.00	Allowed for 100mm of cut for topsoil area. (5x800)x0.1=400.	2447	$24.64	$ 60,300		Includes disposal of topsoil and boxout material.
4.5	Dust Control	1	ITEM	$10,000.00	$10,000.00	Assumed Rate	1	$10,000.00	$ 10,000		
	Subtotal - Earthworks									**$ 107,465**	
5	**Roadworks**										
5.1	Remove existing base course for possible reuse		m2				4620	$ 4.00	$ 18,480		For existing pavements to be reconstructed
5.2	Supply and Install 220mm limestone sub-base	880	m3	$50.00	$44,000.00	Road area with 220mm depth. (5x800)x0.22= 880			$ -		
5.3	Supply and instal 125mm limestone subbase		m2				8096	$10.50	$ 85,008		Based on 85% designs
5.4	Supply and Install 100mm road base	400	m3	$65.00	$26,000.00	Road area with 100mm depth. (5x800)x0.1=400	0		$ -		
5.5	Supply and instal 125mm roadbase		m2				8096	$11.25	$ 91,080		Based on 85% designs
5.6	Supply and Install 7mm Primer Seal	4000	m2	$2.60	$10,400.00	Road area. 5x800=4000.	7376	$2.60	$ 19,178		Based on 85% designs
5.7	Supply and Install 30mm AC14	3200	m2	$12.19	$39,008.00	Length of road (800m) x road widening (4m). 800x4=3200	7376	$12.19	$ 89,913		Based on 85% designs
5.8	Supply and Install 40mm AC14						879	$18.00	$ 15,822		Based on 85% designs
5.9	Supply and Install FK	1529	m	$55.20	$84,400.80	781m south side, 748m north side	1490	$60.00	$ 89,400		Based on 85% designs
5.10	Supply and Install MK (refer note 8)	0	m	$35.00	$0.00		0		$ -		Based on 85% designs
5.11	Supply and Install SMK (refer note 8)	0	m	$35.00	$0.00		157	$35.00	$ 5,495		Based on 85% designs
5.12	Reinstate existing Crossovers	1160	m2	$90.00	$104,400.00	29 crossovers at 40m2 each. 29x40=1160m2		$90.00	$ -		See below for crossovers being reinstated in varying materials
5.13	Key kerbs						157	$17.00	$ 2,669.00		
5.14	Reinstated Concrete Crossovers for commercial/industrial properties to be: 150mm thick N32MPa concrete with SL62 mesh centrally located with a 100mm limestone basecourse.		m2				261	$110.00	$ 28,710.00		Based on 85% designs
5.15	Reinstate Asphalt crossovers for commercial/industrial properties to be: 150mm thick rock roadbase, 7mm primer seal with 30mm asphalt wearing course.		m2				43	$18.79	$ 807.97		Based on 85% designs
5.16	Reinstate concrete crossovers to residential properties to be: 100mm thick N32MPa with 150mm limestone base.		m2				28	$100.00	$ 2,800.00		Based on 85% designs
5.17	Reinstate Asphalt crossovers to residential properties to be: 100mm thick rock roadbase, primer seal with 30mm asphalt wearing course.		m2				158	$18.79	$ 2,968.82		Based on 85% designs
5.18	Reinstate Existing block paving crossovers is to have the existing bricks retained for reuse towards reinstating the crossover on a 150mm limestone base.		m2				20	$54.00	$ 1,080.00		Based on 85% designs
5.19	Reinstate gravel crossover 150mm thick		m2				177	$16.00	$ 2,832.00		Based on 85% designs
5.20	Supply and Install new concrete footpaths	2000	m2	$38.12	$76,240.00	800x2.5 = 2000m2	1621	$38.12	$ 61,796		As part of Revision B to the DCA report (R34.19), the City has instructed that the path in Sultana Road West is to be reduced from 2.5m to 1.8m. Quantity based on 85% designs.
5.21	Supply and Install Pram Ramps	8	ea	$550.00	$4,400.00	6 @ Milner, 2x @ Brae	2	$550.00	$ 1,100		
	Subtotal - Roadworks									**$ 519,139**	
6	**Drainage**										
6.1	Supply and Install new 300dia(CL2) culverts	0	ea	$2,000.00	$0.00		361.4	$ 85.00	$ 30,719		drainage pipe under crossovers
6.2	Remove and Replace existing culverts OR extend existing culvert	1	ea	$5,000.00	$5,000.00	Brae Road		$ 5,000.00	$ -		See item below
6.3	Remove existing drainage pipework		m				29	$ 30.00	$ 870		Remove the pipework at the intersection with Brae Road. This is at a local high point so no need to have the drainage pipe in place.
6.4	Convert Existing SEP's to Gully's	0	ea	$2,500.00	$0.00		1	$ 2,500.00	$ 2,500		
6.5	Covert Existing SEP's to Manholes	1	ea	$2,000.00	$2,000.00	Quantity based on aerial imagery.	0	$ 2,000.00	$ -		
6.6	Supply and Install new SEP's	1	ea	$3,000.00	$3,000.00	Quantity based on aerial imagery.	0	$ 3,000.00	$ -		
6.7	Supply and install bubble in/out soakwell pits						41	$ 3,000.00	$ 123,000		pits in swales by crossovers
6.8	Supply and Install 375 dia. RCP	5	m	$400.00	$2,000.00	Quantity based on aerial imagery.	0	$ 400.00	$ -		
6.9	Headwalls						0	$ 500.00	$ -		
6.10	Form roadside swales		m				1098	$ 18.00	$ 19,764		Based on 85% designs
	Subtotal - Drainage									**$ 176,853**	

	SULTANA ROAD WEST (MILNER ROAD TO BRAND ROAD)											
	Revised Cost August 2018 - Based on Curnow Portion B rates											
	Approximate Length 800m											
Item	**Description**	**New Quantity**	**Unit**	**Rate**	**Amount**	**Notes**	**PCE Quantity**	**PCE Rate**	**PCE Amount**	**PCE Subtotal**	**PCE comment**
7	**Miscellaneous**										
7.1	Supply and Install misc linemarking and Signage	1	ITEM	$5,000.00	$5,000.00		1	$1,000.00	$ 1,000		Chevrons by Brand Rd
7.2	Supply and Install street lighting	800	m	$110.00	$88,000.00	Length of road		$110.00	$ -		
7.3	Supply and install street lighting including cabling		ea pole				9	$3,000.00	$ 27,000		
7.4	Supply and Install trees	54	ea	$450.00	$24,300.00	Allowed for trees at 15m spacing for the entire road length. 800/15=53.33 rounded up.	0	$450.00	$ -		City confirms that having street trees located in the proposed swales would be suboptimal, and therefore exclude street trees from the design and costs.
7.5	Maintenance of trees and verges for a 2 year period	2	Year	$16,948.86	$33,897.72		0	$16,948.86	$ -		City confirms that having street trees located in the proposed swales would be suboptimal, and therefore exclude street trees from the design and costs.
7.6	Supply and Install select fill for swales	0	m3	$30.00	$0.00		0	$30.00	$ -		Discussed that proposed roadside swales do not require any specific select filter media. The swales shall consist of the insitu soils which has high permeability characteristics.
7.7	Supply and Install gravel for swales	0	m2	$33.00	$0.00		0	$33.00	$ -		Discussed that proposed roadside swales do not require any specific select filter media. The swales shall consist of the insitu soils which has high permeability characteristics.
7.8	Clean up	1	ITEM	$5,000.00	$5,000.00		1	$5,000.00	$ 5,000		
7.9	Relocation of power pole at Milner Road Intersection (based on Dundas/Milner/Berkshire Quote)	1	ITEM	$350,000.00	$350,000.00		1	$270,921	$ 270,921		Refer to the Western Power feasibility Study (MF011894 / GFVSVU 22 May 2020) and design drawing (MP190326) for the removal of the power pole #132866. Costs are inclusive of all works shown on the design drawing MP190326, including the switchgear and LV kiosk.
7.10	Provision for misc./unidentified service relocations / adjustments			$20,000.00	$20,000.00		1	$ 20,000.00	$ 20,000		For unidentified services relocation. There may be a need to adjust services, in particular where services are perpendicular to proposed swales.
7.11	Adjustment of Telstra or NBN lids to suit finished levels (Provisional)						1	$ 10,000.00	$ 10,000		Although it is expected that most of the existing communication pit lids currently match proposed levels, an allowance has been made for some lids needing adjusting.
7.12	Adjustment of Water Corp lids (valves, hydrants) to suit finished levels (Provisional)						11	$ 2,000.00	$ 22,000		As the verge level of Sultana Road will be adjusted slightly, lids and spindles will need to be raised.
	Subtotal - Miscellaneous									**$ 355,921**	
8	**Subtotal**										
8.1	Construction Subtotal ex Prelims, Survey				$993,843.52				$ 1,240,241		
	Construction Subtotal				**$1,103,166.31**				**$ 1,376,668**		
9	**Allowances and Charges**										
9.1	Traffic Management		5%		$55,158.32		3%		$ 41,300		Traffic management percentage reduced from 5% to 3% to reflect cost of around $44k.
9.2	BCITF Levy		0.2%		$2,206.33		0.2%		$ 2,753		
9.3	Council Supervision		1.5%		$16,547.49		1.5%		$ 20,650		
9.4	Design and Superintendence		10%		$110,316.63		7.5%		$ 103,250		Design and superintendence fee reduced from 10% to 7.5% , includes locating/survey of services that cross swales
9.5	Contingency		20%		$220,633.26	Refer Note 12 below	5%		$ 68,833		Contingency reduced from 20% to 5% as part of preparing Revision B of the DCA report (R34.19), as instructed by the City, and is reflective the investigations and designs undertaken to date.
	Subtotal - Allowances and Charges									**$ 236,787**	
10	**Subtotal - entire width, approx 800m length**				**$1,508,028**				**$ 1,613,454**		
11	**TOTAL to Scheme (50%)**				**$754,014.17**				**$ 806,727**		
Notes							**Notes**				
1. This estimate is based on current project information and is preliminary only.							1. This estimate is based on the 85% design status drawings				
2. The estimates are provided as an order of magnitude of cost only and are subject to detailed design and agency approvals (Western Power, Water Corporation, etc.).							2. The design and estimates are subject toAuthority approvals.				
3. It is assumed that there is no requirement for imported fill.							3. It is assumed that ground conditions do not require improvement for the construction of road pavement. The pavement investigation report suggests the subgrade is suitable.				
4. It is assumed that ground conditions do not require improvement for the construction of road pavement.							4. The estimate does not include land acquisition costs.				
5. A geotechnical assessment of pavement condition has not been undertaken. It is assumed the existing pavement does not require improvement/upgrade.							5. As discussed with the City, no allowance has been made for street trees or landscaping.				
6. It is assumed that communications, gas and gas services are not required as per Portions A & B.							6. All costing exclude GST.				
7. The estimate does not include land acquisition costs.											
8. All costing exclude GST.											
9. No allowance for key of kerning (add $17 to linear rate)											
10. This item estimate is consistent with advice provided on the 24/7/17 to Jordan Koroveshi via email.											
11. The estimate is based on the length proposed under the Forrestfield North Residential Precinct (800m).											
12. A contingency of 20% has been applied. The added contingency recognises the unknown condition of the pavement, and the need for a geotechnical assessment of the pavement condition prior to the preparation of design drawings.											
Prepared by RN.							Prepared by Michael Cook of Porter Consulting Engineers				

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