

LENDLEASE

Jordan Springs East Stage 3B2

Road Safety Audit - Concept Design

SEPTEMBER 2017



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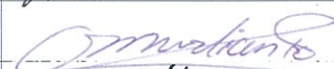

Jordan Springs East Stage 3B2 Road Safety Audit - Concept Design

Lendlease

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REV	DATE	DETAILS
	11/09/2017	Draft
A	13/09/2017	Final Report

	NAME	DATE	SIGNATURE
Prepared by:	Rebecca Temperley	13/09/2017	
Reviewed by:	Ody Murlianto	13/09/2017	
Approved by:	Ryan Miller	13/09/2017	

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1 SUMMARY

Audited project:	Jordan Springs East Stage 3B2 – Concept Design Road Safety Audit
Audited for:	Lendlease
Address:	Level 2, 88 Phillip Street Parramatta NSW 2150
Telephone:	02 9392 4588
Project manager:	Sean Porter Development Manager, NSW/ACT Communities sean.porter@lendlease.com
Auditors:	Rebecca Temperley, Ody Murlianto, Ryan Miller
Audit type:	Concept Design
Commencement meeting:	8 September 2017
Audit date:	8 September 2017
Completion meeting:	12 September 2017
Previous audit:	Yes

This Road Safety Audit has been commissioned by Lendlease and assessed the road design of Stage 3B2 in Jordan Springs East.

The audit identified two high risk and one low risk safety issues related to the road design.

The auditors also identified five issues for 'note only'. These issues were identified during the audit and are for the attention of the design team. There is no obligation to respond to these issues.

2 INTRODUCTION

2.1 AUDIT SCOPE

The purpose of this concept design audit is to identify potential road safety issues for road users based upon the road design associated with the development of Jordan Springs East Stage 3B2. The road design drawings have been prepared by Cardno for Lendlease.

2.2 PROPOSED DESIGN

Jordan Springs East is located within the Penrith City Council Local Government Area (LGA) and forms part of the St Marys development site. It is bounded by existing residential development in the suburbs of Werrington County and Werrington Downs to the south, land zoned for Regional Open Space to the east and land zoned for Regional Park to the north and west. There is also an area zoned for Drainage that adjoins the northern boundary of the precinct.

Jordan Springs East covers an area of approximately 133.1 hectares and is envisaged to accommodate approximately 1,400 dwellings across a total of 1,238 lots to accommodate a population of between 3,900 and 4,300. It is also envisaged to accommodate approximately 760 jobs in light industrial and light manufacturing sectors.

The delivery of the Jordan Springs East masterplan is staged. Under the Precinct Plan amendment (2016) currently under consideration by Council the total yield from Jordan Springs East will be 1,436 residential dwellings with approximately 38 hectares of employment land use. To date, approval has been granted for approximately 746 residential lots across Stages 1, 2 and 3A, with approval sought for an additional 195 residential lots across Stages 4A, 4B and 3B1.

Stage 3B2 proposes to consist of four super-lots and are located approximately in the centre of the precinct, where commercial/retail developments may be proposed. The location of these stages relative to the Jordan Springs East development site is presented in Figure 2.1.

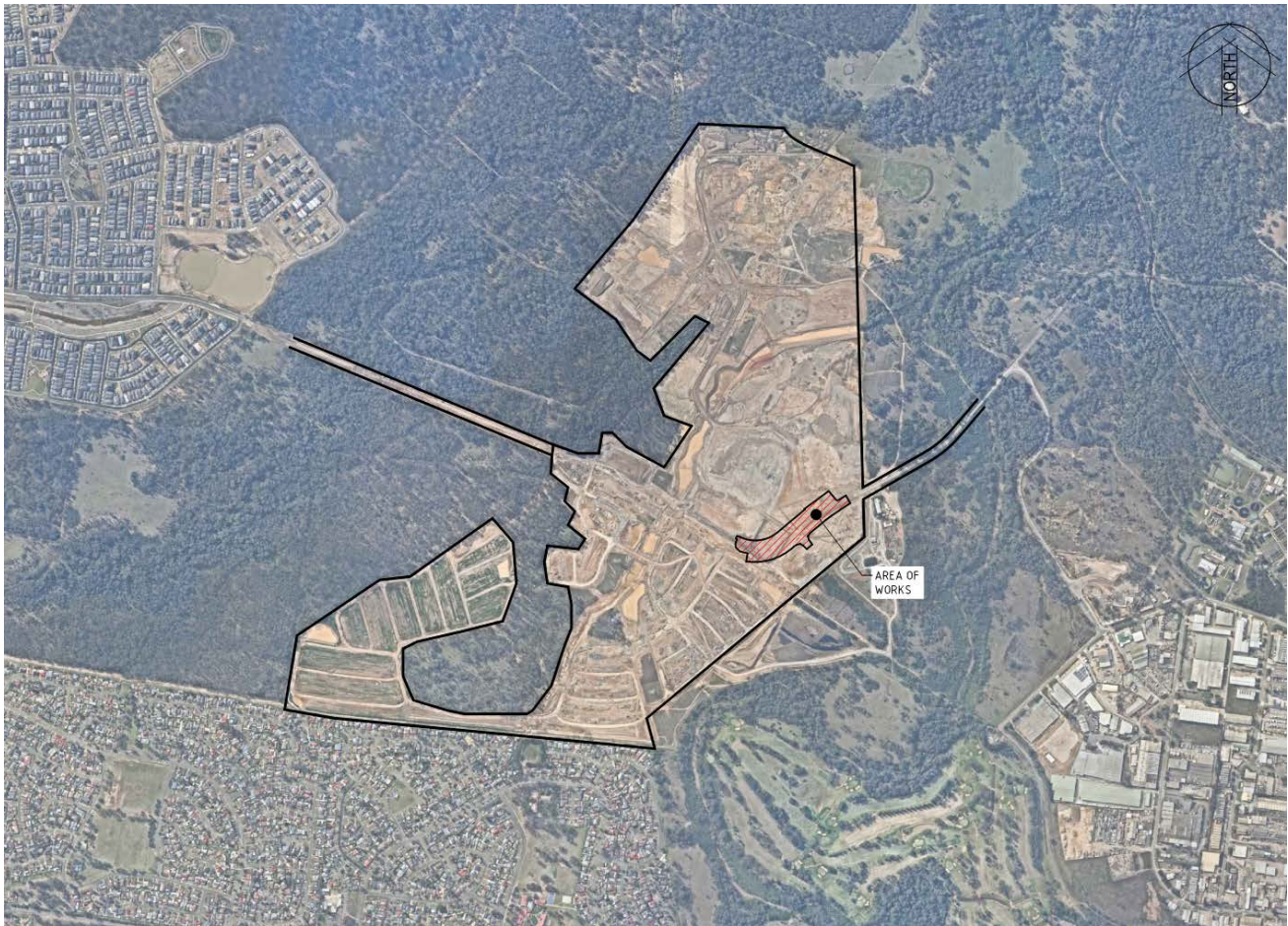


Figure 2.1 Location of Stage 3B2 in Jordan Springs East

2.3 AUDITED DOCUMENTATION

The following drawings prepared by Cardno was provided to the audit team:

Drawing number/Report name	Revision	Description
CV-CARDNO-ST03B2-1001	1 08-09-2017	COVER SHEET & DRAWING SCHEDULE
CV-CARDNO-ST03B2-1011	1 08-09-2017	GENERAL NOTES & LEGENDS
CV-CARDNO-ST03B2-1021	1 08-09-2017	CONTEXT PLAN
CV-CARDNO-ST03B2-1031	1 08-09-2017	GENERAL ARRANGEMENT PLAN
CV-CARDNO-ST03B2-1041	1 08-09-2017	DEVELOPMENT APPLICATION STAGING PLAN AND ROAD HIERARCHY PLAN
CV-CARDNO-ST03B2-1051	1	EXISTING SERVICES AND SURVEY PLAN

Drawing number/Report name	Revision	Description
	08-09-2017	
CV-CARDNO-ST03B2-1101	1 08-09-2017	EROSION AND SEDIMENTATION CONTROL PLAN
CV-CARDNO-ST03B2-1131	1 08-09-2017	EROSION AND SEDIMENTATION CONTROL DETAILS
CV-CARDNO-ST03B2-1251	1 08-09-2017	TYPICAL ROAD CROSS SECTIONS
CV-CARDNO-ST03B2-1301	1 08-09-2017	ROADS & STORMWATER PLAN
CV-CARDNO-ST03B2-1351	1 08-09-2017	ROAD LONGITUDINAL SECTIONS SHEET 1 ROAD 001
CV-CARDNO-ST03B2-1352	1 08-09-2017	ROAD LONGITUDINAL SECTIONS SHEET 2 ROAD 013 & 021
CV-CARDNO-ST03B2-1353	1 08-09-2017	ROAD LONGITUDINAL SECTIONS SHEET 3 ROAD 022 & 023
CV-CARDNO-ST03B2-1354	1 08-09-2017	ROAD LONGITUDINAL SECTIONS SHEET 4 LANE 001 & 002
CV-CARDNO-ST03B2-1601	1 08-09-2017	SITEWORKS DETAILS SHEET 1
CV-CARDNO-ST03B2-1602	1 08-09-2017	SITEWORKS DETAILS SHEET 2
CV-CARDNO-ST03B2-1701	1 08-09-2017	PAVEMENT, SIGNAGE & LINEMARKING PLAN
CV-CARDNO-ST03B2-2201	1 08-09-2017	STORMWATER DRAINAGE DETAILS SHEET 1
CV-CARDNO-ST03B2-2202	1 08-09-2017	STORMWATER DRAINAGE DETAILS SHEET 2
CV-CARDNO-ST03B2-2301	1 08-09-2017	INTERNAL STORMWATER CATCHMENT PLAN
CV-CARDNO-ST03B2-3001	1 08-09-2017	LANEWAY GARBAGE COLLECTION TURNING PATH

2.4 PROCEDURES AND REFERENCE MATERIAL

The procedures used are those described in the Austroads *Guide to Road Safety: Part 6 Road Safety Audit* (Third Edition, 2009). The concept design stage audit checklist guide was used by the audit team as a reference.

Other specific documents and manuals referred to during this audit were:

- Roads and Traffic Authority 1988, *Road Design Guide*
- Austroads 2009, *Guides to Road Design*
- Austroads 2009, *Guides to Road Traffic Management*
- Austroads 2009, *Guide to Road Safety Part 6: Road Safety Audits*
- Roads and Traffic Authority 2005, *NSW Bicycle Guidelines*
- Penrith City Council, *Design Guidelines for Engineering Works for Subdivisions and Developments*, November 2013
- Penrith City Council, *Engineering Construction Specification for Civil Works*, June 2016.

2.5 AUDIT TEAM

The audit team comprised the following members:

Ryan Miller, Level 3 lead road safety auditor

Rebecca Temperley, Level 2 road safety auditor

Ody Murlianto, Level 2 road safety auditor.

2.6 RESPONDING TO THE AUDIT

An audit provides an opportunity for an independent team to highlight potential road safety problems and have them formally considered by the project manager in conjunction with all other project considerations. The responsibility of responding to the findings of a road safety audit rests with the designer and/or the project manager, not with the auditor. The designer and/or project manager is under no obligation to accept the audit findings. It is also noted that it is not the role of the auditor to agree to, or approve the project manager's responses to the audit.

3 ROAD SAFETY AUDIT PROGRAM

3.1 COMMENCEMENT MEETING

A commencement meeting was held on Friday 8 September 2017. Ryan Miller led the meeting outlining the audit scope and providing a project background. Ody Murlianto and Rebecca Temperley also attended the meeting.

3.2 SITE INSPECTION

The audit team did not conduct a site visit as a part of the audit. The site is currently inaccessible with no site works undertaken.

3.3 COMPLETION MEETING

A formal completion meeting will be held on a date to be advised.

4 ROAD SAFETY AUDIT FINDINGS

4.1 THE RISK ASSESSMENT SYSTEM

Each hazard has been recorded and assessed in accordance with the Austroads *Guide to Road Safety: Part 6 Road Safety Audit* (Third Edition, 2009). The guide recommends a risk matrix be used to determine the level of risk associated with each hazard. This risk matrix is described below.

4.1.1 ESTIMATED CRASH FREQUENCY

The probable frequency of an incident occurring as a direct result of the hazard was determined using the criteria displayed in Table 4.1.

Table 4.1 Crash frequency

Frequency	Description
Frequent	Once or more per week
Probable	Once or more per year (but less than once a week)
Occasional	Once every 5 or 10 years
Improbable	Less often than once every 10 years

Source: Austroads

4.1.2 ESTIMATED CRASH SEVERITY

The likely severity of the incident which occurred as a direct result of hazard was determined using the criteria in Table 4.2

Table 4.2 Crash severity

Severity	Description	Examples
Catastrophic	Likely multiple deaths	High-speed, multi-vehicle crash on a freeway. Car runs into crowded bus stop. Bus and petrol tanker collide. Collapse of a bridge or tunnel.
Serious	Likely death or serious injury	High or medium-speed vehicle/vehicle collision. High or medium-speed collision with a fixed roadside object. Pedestrian or cyclist struck by a car.
Minor	Likely minor injury	Some low-speed vehicle collisions. Cyclist falls from bicycle at low speed. Left-turn rear-end crash in a slip lane.
Limited	Likely trivial injury or property damage only	Some low-speed vehicle collisions. Pedestrian walks into object (no head injury). Car reverses into post.

Source: Austroads

4.1.3 DEEMED LEVEL OF RISK

The risk matrix in Table 4.3 was used to assess the level of risk for each hazard. The risk matrix uses the Frequency and Severity determined above to determine the likely level of risk for each hazard.

Table 4.3 Level of risk

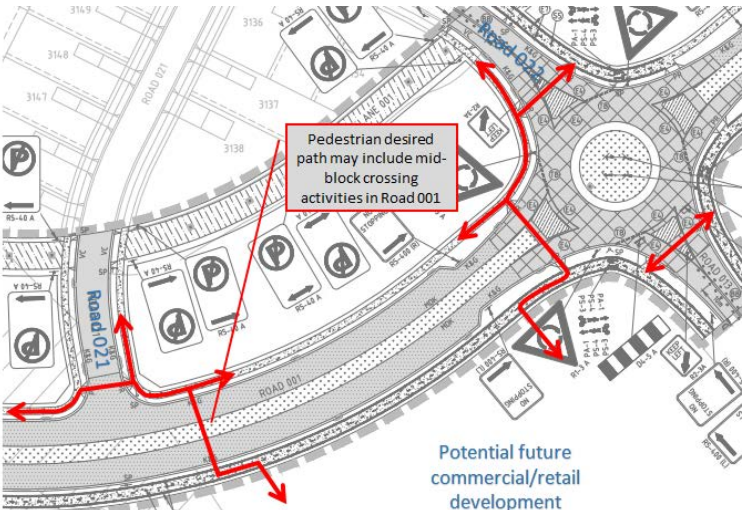
	Frequent	Probable	Occasional	Improbable
Catastrophic	Intolerable	Intolerable	Intolerable	High
Serious	Intolerable	Intolerable	High	Medium
Minor	Intolerable	High	Medium	Low
Limited	High	Medium	Low	Low

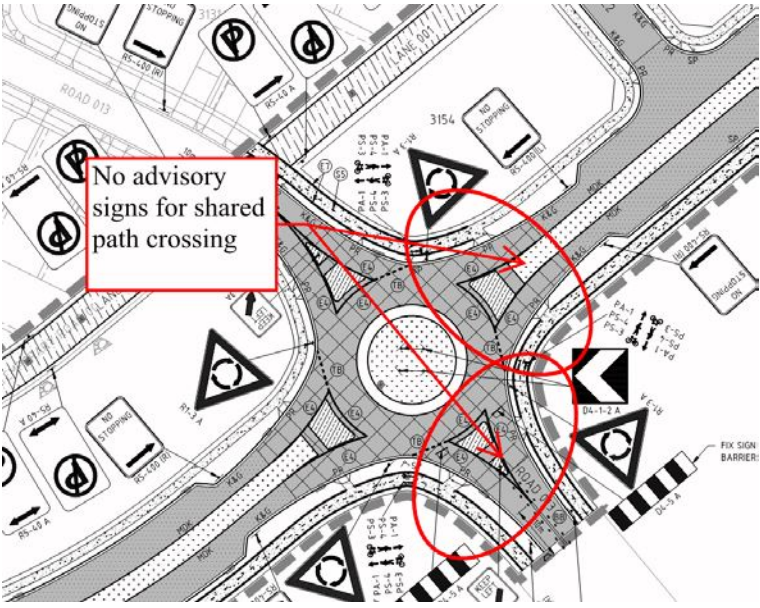
Source: Austroads

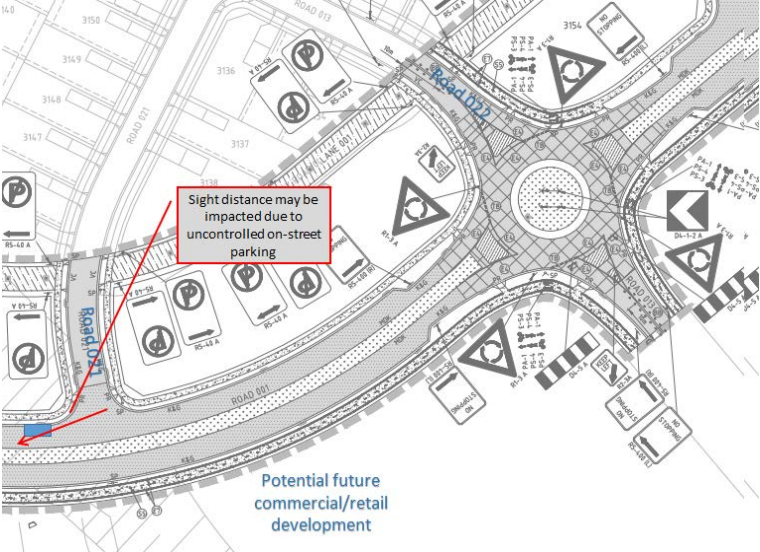
4.2 ROAD SAFETY AUDIT FINDINGS

The audit findings are documented in Table 4.4 provides specific details of each of the audit findings identified during the audit including a risk level rating for each of the audit findings. This road safety audit does not include recommended actions.

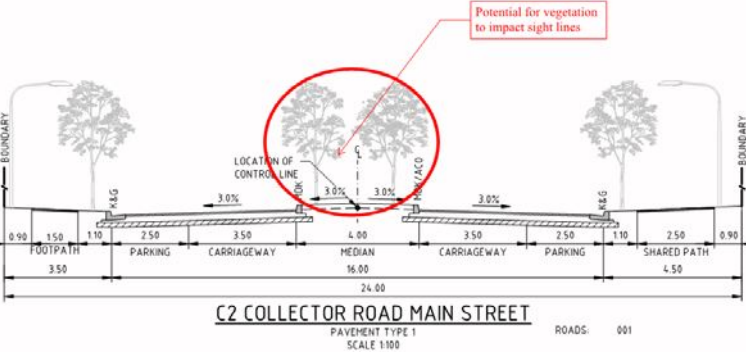
Table 4.4 Road safety audit findings

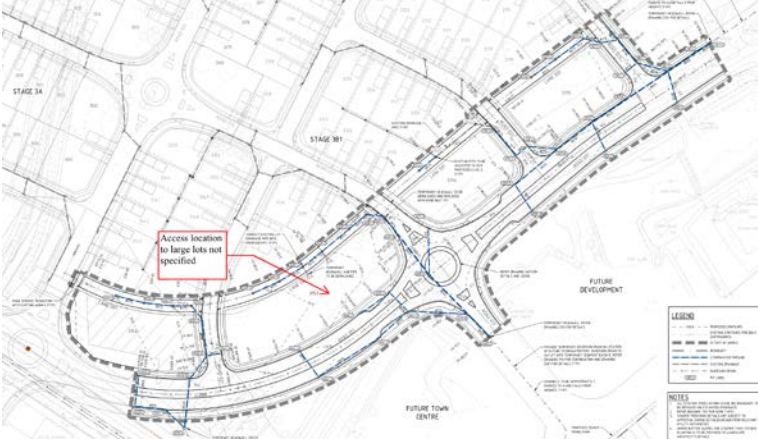
No	Drawings/Location/ Road safety category	Description of findings	Why this is a safety concern	Risk rating (severity/frequency)	Designer's response (12/09/2017)
1	CV-CARDNO-ST03B2-1701 Pedestrians	<p>A pedestrian desire walking line is likely to exist to and from the commercial/retail development proposed south-west of Road 001 and Road 013, which may include mid-block crossing activities in Road 001 between Road 021 and Road 022. No formalised pedestrian crossing facility has been proposed to manage the potential crossing activities mid-block in Road 001.</p> 	Increased likelihood of vehicle/pedestrian crash along Road 001 due to non-provision of formalised pedestrian crossing facility to service the pedestrian crossing demand generated by the proposed commercial/ retail development south-west of Road 001 and Road 013.	High (Serious/ Occasional)	<p><i>Pedestrian crossing points are located east and west of the site at the proposed roundabouts. It is expected that most pedestrians north of Road 001 will navigate to the retail development via Road 002 and Road 022 and utilise these crossings. Constructing a crossing at the midpoint of the two proposed roundabouts may be a hazard in itself as pedestrians may be hidden by the proposed landscaped median. We propose to maintain the current design unless instructed otherwise by council.</i></p>

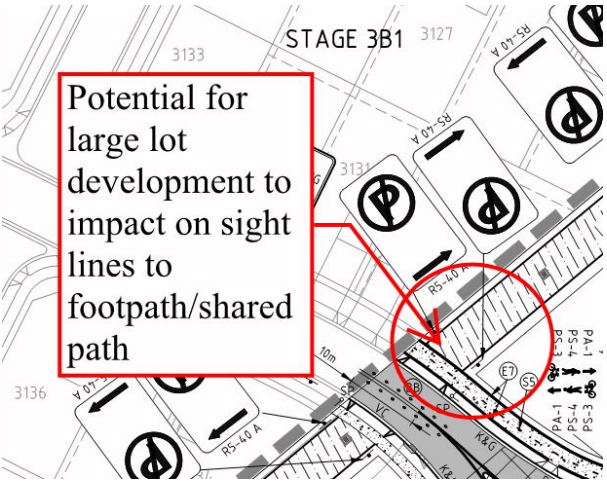
No	Drawings/Location/ Road safety category	Description of findings	Why this is a safety concern	Risk rating (severity/ frequency)	Designer's response (12/09/2017)
2	CV-CARDNO-ST03B2-1701 Pedestrians and Cyclists	<p>The shared path crosses the roundabout at the intersection of Road013 and Road001 on the south and west approach. There is no warning signage proposed for vehicles approaching the roundabout to watch for cyclists or for cyclists on the shared path to yield to/watch for vehicles.</p> 	Increase likelihood of a crash due to lack of awareness by motorists of bicycle crossing activities at the shared path, or if cyclists are unaware of the priority at the crossing.	High (Serious/ Occasional)	<p>Signage at the proposed roundabout is consistent with previously designed roundabouts in the estate and additional signage may overcomplicate and distract motorists.</p> <p>We propose to maintain the current design unless instructed otherwise by council.</p>

No	Drawings/Location/ Road safety category	Description of findings	Why this is a safety concern	Risk rating (severity/ frequency)	Designer's response (12/09/2017)
3	CV-CARDNO-ST03B2-1701 Parking	<p>There is an indented parking bay to allow for kerbside parking along Road 001 between Road 021 and Road 022. Moderate to high future parking demand is expected in the indented parking bay due to the commercial/retail land uses proposed within its immediate vicinity.</p> <p>There is a lack of on-street parking restriction proposed in Road 001 to ensure on-street parking compliance and ascertain adequate sight distance for vehicles exiting from Road 021 to Road 001.</p> 	If parking is close to an intersection driver sight lines will be impacted leading to an increased crash risk.	Low (Limited/ Occasional)	<i>No stopping signage will be incorporated to provide adequate sight distance</i>

No	Drawings/Location/ Road safety category	Description of findings	Why this is a safety concern	Risk rating (severity/ frequency)	Designer's response (12/09/2017)
NOTE 1	General Comment Pavement	Pavement design shown in the detailed design drawings indicate an assumed California Bearing Ratio (CBR) of 3% and 5%. Ensure confidence in CBR prior to construction as insufficient pavement thickness leads to pavement defects including potholes which may lead to an increased crash risk (for example swerving late to avoid defect).		Note only	
NOTE 2	Lighting	No lighting plan or assessment provided.	Adequate lighting particularly at any designated pedestrian crossing points and intersections has the potential to reduce crash risk.	Note only	


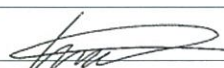
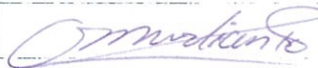
No	Drawings/Location/ Road safety category	Description of findings	Why this is a safety concern	Risk rating (severity/ frequency)	Designer's response (12/09/2017)
NOTE 3	Landscaping	<p>No landscape plan has been provided as a part of the road safety audited documentation. The collector road cross section indicates that plants are proposed in the central median along the collector road main street (i.e. Road 001).</p> 	If vegetation obstructs sight lines, there is an increased crash risk.	Note only	

No	Drawings/Location/ Road safety category	Description of findings	Why this is a safety concern	Risk rating (severity/ frequency)	Designer's response (12/09/2017)
NOTE 4	Access to lots	<p>Access to the proposed super-lots (3152, 3153, 3154, 3155) has not been clarified in the audited documentation. Increased conflict between road users can be expected if access to the super-lots are proposed from the collector road, where the traffic volumes are expected to be higher than the side roads.</p> 	Turning manoeuvres from access driveways directly into/out of the collector road, instead of the rear laneway, increases the likelihood of the crash risk.	Note only	<i>The lots in question will be rear loaded and access will be via the laneways</i>

No	Drawings/Location/ Road safety category	Description of findings	Why this is a safety concern	Risk rating (severity/ frequency)	Designer's response (12/09/2017)
NOTE 5		<p>The boundary lines of the super-lots appear to not be splayed at the laneways' intersections with the respective side streets.</p> <p>The proposed building line is not detailed in the drawing at this stage, however should the building be built on the proposed boundary line, there is a potential that pedestrian sight lines to not be provided to the footpath or shared path.</p> 	Impeded sight lines do not allow sufficient time for drivers to react leading to an increased crash risk.	Note only	

5 FORMAL STATEMENT

The findings and opinions in the report are based on the examination of the concept design drawings as well as the specific road and environs, and might not address all concerns existing at the time of the audit. The Auditors have endeavoured to identify features of the design and/or the road that could be modified or removed in order to improve safety. It should be noted that although every effort has been made to identify potential safety hazards, no guarantee can be made that every deficiency has been identified. It must also be recognised that safety cannot be guaranteed since no road can be regarded as absolutely safe. While every effort has been made to ensure the accuracy of this report, it is made available strictly on the basis that anyone relying on it does so at their own risk without any liability to the Auditors.

 Ryan Miller Level 3 Lead Road Safety Auditor Identification number: RSA-02-0223 Signature date: 11/09/2017	 Rebecca Temperley Level 2 Road Safety Auditor Identification number: RSA-02-1068 Signature date: 11/09/2017
 Ody Murlianto Level 2 Road Safety Auditor Identification number: RSA-02-0910 Signature date: 11/09/2017	

APPENDIX A

AUDITED DOCUMENTS





LENDLEASE
JORDAN SPRINGS EAST
STAGE 3B2 - CIVIL WORKS
DRAFT DEVELOPMENT APPLICATION



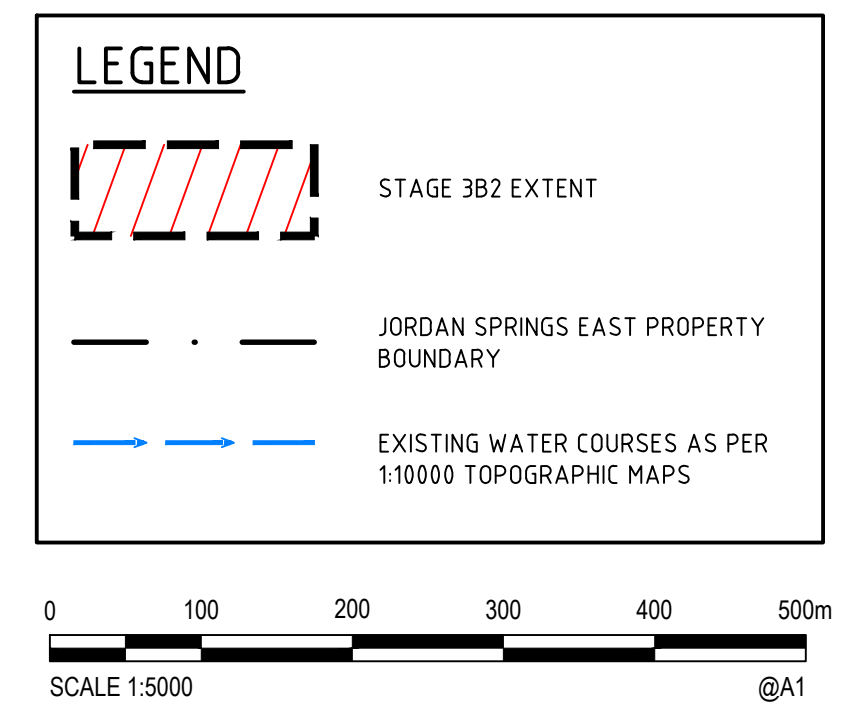
SCHEDULE OF DRAWINGS

DRAWING No.	DESCRIPTION
CV-CARDNO-ST03B2-1001	COVER SHEET & DRAWING SCHEDULE
CV-CARDNO-ST03B2-1011	GENERAL NOTES & LEGENDS
CV-CARDNO-ST03B2-1021	CONTEXT PLAN
CV-CARDNO-ST03B2-1031	GENERAL ARRANGEMENT PLAN
CV-CARDNO-ST03B2-1041	DEVELOPMENT APPLICATION STAGING PLAN AND ROAD HIERARCHY PLAN
CV-CARDNO-ST03B2-1051	EXISTING SERVICES AND SURVEY PLAN
CV-CARDNO-ST03B2-1101	EROSION AND SEDIMENTATION CONTROL PLAN
CV-CARDNO-ST03B2-1131	EROSION AND SEDIMENTATION CONTROL DETAILS
CV-CARDNO-ST03B2-1251	TYPICAL ROAD CROSS SECTIONS
CV-CARDNO-ST03B2-1301	ROADS & STORMWATER PLAN
CV-CARDNO-ST03B2-1351	ROAD LONGITUDINAL SECTIONS SHEET 1 ROAD 001
CV-CARDNO-ST03B2-1352	ROAD LONGITUDINAL SECTIONS SHEET 2 ROAD 013 & 021
CV-CARDNO-ST03B2-1353	ROAD LONGITUDINAL SECTIONS SHEET 3 ROAD 022 & 023
CV-CARDNO-ST03B2-1354	ROAD LONGITUDINAL SECTIONS SHEET 4 LANE 001 & 002
CV-CARDNO-ST03B2-1601	SITWORKS DETAILS SHEET 1
CV-CARDNO-ST03B2-1602	SITWORKS DETAILS SHEET 2
CV-CARDNO-ST03B2-1701	PAVEMENT, SIGNAGE & LINEMARKING PLAN
CV-CARDNO-ST03B2-2201	STORMWATER DRAINAGE DETAILS SHEET 1
CV-CARDNO-ST03B2-2202	STORMWATER DRAINAGE DETAILS SHEET 2
CV-CARDNO-ST03B2-2301	INTERNAL STORMWATER CATCHMENT PLAN
CV-CARDNO-ST03B2-3001	LANEWAY GARBAGE COLLECTION TURNING PATH

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Checked DAC	Date 08.09.17				
Designed B/JD	Date 08.09.17				
Verified	Date				
Approved		Datum AHD		Scale	Size A1
Drawing Number		Revision			
APM 08.09.17		CV-CARDNO-ST03B2-1001			1



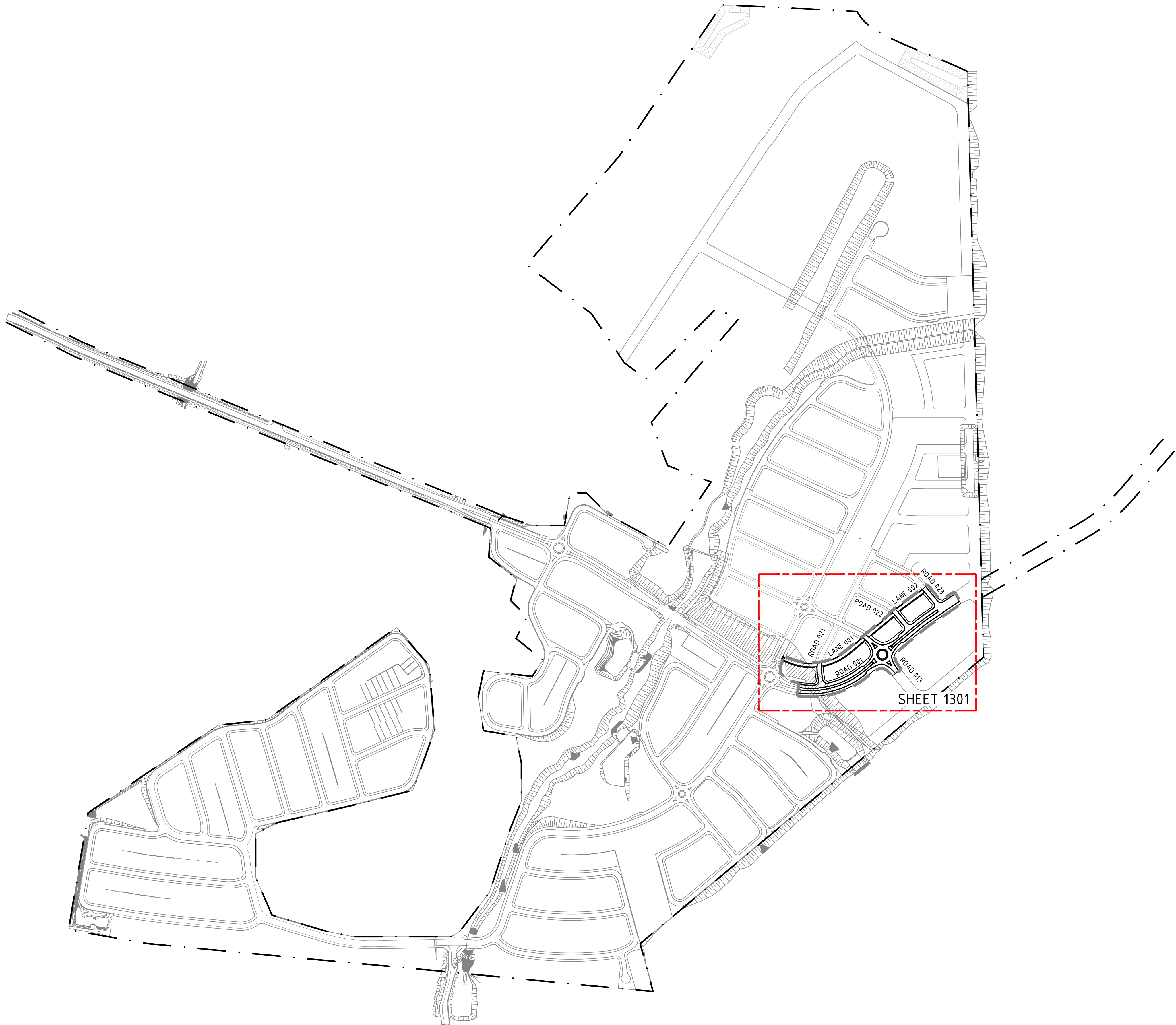
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Drawn MCD	Date 08.09.17	Client LENLEASE			
Checked DAC	Date 08.09.17	Project JORDAN SPRINGS EAST	Status FOR INFORMATION ONLY		
Designed SJD	Date 08.09.17	STAGE 3B2 - CIVIL WORKS	NOT TO BE USED FOR CONSTRUCTION PURPOSES		
Verified	Date	DRAFT DEVELOPMENT APPLICATION	Datum AHD	Scale 1:5000	Size A1
Approved		Title CONTEXT PLAN	Drawing Number CV-CARDNO-ST03B2-1021		Revision 1
ARM	08.09.17				



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Client	LENDEASE
Project	JORDAN SPRINGS EAST STAGE 3B2 - CIVIL WORKS DRAFT DEVELOPMENT APPLICATION
Title	GENERAL ARRANGEMENT PLAN

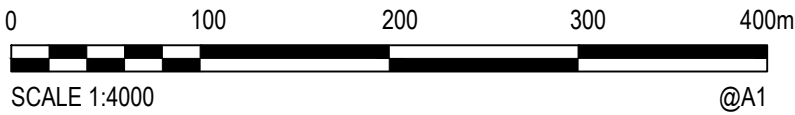
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NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Date		Scale	Size
AHD		1:4000	A1
Drawing Number			Revision
CV-CARDNO-ST03B2-1031			1



NOTES:

1. BASED ON INFORMATION PROVIDED BY LENDLEASE (11/05/17).
2. EXTENT OF FUTURE STAGES SUBJECT TO REFINEMENT.
3. ROAD AND LOT LAYOUTS OUTSIDE OF PROPOSED STAGING BOUNDARIES ARE BASED ON A PRELIMINARY MASTERPLAN PREPARED BY LENDLEASE AND IS SUBJECT TO FUTURE REFINEMENT.

LEGEND	
	STAGE BOUNDARY
	PROPOSED LOTS
	A2 ACCESSWAY
	BRIDGE
	B1 BUS LINK
	C3 COLLECTOR ROAD MAIN STREET
	C5 COLLECTOR ROAD VILLAGE CENTRE
	E1 EMPLOYMENT STREET
	JORDANS CONNECTOR ROAD REFER DRAWING SET 89914020-JC01 FOR TYPICAL CROSS SECTIONS.
	L1 MINOR LOCAL STREET
	L2 PEDESTRIAN PRIORITY
	L3 LOCAL STREET POSSIBLE BUS ROUTE
	P1 PARK EDGE ROAD
	P2 PARK EDGE ROAD POSSIBLE BUS LINK
	TEMPORARY ROAD



Rev.	Date	Description	Des.	Verif.	Appd.
1	08.09.17	DRAFT - ISSUED FOR INFORMATION	BJD	ARM	

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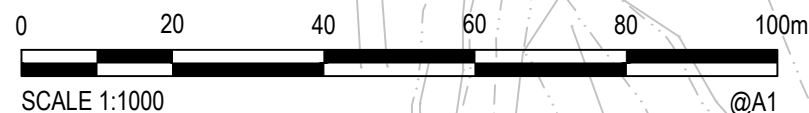
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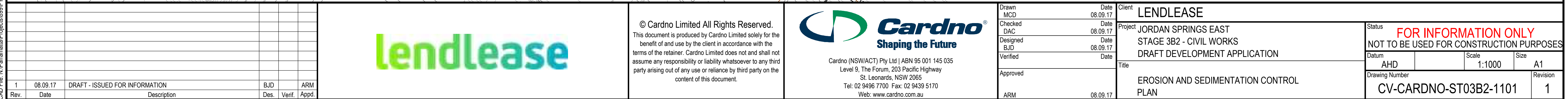
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Checked	DAC	Date	08.09.17
Designed	BJD	Date	08.09.17
Verified		Date	
Approved	ARM	Date	08.09.17

Client	LENDLEASE
Project	JORDAN SPRINGS EAST STAGE 3B2 - CIVIL WORKS DRAFT DEVELOPMENT APPLICATION
Title	DEVELOPMENT APPLICATION STAGING PLAN AND ROAD HIERARCHY PLAN

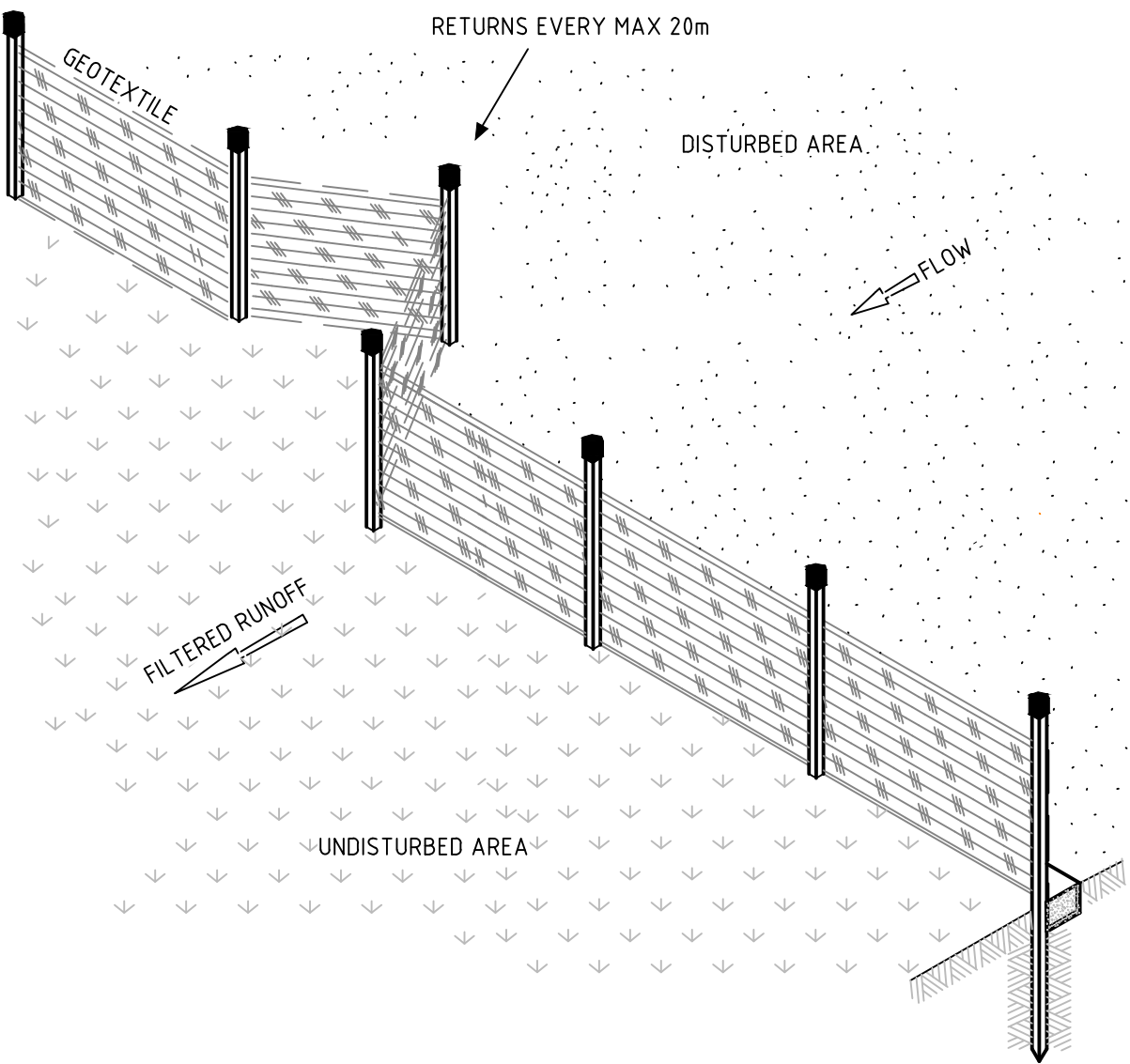
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Drawing Number	CV-CARDNO-ST03B2-1041	Size	A1
Revision	1		



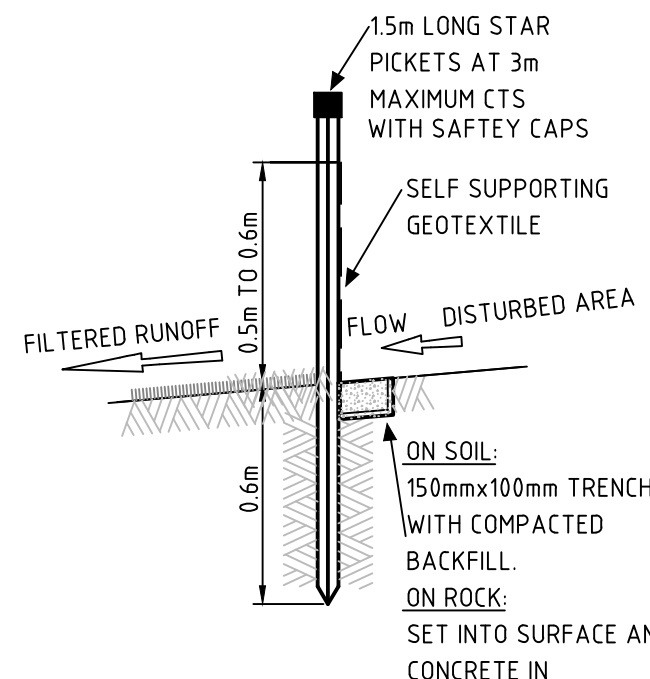
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NOT TO BE USED FOR CONSTRUCTION PURPOSES							
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Drawing Number						Revision	
CV-CARDNO-ST03B2-1051						1	



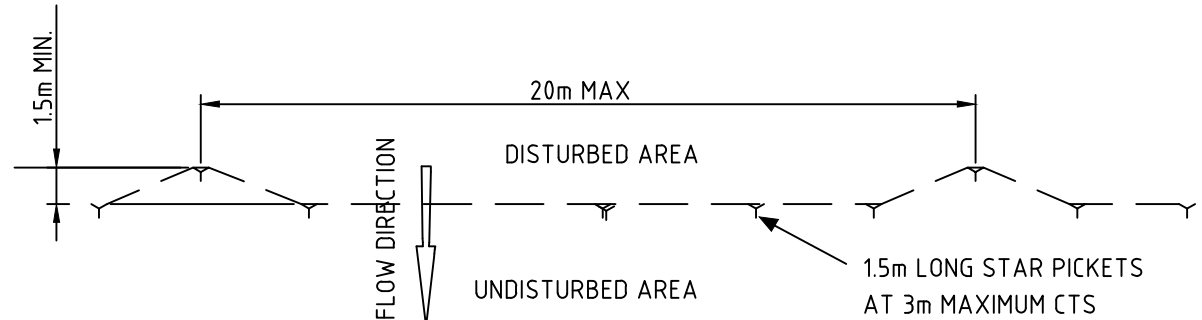
DATE PLOTTED: 8 September 2017 9:44 AM BY: BRITTANY DEBONO



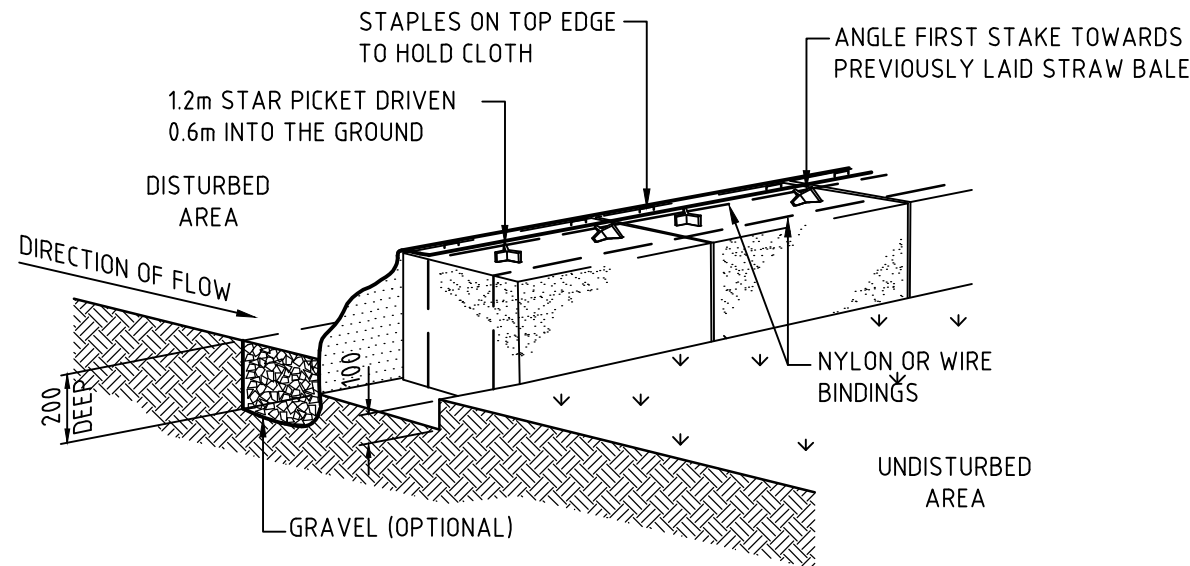
SILT FENCE
NOT TO SCALE



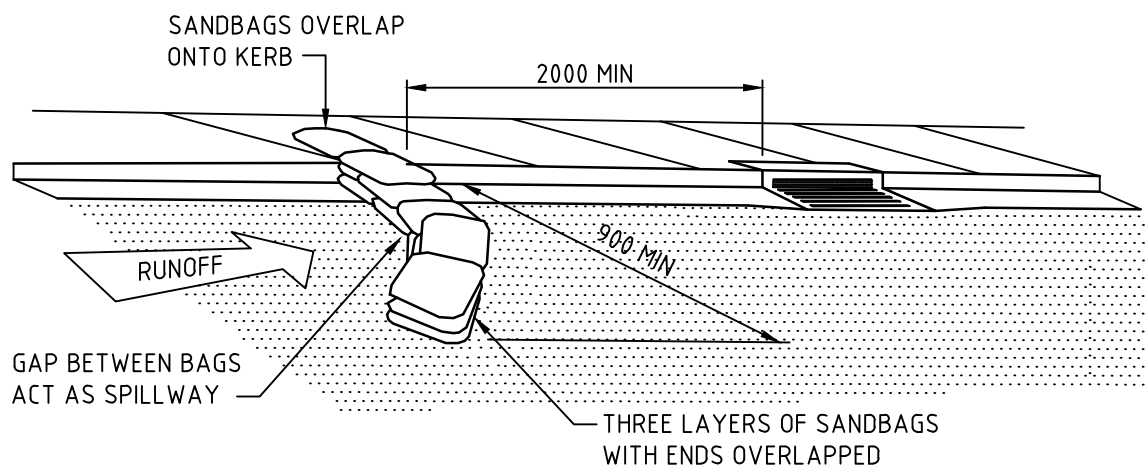
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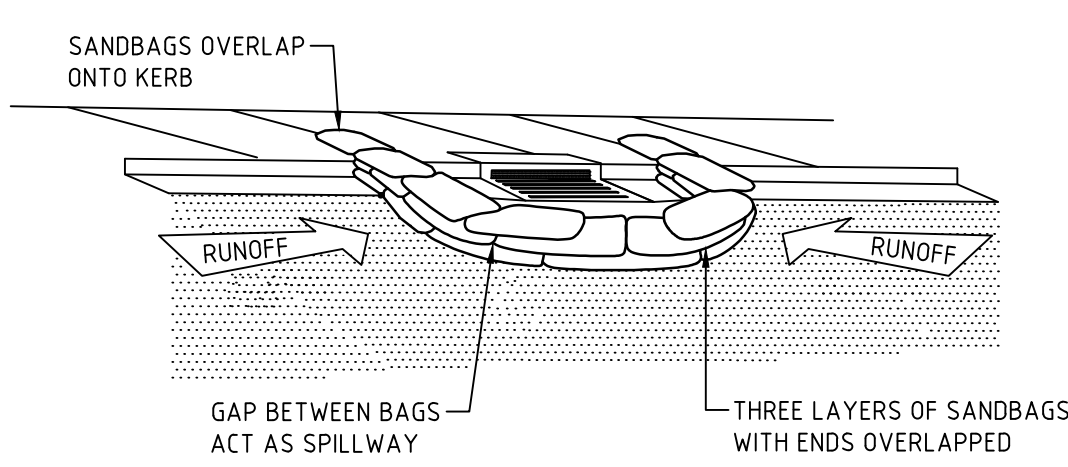
SILT FENCE PLAN
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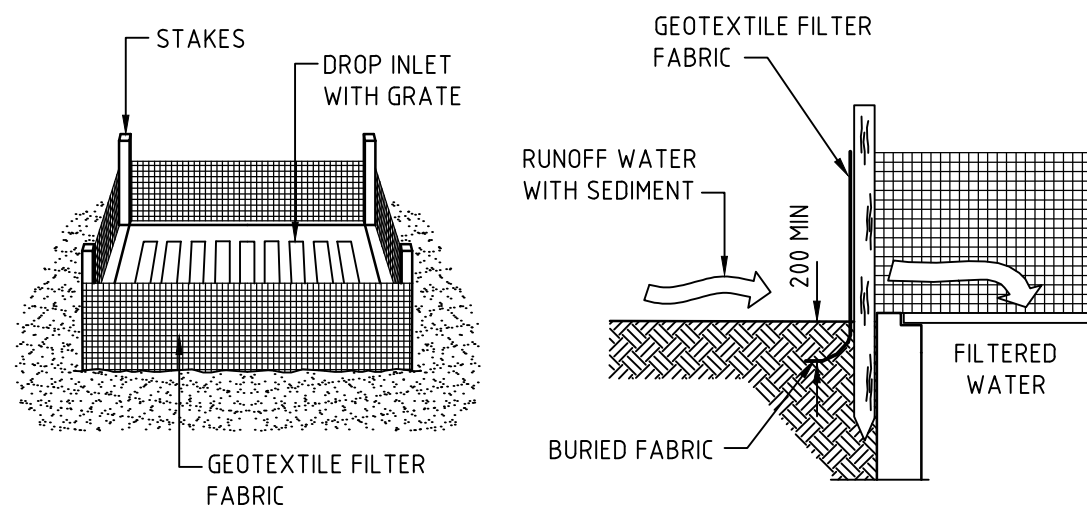
**SEDIMENT FENCE
(GEOTEXTILE FILTER FABRIC & STRAW BALE)**
NOT TO SCALE



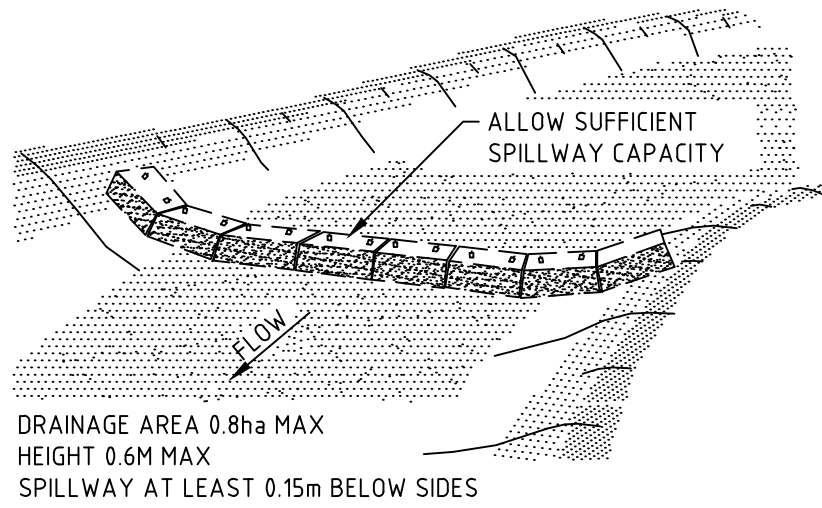
**SEDIMENT TRAP FOR KERB INLET
(ON GRADE - SANDBAG)**
NOT TO SCALE



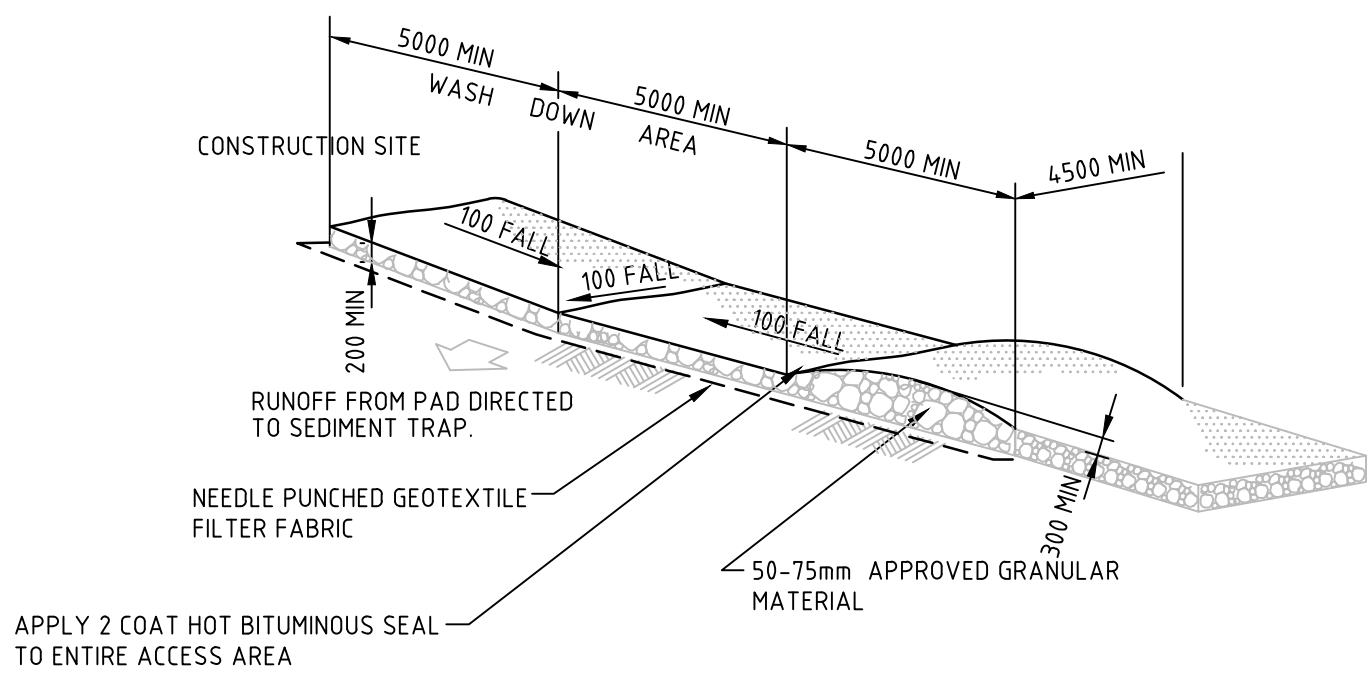
**SEDIMENT TRAP FOR KERB INLET
(AT LOW POINT - SANDBAG)**
NOT TO SCALE



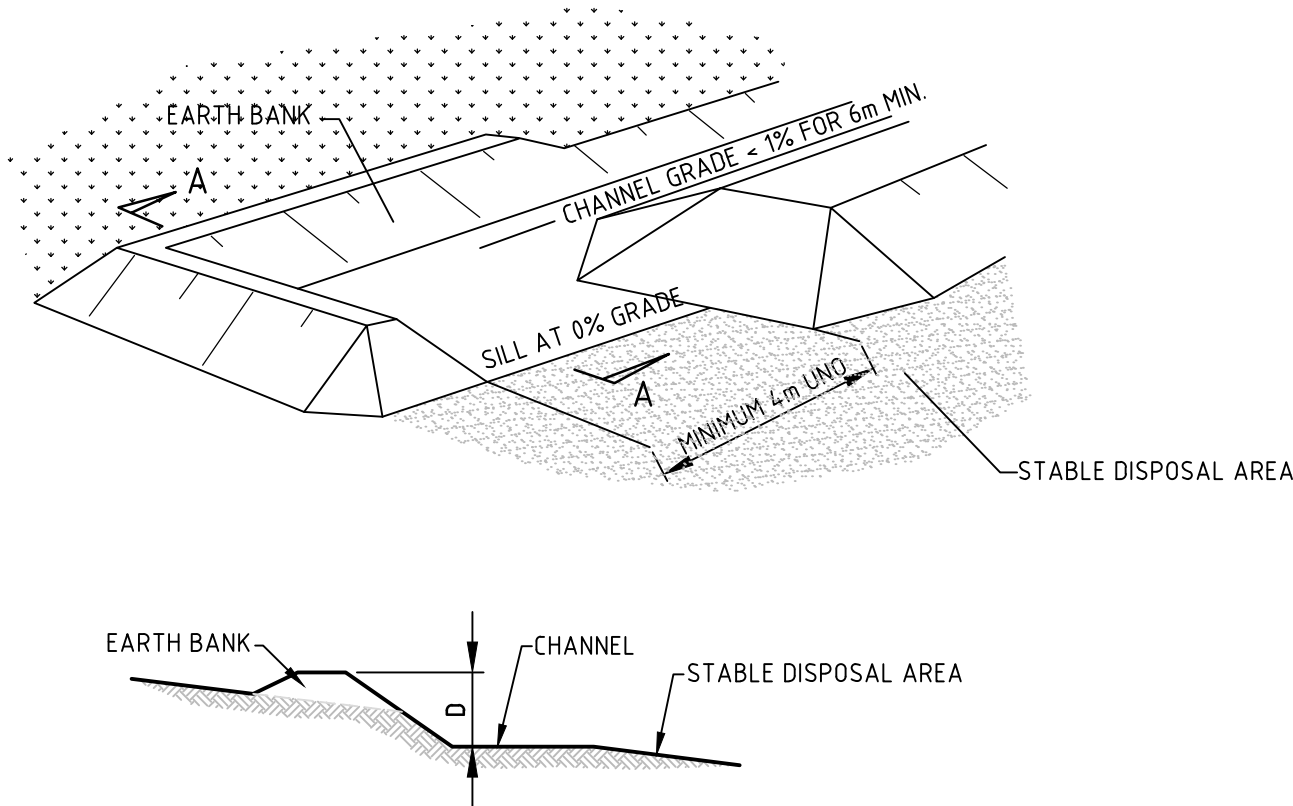
**SEDIMENT TRAP FOR DROP INLET
(GEOTEXTILE FILTER FABRIC)**
NOT TO SCALE



CHECK DAM - STRAW BALE
NOT TO SCALE



STABILISED SITE ENTRY/EXIT WITH WHEEL WASH
NOT TO SCALE



LEVEL SPREADER DETAIL
NOT TO SCALE

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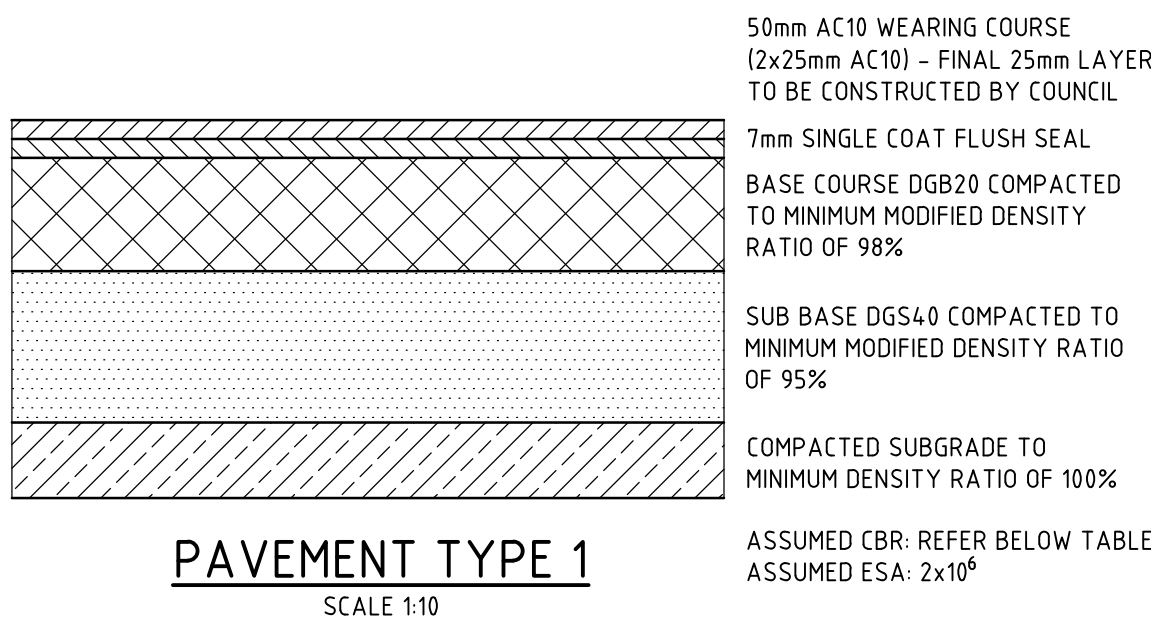
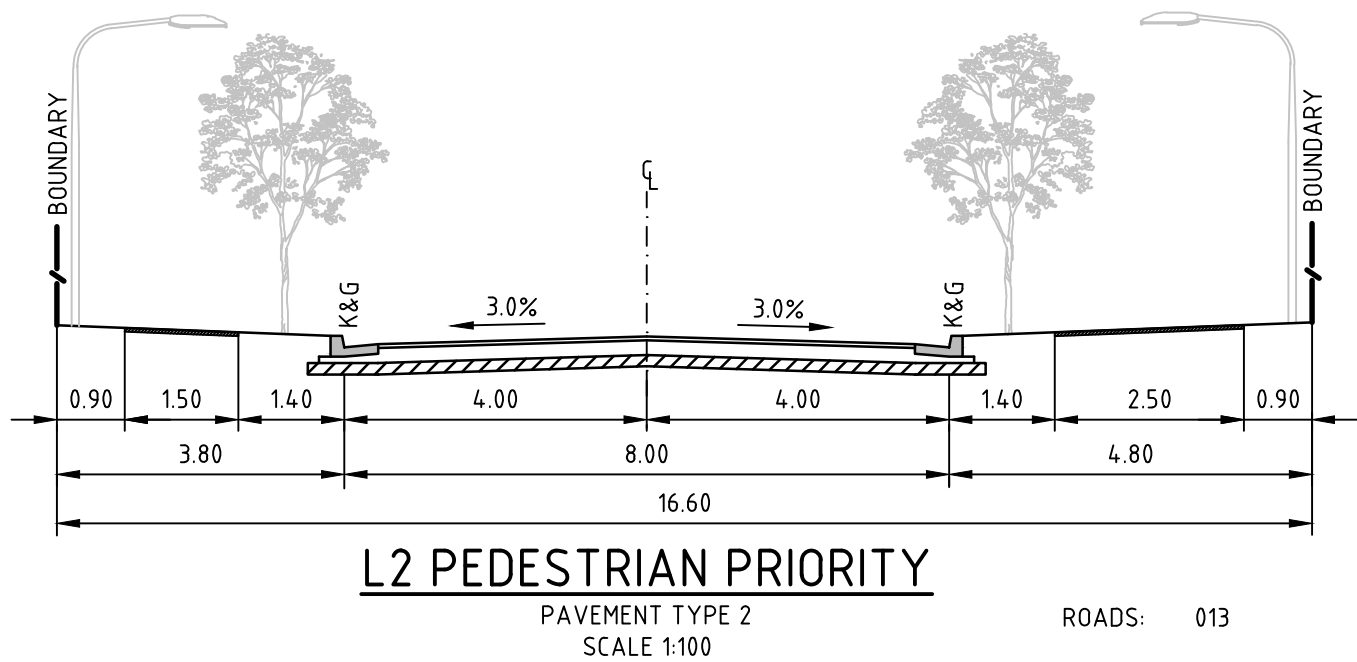
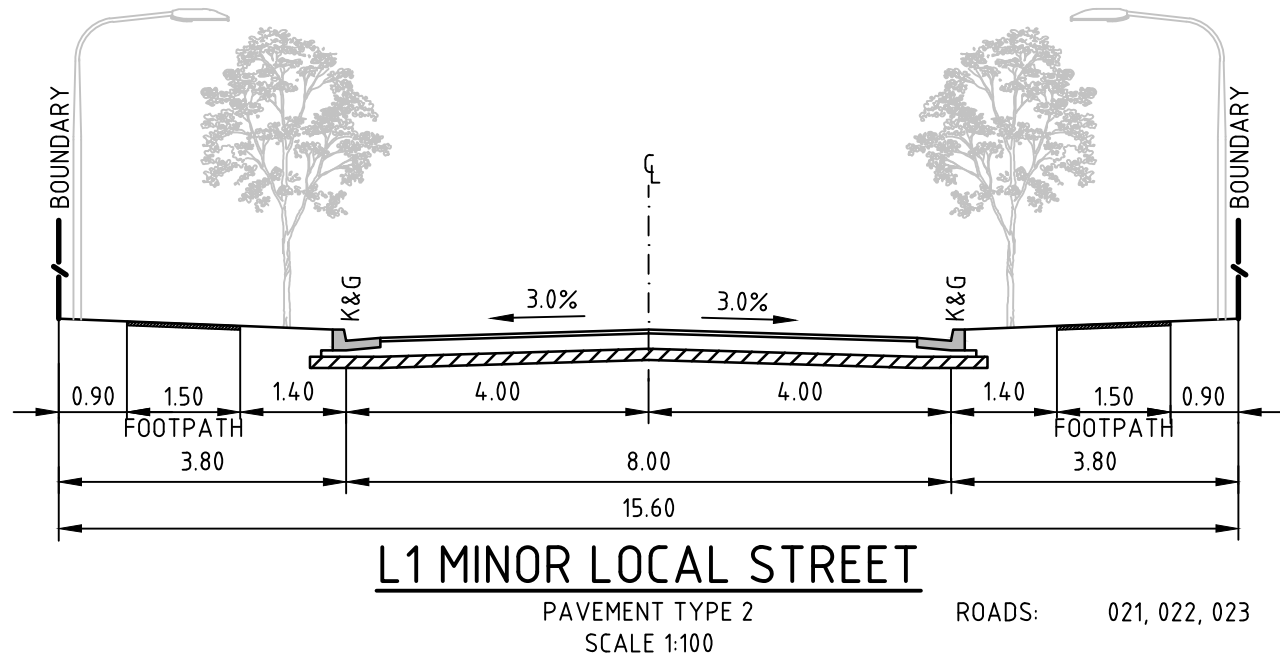
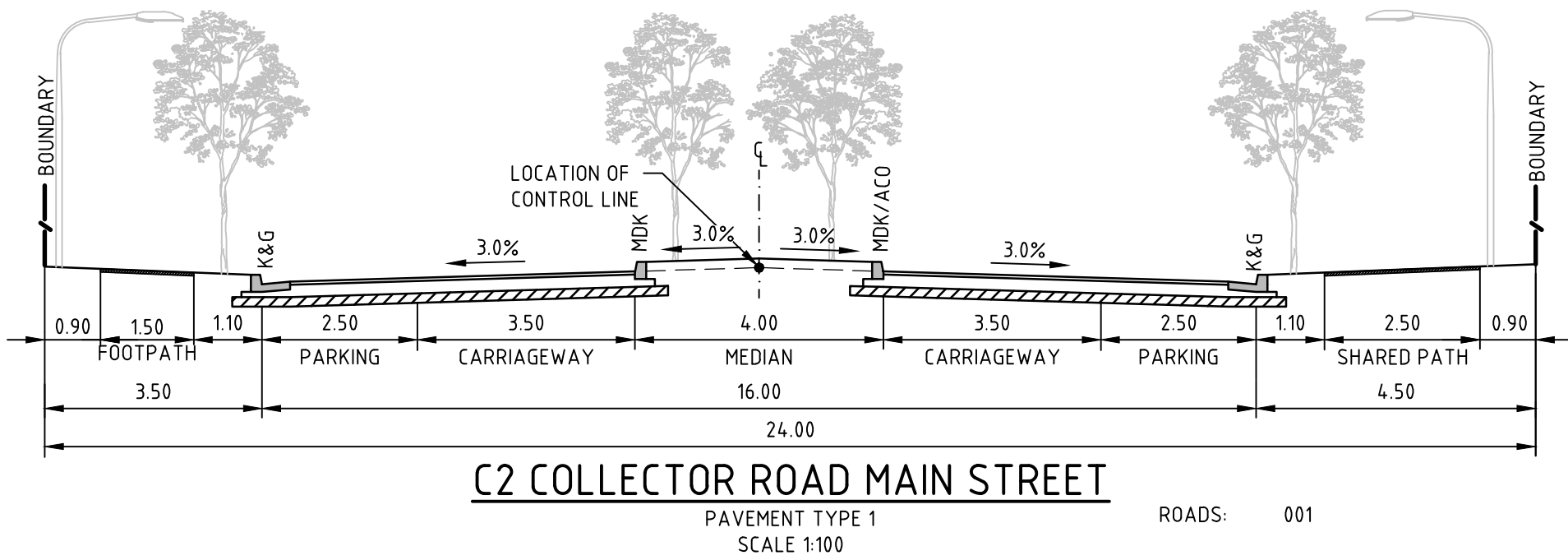
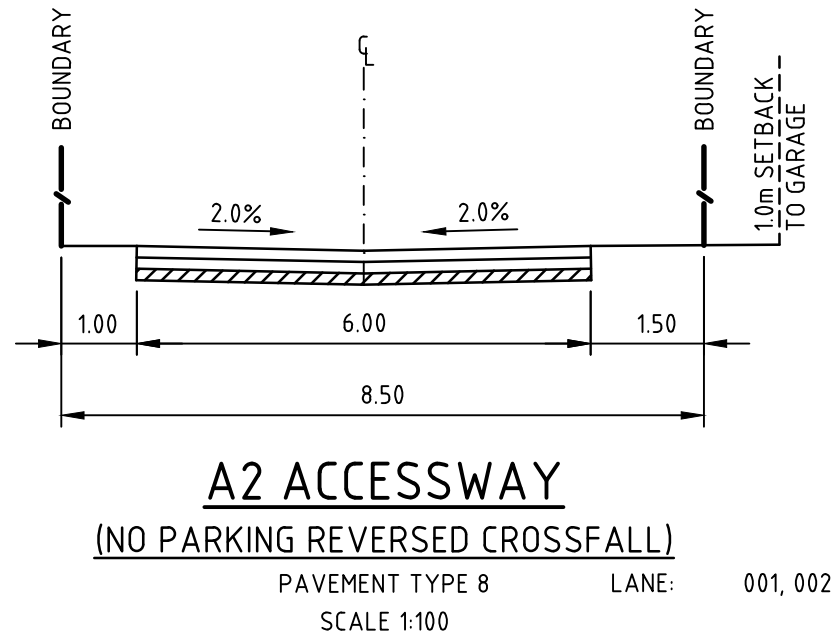
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Drawn MCD Date 08.09.17
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Verified Date
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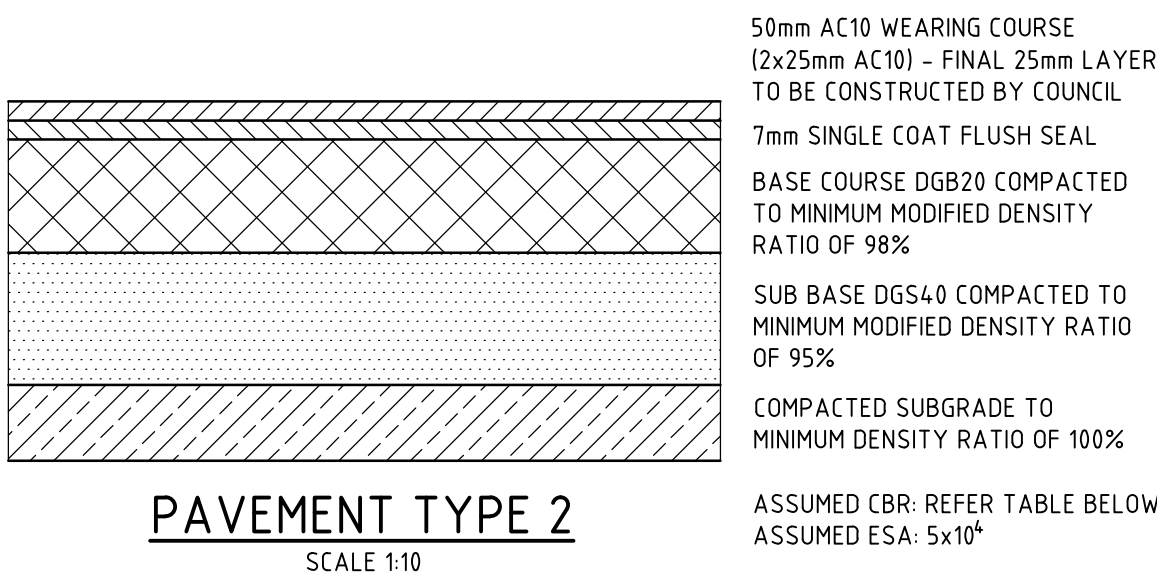
Client **LENLEASE**
Project **JORDAN SPRINGS EAST
STAGE 3B2 - CIVIL WORKS
DRAFT DEVELOPMENT APPLICATION**
Title **EROSION AND SEDIMENTATION CONTROL
DETAILS**

Status **FOR INFORMATION ONLY**
NOT TO BE USED FOR CONSTRUCTION PURPOSES
Datum **AHD** Scale **AS SHOWN** Size **A1**
Drawing Number **CV-CARDNO-ST03B2-1131** Revision **1**

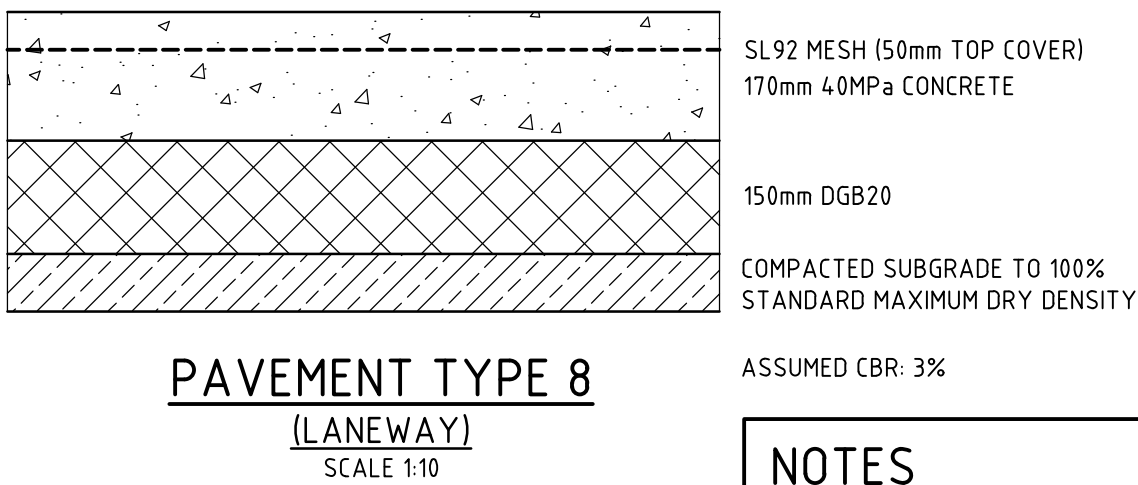
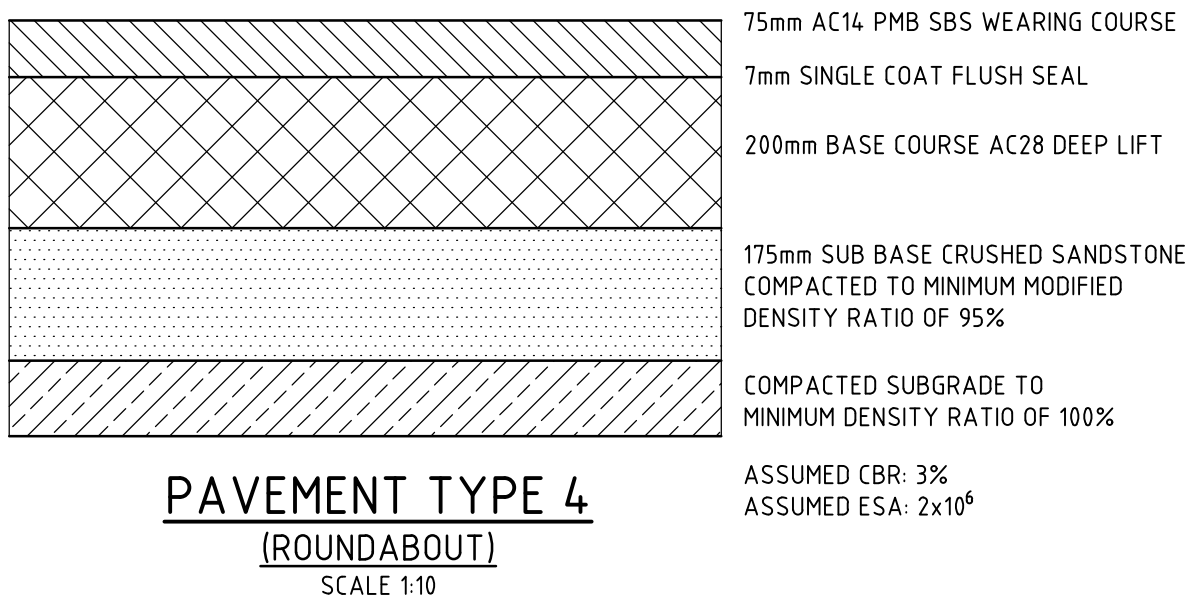
Rev.	Date	Description	Des.	Verif.	Appd.
1	08.09.17	DRAFT - ISSUED FOR INFORMATION	BJD	ARM	



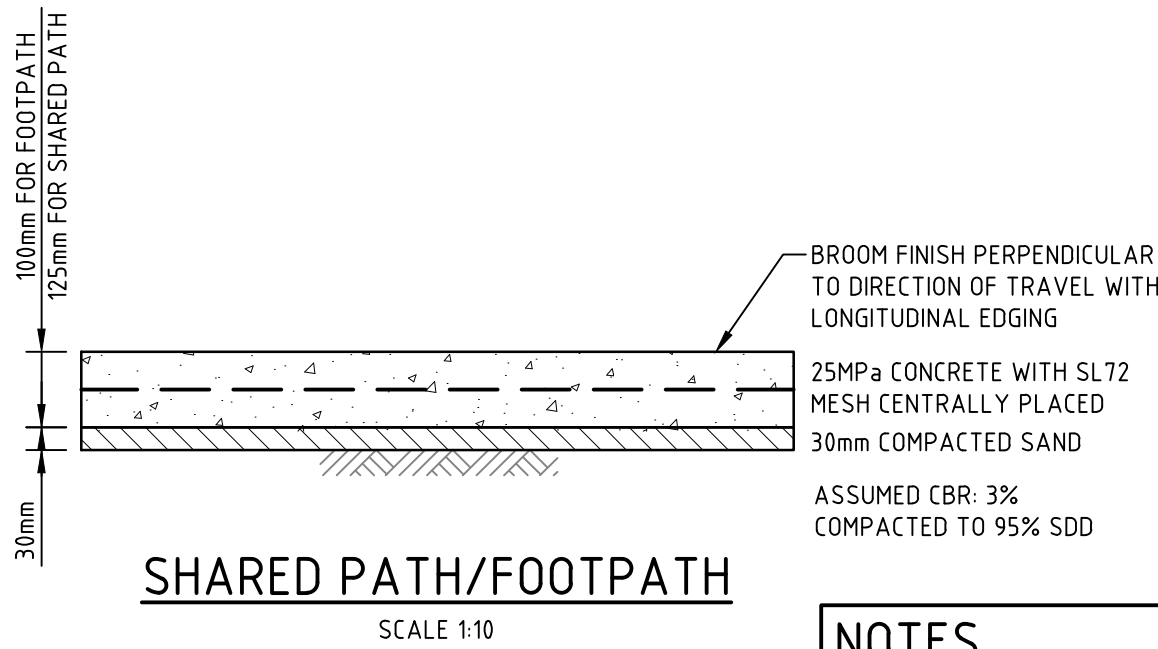
PAVEMENT 1 DESIGN		
DESIGN SUBGRADE	CBR 3%	CBR 5%
WEARING SURFACE	50mm AC10	50mm AC10
SINGLE COAT FLUSH SEAL	7mm	7mm
BASECOURSE	150mm	150mm
SUBBASE	410mm	290mm
TOTAL THICKNESS	610mm	490mm



PAVEMENT 2 DESIGN		
DESIGN SUBGRADE	CBR 3%	CBR 5%
WEARING SURFACE	50mm AC10	50mm AC10
SINGLE COAT FLUSH SEAL	7mm	7mm
BASECOURSE	150mm	150mm
SUBBASE	275mm	175mm
TOTAL THICKNESS	475mm	375mm

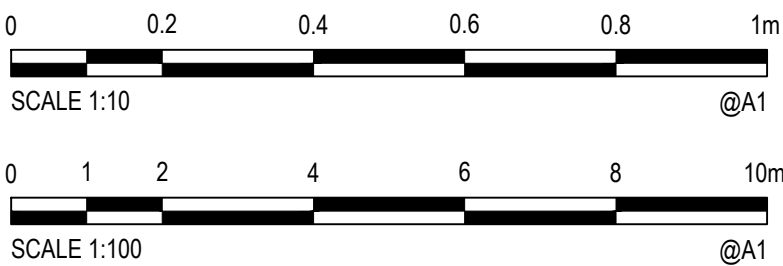


- NOTES**
- SAWCUT PATH OR TROWELLED DUMMY JOINT AT 4m SPACING.
 - EVERY THIRD JOINT TO BE FULL DEPTH DOWELLED EXPANSION JOINT.
 - REFER DRAWING 1601 FOR JOINT DETAILS.



- NOTES**
- SAWCUT PATH OR TROWELLED DUMMY JOINT AT 2m SPACING.
 - EVERY THIRD JOINT TO BE FULL DEPTH DOWELLED EXPANSION JOINT.
 - REFER DRAWING 1601 FOR JOINT DETAILS.

- NOTES**
- STREET SCAPES SHOWN ARE INDICATIVE ONLY AND SUBJECT TO DETAILED LANDSCAPING DESIGN AND APPROVAL.
 - FOOTPATHS TO BE GRADED AT MAXIMUM 2.5%. REMAINING VERGE AREAS TO BE GRADED TO ACHIEVE OVERALL 4.0% GRADE FROM TOP OF KERB TO ROAD RESERVE BOUNDARY.
 - CONSTRUCTION OF FOOTPATH AND SHARED PATH TO BE DEFERRED UNTIL DIRECTED BY THE SITE SUPERINTENDENT.
 - REFER DRAWING 1701 FOR PAVEMENT PLAN.



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Verified: ARM
Approved: ARM
Date: 08.09.17
Date: 08.09.17
Date: 08.09.17
Date: 08.09.17

Client: LENDLEASE
Project: JORDAN SPRINGS EAST
STAGE 3B2 - CIVIL WORKS
DRAFT DEVELOPMENT APPLICATION
Title: TYPICAL ROAD CROSS SECTIONS

Status: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
Datum: AHD
Scale: AS SHOWN
Size: A1
Drawing Number: CV-CARDNO-ST03B2-1251
Revision: 1

Rev.	Date	Description	Des.	Verif.	Appd.
1	08.09.17	DRAFT - ISSUED FOR INFORMATION	BJD	ARM	

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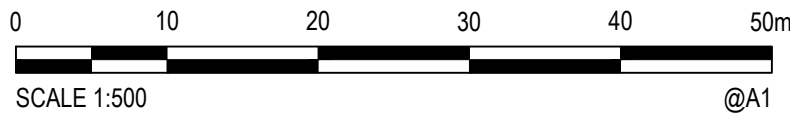
Client	LENDELEASE
Project	JORDAN SPRINGS EAST STAGE 3B2 - CIVIL WORKS DRAFT DEVELOPMENT APPLICATION
Title	ROADS & STORMWATER PLAN

Status				FOR INFORMATION ONLY			
NOT TO BE USED FOR CONSTRUCTION PURPOSES							
Datum				Scale		Size	
AHD				1:500		A1	
Drawing Number						Revision	
CV-CARDNO-ST03B2-1301						1	

Status FOR INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum AHD		Scale AS SHOWN	Size A1
Drawing Number CV-CARDNO-ST03B2-1351			Revision 1

Drawn MCD	Date 08.09.17	Client	LENLEASE		
Checked DAC	Date 08.09.17	Project	JORDAN SPRINGS EAST STAGE 3B2 - CIVIL WORKS DRAFT DEVELOPMENT APPLICATION	Status	FOR INFORMATION ONLY
Designed BJD	Date 08.09.17			NOT TO BE USED FOR CONSTRUCTION PURPOSES	
Verified	Date				
Approved		Title	ROAD LONGITUDINAL SECTIONS SHEET 2 ROAD 013 & 021	AHD Scale AS SHOWN	A1 Size
ARM	08.09.17			Drawing Number CV-CARDNO-ST03B2-1352	Revision 1

Status FOR INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum		Scale	Size
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Drawing Number			Revision
CV-CARDNO-ST03B2-1353			1



Drawn	Date
MCD	08.09.17
Checked	Date
DAC	08.09.17
Designed	Date
BJD	08.09.17
Verified	Date
Approved	
ARM	08.09.17

Client	LENLEASE
Project	JORDAN SPRINGS EAST STAGE 3B2 - CIVIL WORKS DRAFT DEVELOPMENT APPLICATION
Title	ROAD LONGITUDINAL SECTIONS SHEET 4 LANE 001 & 002

Status **FOR INFORMATION ONLY**
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Datum		Scale	Size
AHD		AS SHOWN	A1
Drawing Number			Revision
CV-CARDNO-ST03B2-1354			1

ROUNDAABOUT CENTRE ISLAND PLAN
SCALE 1:100

ROUNDABOUT CENTRE ISLAND DETAIL

TYPICAL ROUNDABOUT SPLITTER ISLAND DETAIL

TYPICAL CENTRAL MEDIAN DETAIL

SCALE 1:20

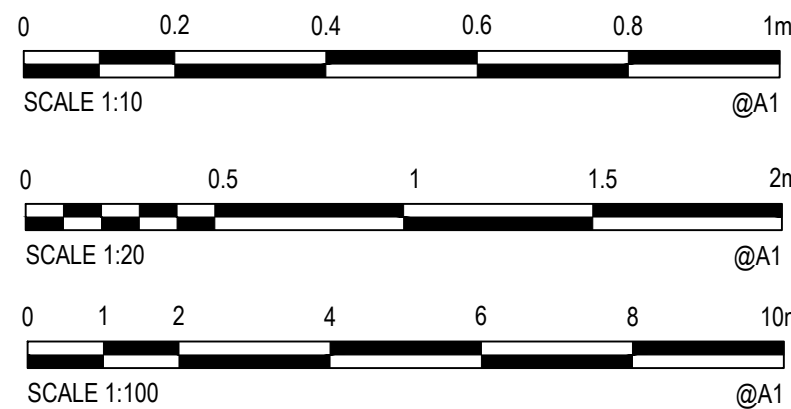
TRANSVERSE CONTRACTION JOINT (TCJ)

DETAIL 

DOWELED EXPANSION JOINT (DEJ)

DISH DRAIN (DD)
SCALE 1:10

MEDIAN KERB (MDK)
(RMS SF KERB)
SCALE 1:10

[illegible]

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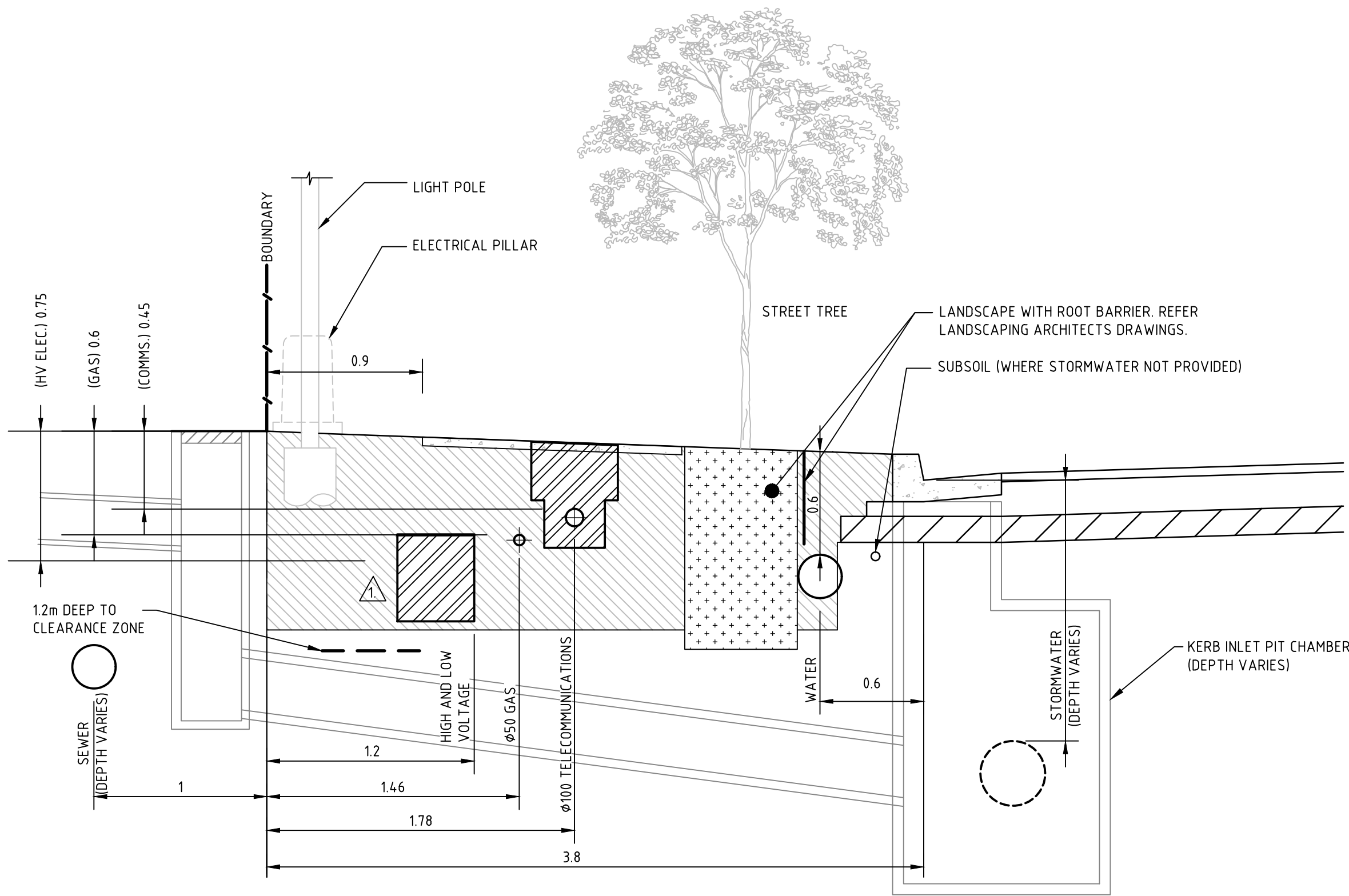
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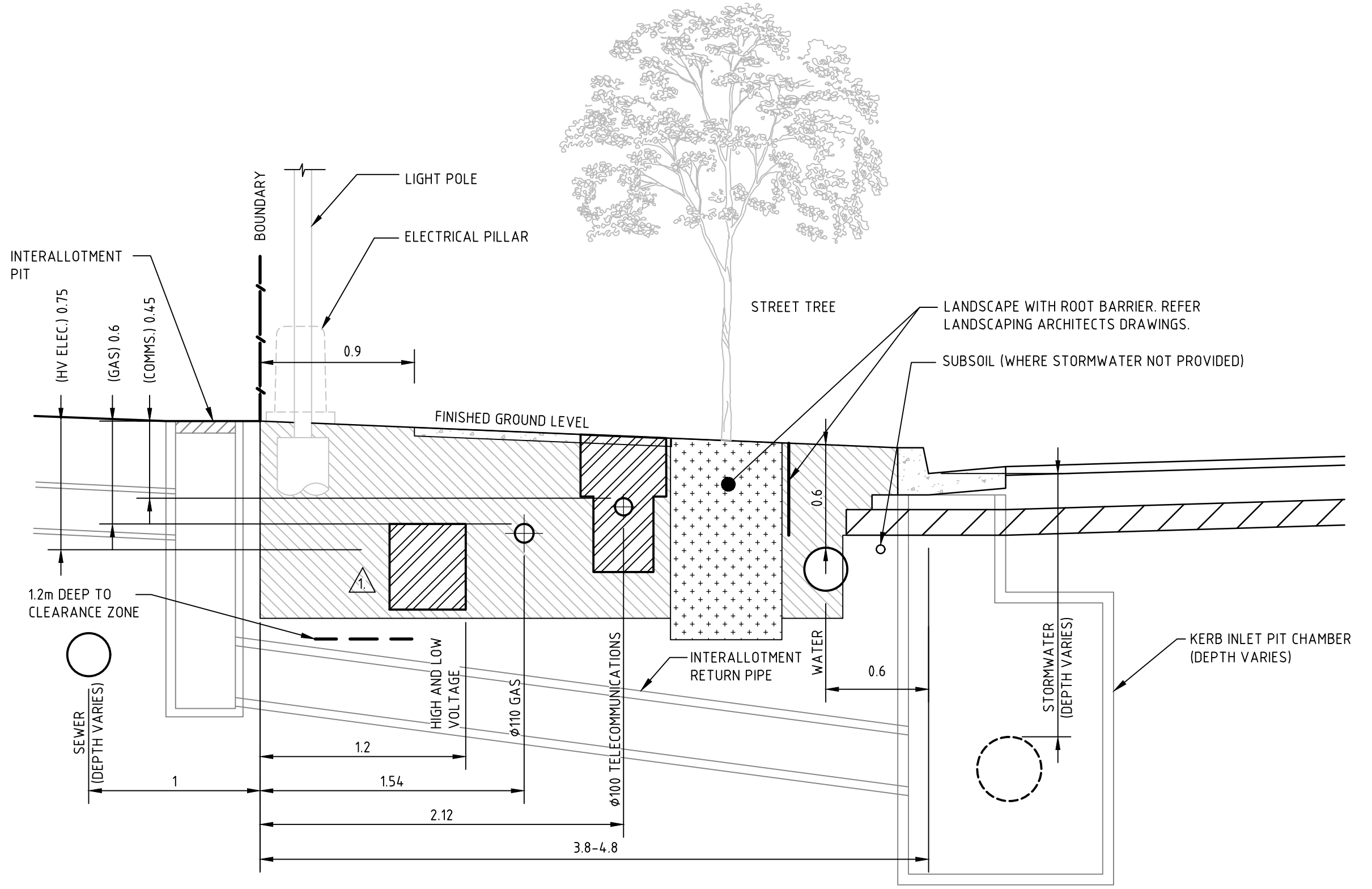
Drawn	Date
MCD	08.09.17
Checked	Date
DAC	08.09.17
Designed	Date
BJD	08.09.17
Verified	Date
Approved	
ARM	08.09.17

Client	LENDDLEASE
Project	JORDAN SPRINGS EAST STAGE 3B2 - CIVIL WORKS DRAFT DEVELOPMENT APPLICATION
Title	SITWORKS DETAILS SHEET 1

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AHD		AS SHOWN	A1
Drawing Number			Revision
CV-CARDNO-ST03B2-1601			1

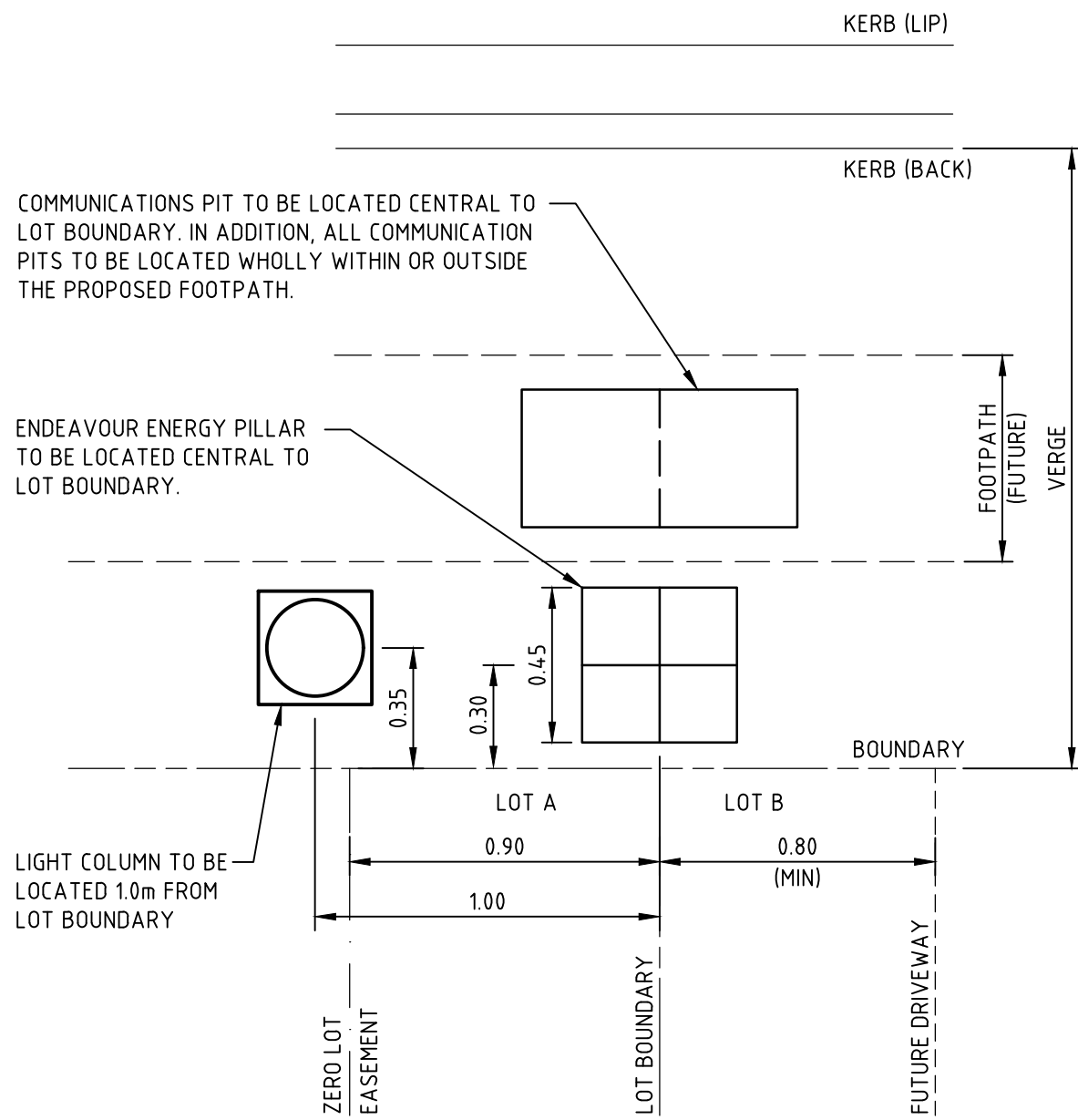


TYPICAL LOCAL ROAD SERVICES
TRENCH EXCAVATION
SCALE 1:25



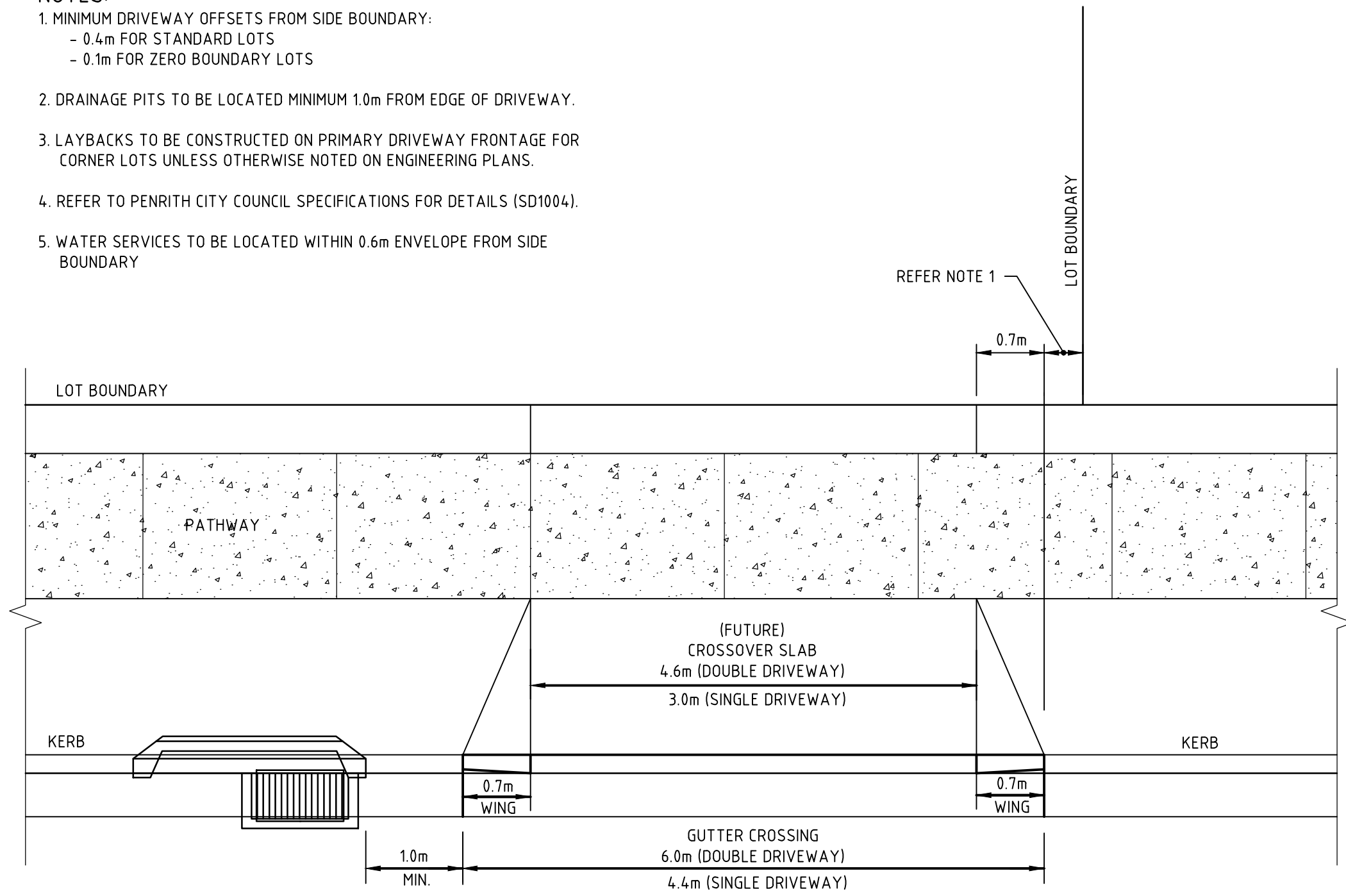
TYPICAL COLLECTOR ROAD SERVICES
TRENCH EXCAVATION
SCALE 1:25

NOTE
⚠ WHERE STORMWATER ENCRONES INTO ELECTRICAL CLEARANCE ZONE, COVER MAY BE REDUCED FROM 750mm TO 500mm AND CONDUITS CONCRETE ENCASED. SUPERINTENDENT IS TO APPROVE CONCRETE ENCASEMENT PRIOR TO WORKS COMMENCING UNLESS SPECIFIED ON CERTIFIED ELECTRICAL DRAWINGS.

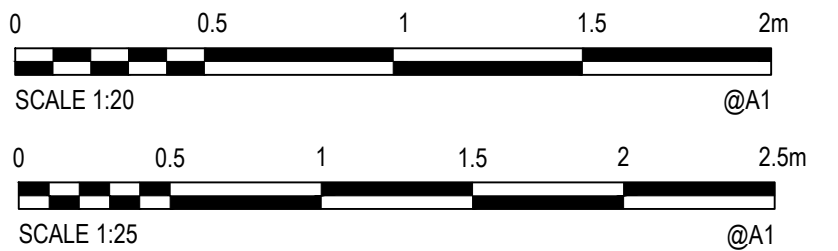


TYPICAL SURFACE UTILITY LAYOUT
SCALE 1:20
(LIGHT COLUMN AND ELECTRICAL PILLAR)

- NOTES:**
- MINIMUM DRIVEWAY OFFSETS FROM SIDE BOUNDARY:
 - 0.4m FOR STANDARD LOTS
 - 0.1m FOR ZERO BOUNDARY LOTS
 - DRAINAGE PITS TO BE LOCATED MINIMUM 1.0m FROM EDGE OF DRIVEWAY.
 - LAYBACKS TO BE CONSTRUCTED ON PRIMARY DRIVEWAY FRONTAGE FOR CORNER LOTS UNLESS OTHERWISE NOTED ON ENGINEERING PLANS.
 - REFER TO PENRITH CITY COUNCIL SPECIFICATIONS FOR DETAILS (SD1004).
 - WATER SERVICES TO BE LOCATED WITHIN 0.6m ENVELOPE FROM SIDE BOUNDARY



TYPICAL VEHICULAR CROSSING LOCATION DETAIL (VC)
N.T.S.



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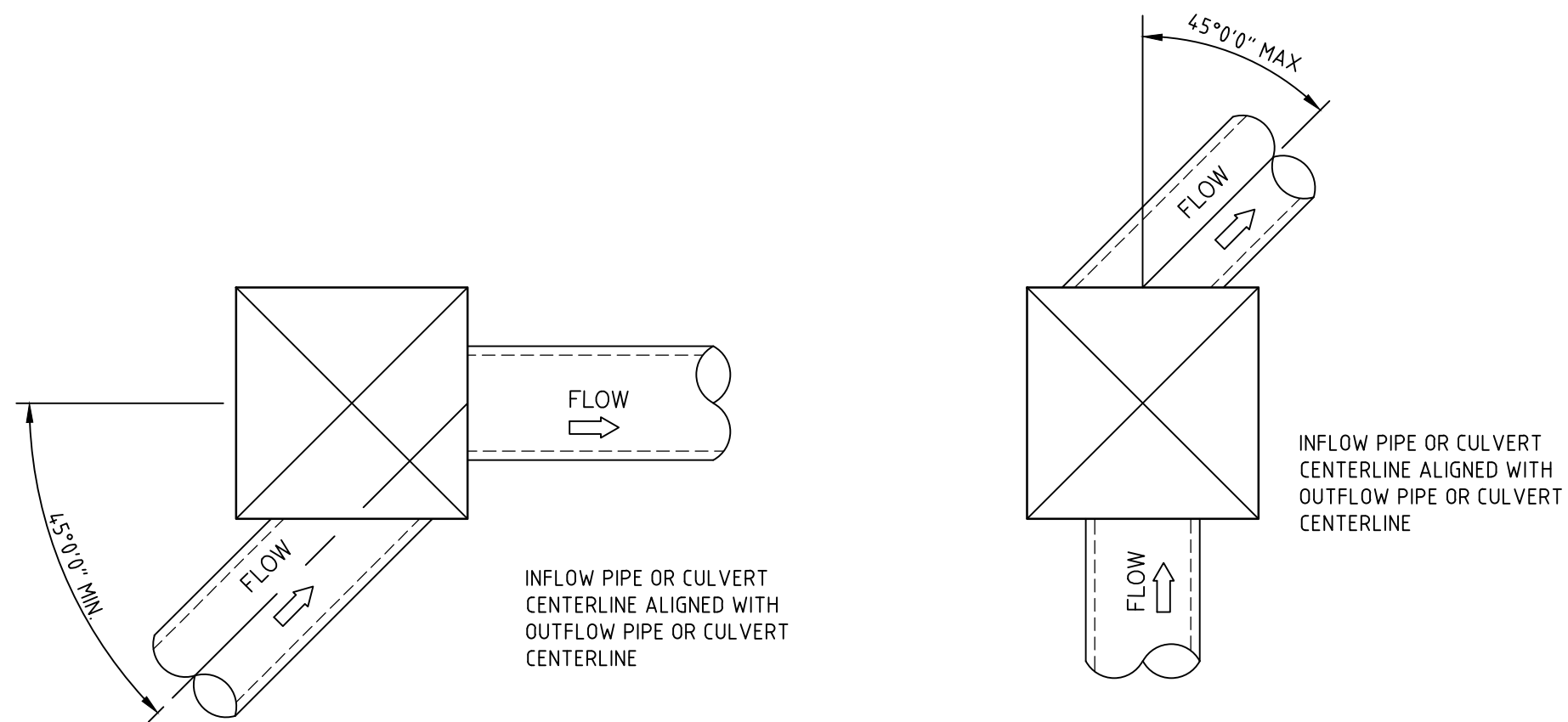
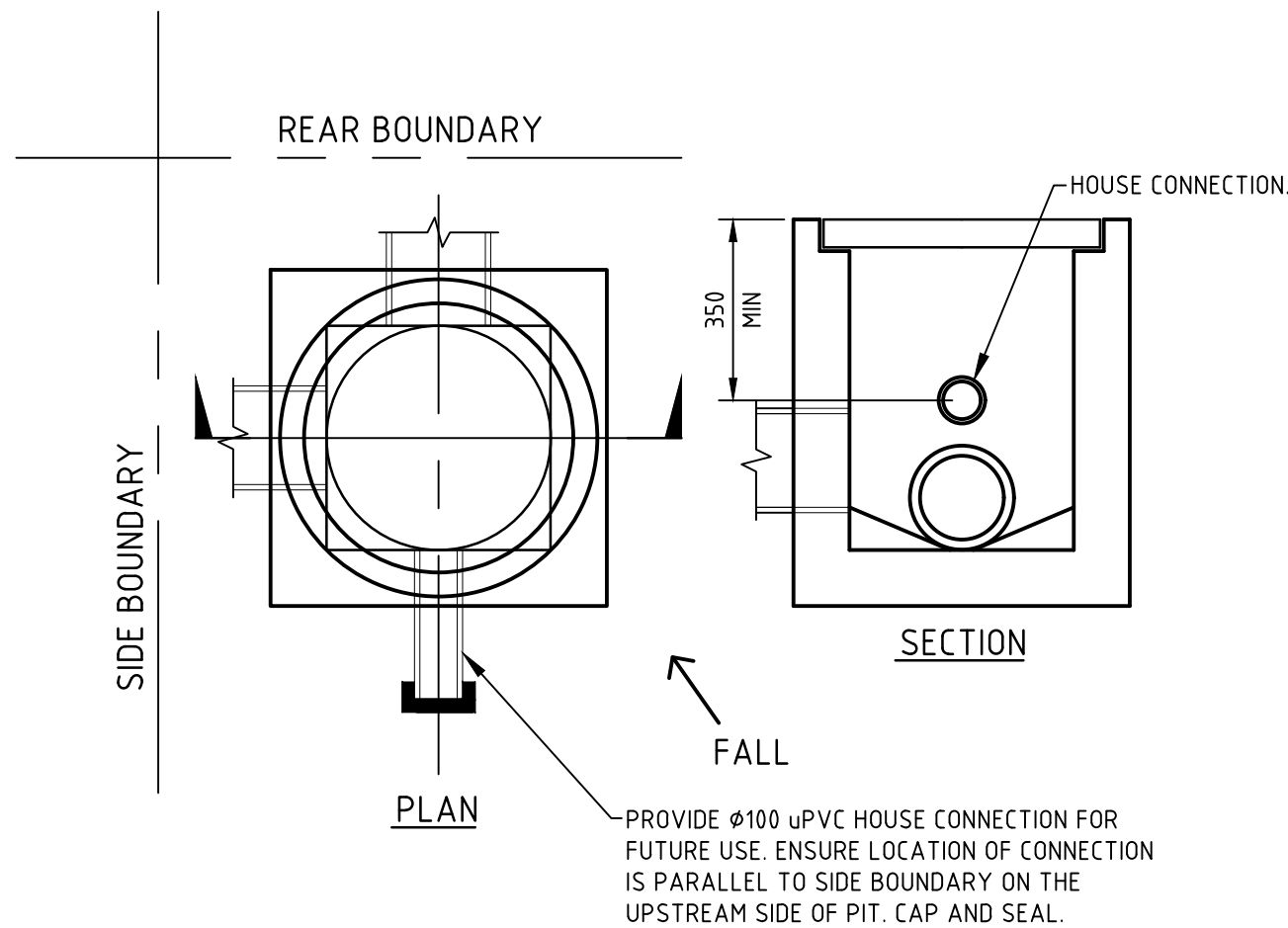
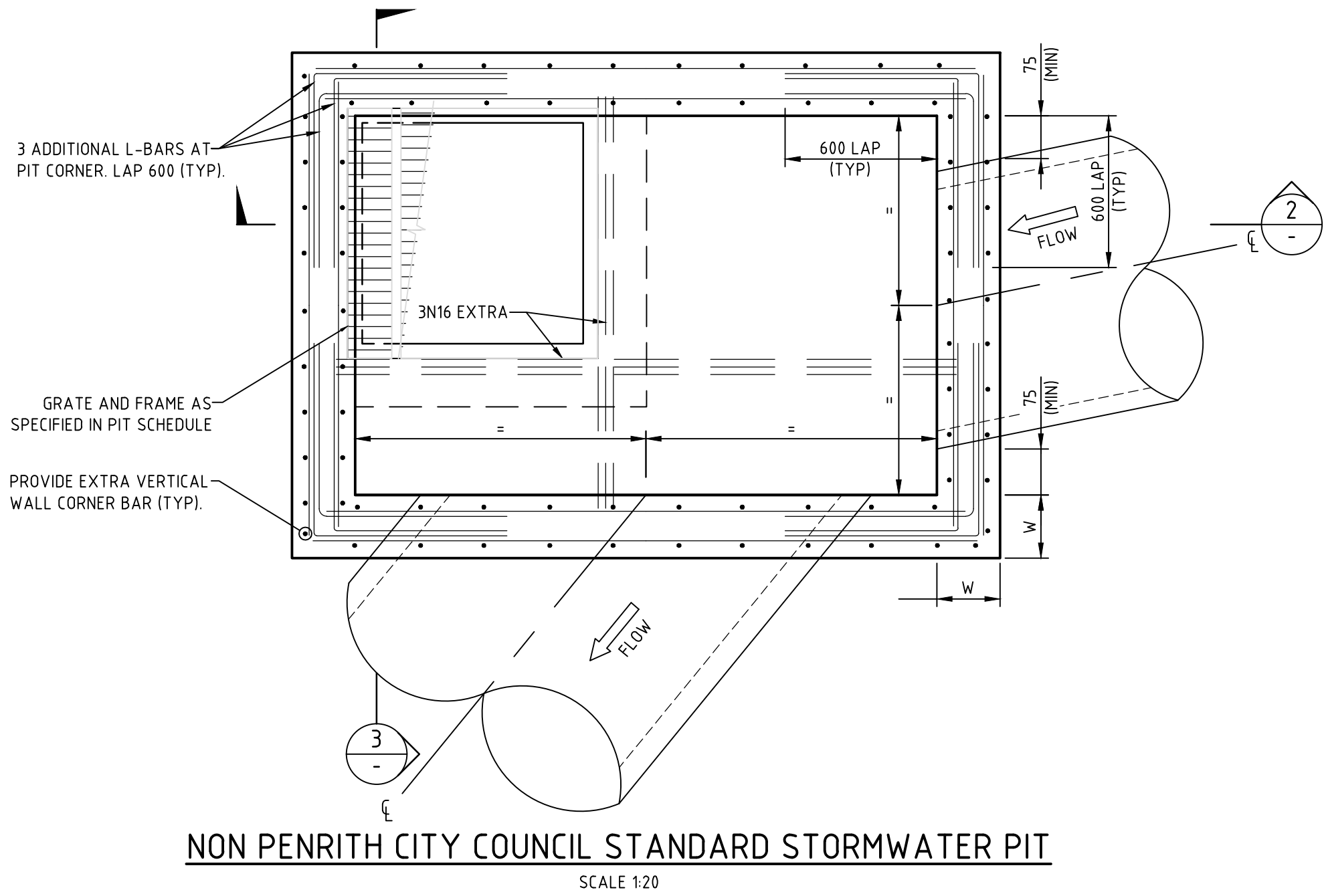
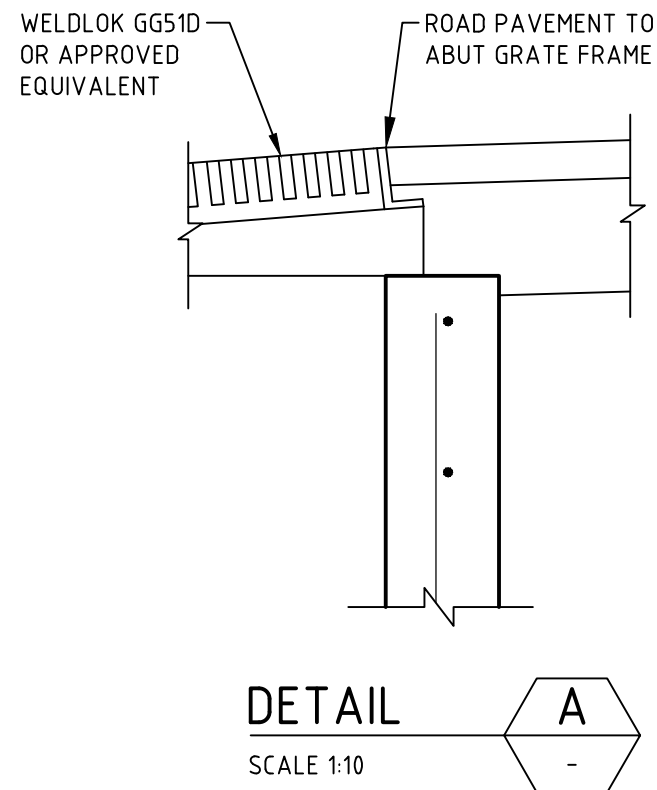
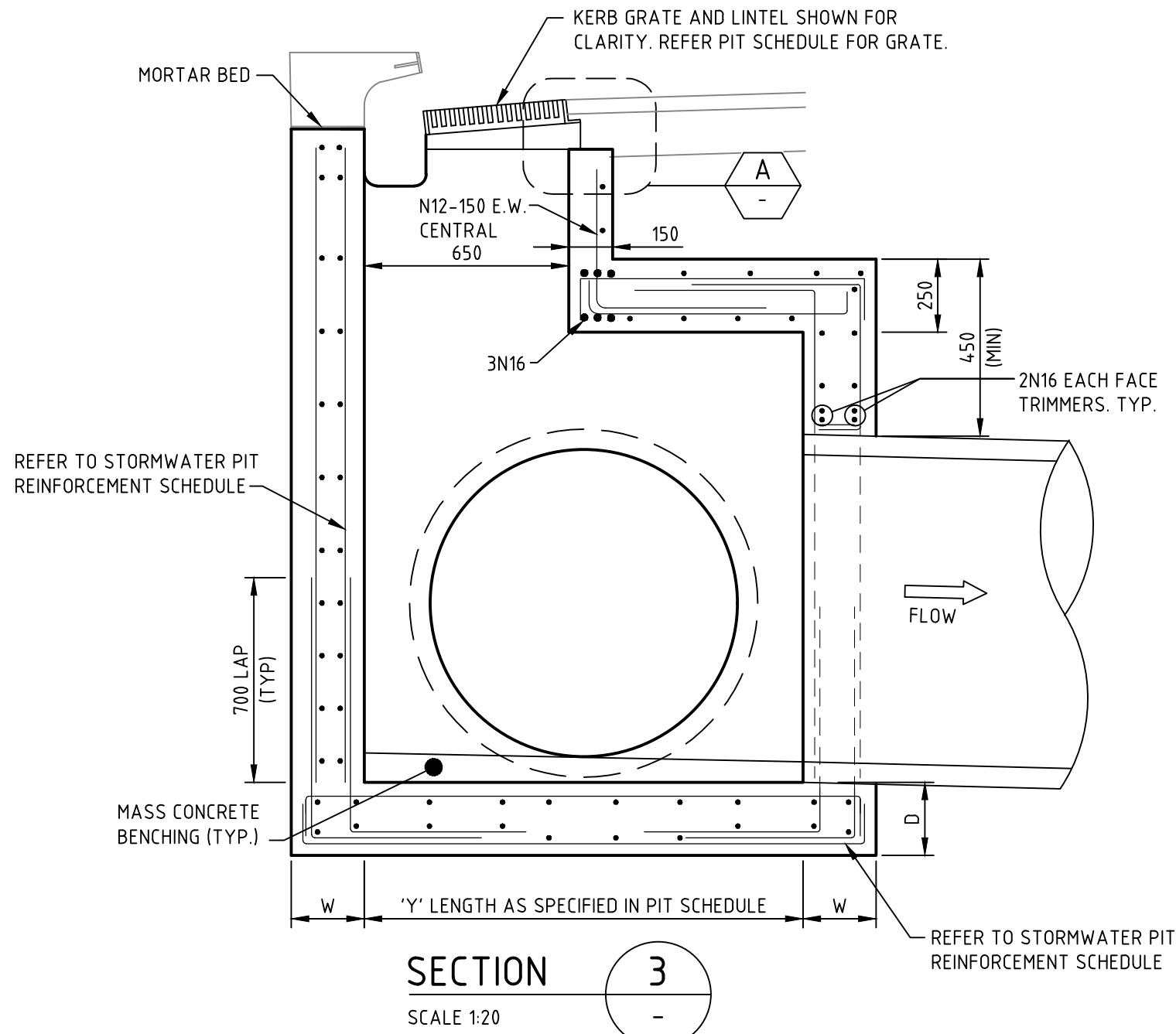
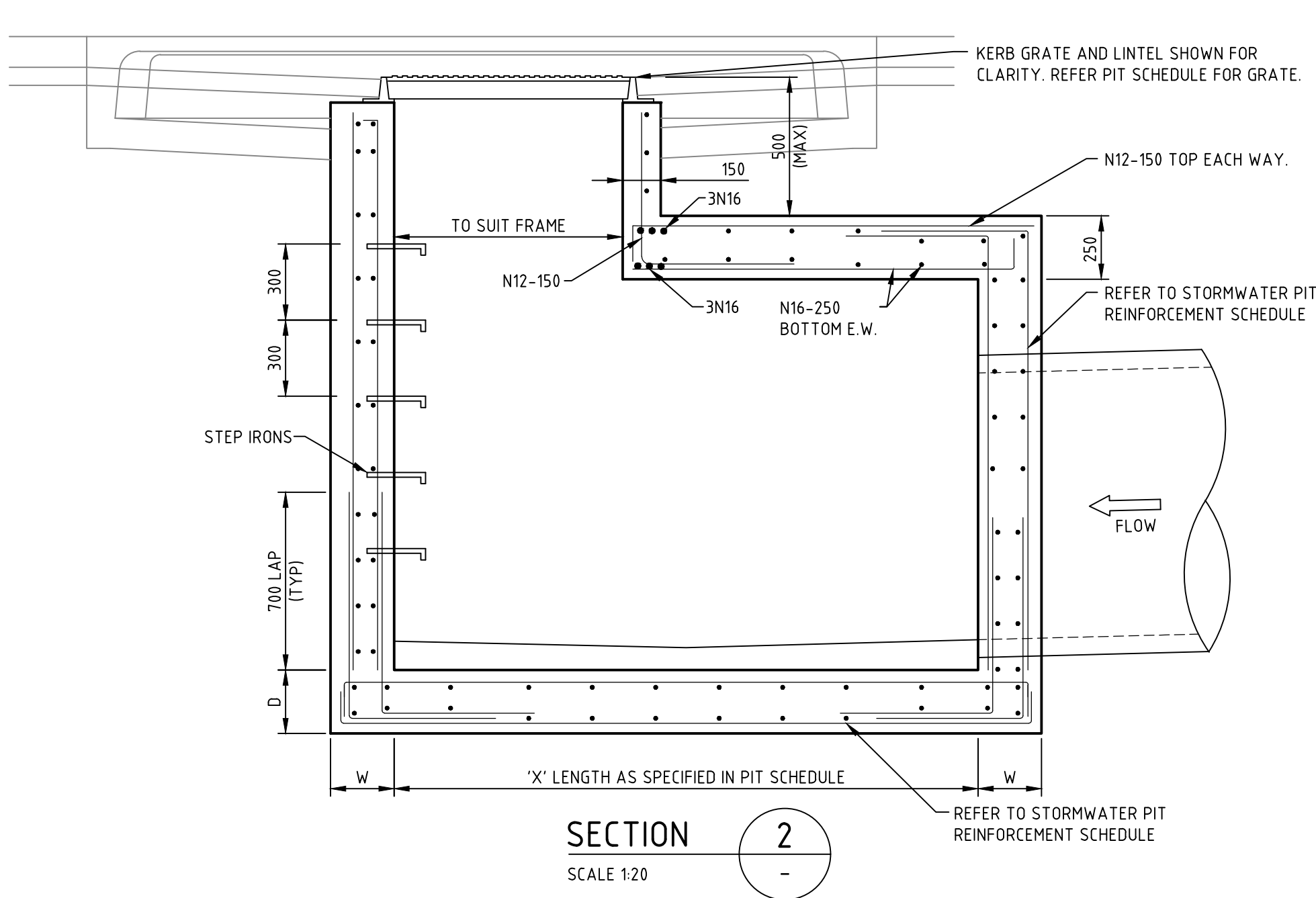
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Client **LENLEASE**
Project JORDAN SPRINGS EAST
STAGE 3B2 - CIVIL WORKS
DRAFT DEVELOPMENT APPLICATION
Title SITEWORKS DETAILS
SHEET 2

Status **FOR INFORMATION ONLY**
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Datum AHD Scale AS SHOWN Size A1
Drawing Number CV-CARDNO-ST03B2-1602 Revision 1

<div> <div>Status</div> <div>FOR INFORMATION ONLY</div> <div>NOT TO BE USED FOR CONSTRUCTION PURPOSES</div> </div>			
<div>Datum</div> <div>AHD</div>		<div>Scale</div> <div>AS SHOWN</div>	<div>Size</div> <div>A1</div>
<div>Drawing Number</div> <div>CV-CARDNO-ST03B2-2201</div>			<div>Revision</div> <div>1</div>



IMPORTANT NOTE: PIT STANDARD DETAILS

PENRITH COUNCIL STANDARD GRATED GULLY PITS DETAIL, SD2001 TO BE USED FOR PIT DETAILS WHERE:
A. PIT INTERNAL WIDTH IN ANY DIRECTION IS LESS THAN OR EQUAL TO 1200mm, AND
B. PIT DEPTH FROM SETOUT POINT TO INVERT IS LESS THAN OR EQUAL TO 2000mm.

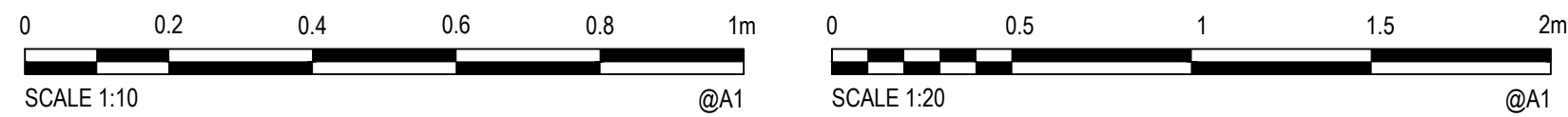
FOR PITS WIDER THAN 1200mm AND/OR DEEPER THAN 2000mm REFER TO THE BELOW TABLE AND DETAILS.

NON PCC STORMWATER PIT REINFORCEMENT SCHEDULE					
PIT DIMENSIONS(mm)		WALL DIMENSIONS(mm)		VERTICAL REINFORCEMENT	HORIZONTAL REINFORCEMENT
LENGTH 'X', 'Y'	DEPTH 'H'	BASE THICKNESS 'D'	WALL THICKNESS 'W'		
1200-X,Y<3300	2000-H<3900	230	230	N12-200 E.F.	N12-200 E.F.
X,Y<1200	H<6000	230	230	N16-250 E.F.	N16-250 E.F.

NOTE: PIT REINFORCEMENT TO BE SELECTED USING MAXIMUM PIT DIMENSION

NOTES:

- PIT REINFORCEMENT TO BE SELECTED USING MAXIMUM PIT DIMENSION.
- MINIMUM COVER TO REINFORCING AND CONCRETE STRENGTH AS SPECIFIED ON SHEET 1011.



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Client **LENDELEASE**
Project **JORDAN SPRINGS EAST
STAGE 3B2 - CIVIL WORKS
DRAFT DEVELOPMENT APPLICATION**
Title **STORMWATER DRAINAGE DETAILS
SHEET 2**

Status **FOR INFORMATION ONLY**
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Datum **AHD** Scale **AS SHOWN** Size **A1**
Drawing Number **CV-CARDNO-ST03B2-2202** Revision **1**

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